

EASO AWARDS

2014 EASO Young Investigator Award in Clinical Research

Julia Szendroedi, MD, PhD

Clinical Research Center, German Diabetes Center, Department of Diabetology and Endocrinology, UKD Heinrich Heine University, Düsseldorf, Germany

Insulin resistance is a key feature of obesity and type-2 diabetes and has been related to augmented lipid availability, mitochondrial impairment and inflammatory pathways. However, the cellular mechanism underlying human insulin resistance is still unclear. Our data suggest that the adaptability of mitochondria to metabolic conditions is impaired in insulin resistant states. We also found that hepatocellular lipid deposition is a sensitive marker of whole body insulin resistance and muscle mitochondrial function. This supports the importance of an interplay between muscle and liver energy metabolism and fat storage. We developed a non-invasive technique to determine hepatic energy metabolism and showed for the first time in humans that impaired hepatocellular mitochondrial function relates to obesity and insulin resistance. We also examined the early sequence of cellular events during the development of lipid-induced insulin resistance in healthy humans and found that elevation of plasma free fatty acids induces an increase of myocellular diacylglycerol which is followed by activation of protein kinase C isoforms and inhibition of insulin signaling. In young obese insulin resistant but glucose tolerant humans, similar diacylglycerol species are increased which are related to activation of protein kinase C and impaired insulin signaling. In mice with lipodystrophy, steatosis and insulin resistance we are now investigating cellular mechanisms underlying diabetic cardiomyopathy. In summary, this line of research continues to extend the knowledge on the development and sequale of insulin resistance in obese humans.

PLENARY LECTURE

Wednesday, 28 May, 2014

T1:PL

The role of our microbiomic genome in cardiometabolic health

Karine Clément

Pr. Karine Clément MD, PhD Professor of Nutrition ICAN INSERM UMRS U872(Eq 7) Nutrimique University Pierre et Marie Curie-Paris 6Cordelier Research Center. Paris 75006Tel 00 33(0) 142346825

Composed of about 10 trillion cells, the human body is host to 100 trillion bacteria which constitute an extremely rich and diverse flora. From a genetic point of view there is 500,000 bacterial genes on average compared to 23,000 genes in the human genome. Indeed, a human being is the result of a mutualistic association, stemming from a co-evolution, whom balance is essential to maintaining the health and well-being. The intestinal flora is now seen as a full organ linking (external) environmental factors and biology of the organism (the host). It provides essential functions throughout life. An imbalance of the intestinal flora or dysbiosis has been demonstrated in a variety of human diseases, whether metabolic, cardiovascular or immuno-inflammatory. These observations have been made in particular through the development, in recent years, of tools for the study of the metagenome allowing the sequencing of bacterial genes from the gut microbiome. A factor very frequently found is the loss of bacterial diversity. Although the loss of diversity is typically associated with taking antibiotics, it is also found in other diseases such as cystic fibrosis, intestinal disorders, and more recently in metabolic diseases such as diabetes and obesity. Recently, our team has helped to show that obese people with a loss of bacterial diversity had more risk factors (dyslipidemia, low-grade inflammation) and improved less these risk factors with a restrictive but rich in fibers diet. This presentation will review the recent discoveries in the field by taking the example of metabolic diseases.

Thursday, 29 May, 2014

T2:PL

Personalised nutrition: Nutrigenomics in practice

Diana Ivanova

Department of biochemistry, molecular medicine and nutrigenomics, Medical University Varna, BULGARIA

We are in the midst of a golden period for research into human nutrition when the developments of genomics added value to nutrition research. After Della Penna (1999) proposed the concept of nutrigenomics as new field combining nutrition with genomics, the concept of personalised nutrition also gradually emerged. Nutrigenomics is a cross-discipline of multi-disciplines, that considers how our diet influences our genome, and how this interaction modifies phenotype, that is to say how diet alters biological systems to promote either health or disease. A new concept for biomarkers based on systems biology approach is being developed providing new insights into the molecular action of nutrients. High-throughput biological instrumentation and techniques for analyses of biomolecules, cells, tissues and even complex life systems are applied to quantify phenotypic flexibility. Issues such as discrepancies in human nutrition studies, the concept of using molecular dietary signatures and patterns of responses instead of a single response are discussed. The perspectives of nutrition research and its integration to medicine are brought into focus.

T3:PL

'What can we learn from hypothalamic obesity?'

Hermann Müller

Department of Pediatrics, Klinikum Oldenburg, Oldenburg, Germany

Introduction: Hypothalamic obesity is an intractable form of obesity syndrome that was initially described in patients with hypothalamic tumors and malformations (such as craniopharyngioma) and surgical damage. However, this definition is currently expanded to include obesity developing after a variety of insults including intracranial infections, trauma, vascular diseases, hydrocephalus, in addition to acquired or congenital functional defects in central energy homeostasis in children. The pathogenic mechanisms underlying hypothalamic obesity are complex and multifactorial. Weight gain results from damage to the ventromedial hypothalamus which leads, variously, to hyperphagia, a low resting metabolic rate, autonomic imbalance, endocrine deficits, reduced physical activity, and insomnia.

Results: Childhood craniopharyngiomas (CP) are sellar embryogenic malformations of low-grade histological malignancy and low incidence. Despite high survival rates (92%), the quality of survival is frequently impaired due to sequelae caused by hypothalamic obesity. With the aid of imaging studies, recent reports have indicated that the degree of obesity of affected patients is positively correlated with the degree and extent of hypothalamic damage. Therefore, CP can be considered as a paradigmatic disease, reflecting challenges in diagnostic and treatment of hypothalamic obesity.

Conclusion: Despite the availability of promising therapeutic approaches, it must be emphasized that there is currently no pharmacological therapy for hypothalamic obesity in CP that has been shown to be effective in controlled studies. Surgical strategies to preserve hypothalamic integrity are mandatory for the prevention of hypothalamic obesity. The appropriate time point of irradiation after incomplete resection is currently under investigation in the multinational randomized trial KRANIOPHARYNGEOM 2007 (www.kraniopharyngeom.net).

Friday, 30 May, 2014

T4:PL

Social disparities in obesity and the economic crisis

Cecchini, Sassi

Organization for Economic Co-operation and Development (OECD)

In 2008, the world economy entered what is arguably the worst economic crisis ever. The effects of the recession have been considerable. Unemployment rates increased dramatically. In the most affected countries, governments spending, including health and social spending, was significantly cut. Six years after the beginning of the crisis there is clear evidence that the economic downturn has had an effect on the wellbeing of individuals. On the other hand, it is less clear whether, and to what extent, financial stress has affected individual patterns of diet and physical activity and if the crisis became a further exacerbating factor underpinning the obesity epidemic. This presentation, based on the ongoing work of the OECD Economics of Prevention Project in the area of obesity, will discuss the available evidence about how economic conditions modify behaviours related to obesity. Particular attention will be devoted to discussing effects of the crisis across groups of different socio-economic status (SES) or income. Low-SES people have disproportionate levels of obesity and OECD work suggests that the crisis may have the potential to further increase health disparities. Finally, and more importantly, the talk will discuss what prevention strategies national governments should

implement during difficult economic times to tackle negative health and economic effects of obesity.

Acknowledgement: The views expressed are those of the authors and not necessarily those of the OECD or its member countries.

T5:PL

Cross-talks between gut microbes and host cells controls energy homeostasis

Cani Patrice

Université catholique de Louvain, Louvain Drug Research Institute, Metabolism and Nutrition research group, WELBIO, Brussels, Belgium.

Obesity is associated with a cluster of metabolic disorders, low-grade inflammation, and gut barrier disruption. We and others have suggested that cross-talks between gut microbiota and the host cells contribute to the regulation of energy, glucose and lipid homeostasis.

Over the last 15 years, our work has been devoted to elucidate the mechanisms by which specific bacteria present in the gastrointestinal tract controls nutrients absorption and host biology in the context of obesity and associated disorders (i.e., diabetes, inflammation and liver diseases).

We discovered that the gut microbiota contribute to the regulation of food intake, fat mass development and energy homeostasis via several mechanisms. We also elucidate one of the putative mechanisms linking gut microbes and the development of insulin resistance and low grade inflammation characterizing obesity, which is the concept of metabolic endotoxemia (i.e., increase in plasma LPS levels).

Although the clear mechanisms involved in the bacteria-host interactions are still under investigation, we found that changes in gut microbiota composition are associated with the modification of appetite, food intake, body weight gain and adipose tissue development. We found that the gut microbiota contributes to the regulation of whole body energy homeostasis and glucose homeostasis by modulating endocrine functions. For instance, we found that the modulation of gut microbial composition and activity changes gut peptides production and secretion (e.g., GLP-1, GLP-2, PYY, ghrelin). For instance, we found that the gut microbiota controls the regulation of L-cells number and differentiation, modulates the endocannabinoid system tone but also leptin sensitivity.

More recently, we have identified the role of a novel bacteria (*Akkermansia muciniphila*) that plays a major role upon gut barrier disruption during obesity, diabetes and inflammation.

Although this is an area of research with numerous unsolved questions, growing scientific interest will increase our knowledge as well as the underlying mechanisms in order to better manage all the determinants of the gut microbiota and the development of obesity.

Thus these findings reveal novel putative mechanisms involved in the host-microbiota interactions.

Saturday, 31 May, 2014

T6:PL

Adipose tissue oxygen tension in obesity: The gateway to chronic diseases?

Gijs Goossens

Maastricht University Medical Centre, Department of Human Biology, NUTRIM School for Nutrition, Toxicology and Metabolism

Introduction: An impaired adipose tissue function in obesity, rather than an excessive fat mass per se, represents a key step in the development of chronic diseases, including cardiovascular disease and type 2 diabetes. This is also illustrated by the fact that a subgroup of obese individuals remains relatively metabolically healthy due to a preserved normal adipose tissue architecture and function. Adipose tissue dysfunction is characterized by adipocyte enlargement, increased infiltration of adipose

tissue with immune cells (inducing a pro-inflammatory phenotype) and decreased lipid storage capacity, which contribute to systemic inflammation and ectopic fat storage and, consequently, insulin resistance. Importantly, the trigger that instigates adipose tissue dysfunction is not entirely understood. The oxygenation status of adipose tissue has recently been proposed as a key factor involved in adipose tissue dysfunction. Adipose tissue oxygen partial pressure (AT PO₂) reflects the balance between adipose tissue oxygen supply and consumption. Perturbations in this delicate balance may occur in pathophysiological conditions such as obesity. Adipose tissue hypoxia has been demonstrated after a very rapid and massive increase in body fat mass in animal models of obesity. Importantly, it seems that these findings cannot be extrapolated to human obesity. Recently published as well as preliminary data from both rodent and human (intervention) studies suggest that modulation of AT PO₂ may improve adipose tissue function and insulin sensitivity. These findings may open novel therapeutic avenues to prevent and treat obesity-related chronic diseases.

CLOSING LECTURE

Protein, carbs and fats in personalized weight control – efficacy, effectiveness and safety

Arne Astrup

Department of Nutrition, Exercise and Sports, Faculty of Science, University of Copenhagen, Denmark

Introduction: Nobody disagrees about the crucial role of reduction of energy intake in weight loss and body weight control in overweight and obese individuals. Whether this can be achieved automatically by a particular diet composition is more controversial. Nevertheless, there is robust evidence that all calories are not equal when it comes to their effect on satiety and thermogenesis. Randomized controlled trials (RCT), and meta-analyses of RCT, generally show that higher protein diets improve weight loss and maintenance, but efficacy is difficult to assess quantitatively due to the problem inherent to randomized dietary intervention trials, i.e. the difficulty of ensuring adherence to one particular diet composition for extended periods.

Methods: We have developed methods to study spontaneous changes in energy intake and body weight in randomized controlled trials (RCT's) by allowing subjects to consume different diets, but with fixed macronutrient composition, ad libitum by providing all foods free of charge to the whole family from a university supermarket, typically at least one food collection each week. Diet composition (e.g. macronutrients, fibre, calcium) and certain characteristics (e.g. glycemic index, food groups, and drinks) are ensured using bar codes registered at the shop check-out.

Results: In a series of RCT's we have found that dietary fat content has a small but significant effect on energy intake and body weight, whereas protein to carbohydrate ratio, and glycemic index of carbohydrates, play an important role for spontaneous energy intake. Sugary soft drinks exert only a weak satiety effect and their consumption poses a risk of overconsumption of energy. An increased ratio of protein to carbohydrate improves weight control and produces improvements in cardio-metabolic risk factors, whilst there is no evidence of adverse effects on bone, kidney or gastrointestinal health as long as the protein sources are balanced.

Conclusion: In conclusion, diet composition is a determinant of energy intake, and an optimized diet plays an important role in the prevention and management of obesity.

ASSOCIATIONS

Thursday, 29 May, 2014

European Society for clinical Investigation (ESCI) Association session – Liver & Obesity: When fat is just too much

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Nonalcoholic-fatty liver disease: from genotype to phenotype

Krawczyk M.

(Department of Medicine II, Saarland University Medical Center, Homburg, Germany) marcin.krawczyk@uks.eu

To date non-alcoholic fatty liver disease (NAFLD) represents one of the most frequent hepatic conditions worldwide. Currently over 20% of adults in the United States suffer from fatty liver. In Europe, NAFLD is also emerging as the most common hepatic disorder and is expected to become a major cause for liver transplantation in the near future. NAFLD is considered to be the hepatic manifestation of the metabolic syndrome and is mostly suspected in obese individuals (Krawczyk/Portincasa, *Best Pract Res Clin Gastroenterol.* 2010). In brief, NAFLD is diagnosed in those who do not consume excessive amounts of alcohol, do not suffer from any additional viral or non-viral liver diseases and present with a typical ‘bright liver’ on abdominal ultrasonography. Conceptually, there are two major types of NAFLD: the most common form, termed non-alcoholic fatty liver (NAFL) and non-alcoholic steatohepatitis (NASH), the more severe form of hepatic lipid accumulation. (Chalasani/Sanyal, *Gastroenterology* 2012). In general, NAFL is a benign condition. NASH, in turn, represents a progressive form of NAFLD and is characterized by chronic hepatocellular injury and inflammation. To date, liver biopsy is required to distinguish between NAFL and NASH, and to stage and grade the liver disease in NASH patients. Since NASH can lead to liver fibrosis, cirrhosis, and in some cases hepatocellular cancer (HCC), its early detection in individuals who are at increased risk of developing NASH is warranted. In addition, the development of novel non-invasive methods of measuring hepatic steatosis is pivotal to prevent the progression of liver disease.

Most recently, a genetic predisposition caused by the frequent variant p.I148M of adiponutrin (PNPLA3) has been established as common risk factor for fatty liver disease (Anstee/Day, *Nat Rev Gastroenterol Hepatol.* 2013), also in individuals without environmental prosteatotic triggers. This frequent variant has been associated with liver injury in children and adults who suffer from hepatic steatosis. Further studies have also demonstrated an association between adiponutrin polymorphisms and development of steatosis and fibrosis in other chronic liver diseases. Of note, as much as 10% of Europeans are homozygous carriers of the risk PNPLA3 allele. In the current talk major studies that established variant adiponutrin as a genetic determinant of NAFLD will be discussed. Moreover PNPLA3-associated steatohepatitis (PASH) (Krawczyk/Lammert, *Semin Liver Dis.* 2013) as novel gene-based term for this type of fatty liver disease will be presented. Finally, additional genetic determinants of hepatic steatosis as well as novel non-invasive methods of quantifying hepatic fat accumulation (e.g. controlled attenuation parameter, CAP) will be discussed.

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Gut microbiota, insulin sensitivity and non-alcoholic steatohepatitis

Fernandez-Real José Manuel J

(Hospital of Girona and IDIBGI, Girona, Spain. CIBERobn, Madrid, Spain) jmfreal@idibgi.org [Presenter]

Introduction: The past decade has witnessed an impressive increase in our appreciation of the importance of inflammation in insulin resistance and non-alcoholic steatohepatitis, with much attention focused on the role of innate and adaptive immune cells.

Methods: To review current evidence.

Results: The study of the key roles of the immune system and its interactions with the gut microbiota reconciles the most important and known features of insulin resistance and inflammation.

Conclusion: Systems biology approaches will possibly illuminate transgenomic cross-talk between the metagenome and the host genome and how this influences host systemic biochemistry.

REVIEW SESSIONS & WORKSHOPS

Wednesday, 28 May, 2014

T1:RS1 – Immunology

T1:RS1.2

Hormonal and Lipid Sensing in Astrocytes are Required for Systemic Energy Homeostasis

Cristina García Cáceres¹, Jae Geun Kim², Yuanqing Gao¹, et al.

¹Helmholtz Diabetes Center, Helmholtz Zentrum München & Division of Metabolic Diseases, Technische Universität München, Munich, Germany
²Program in Integrative Cell Signaling and Neurobiology of Metabolism, Section of Comparative Medicine, Yale University School of Medicine, New Haven, CT 06520, USA

Introduction: Hormonal inputs such as leptin and insulin regulate neuronal circuitries maintaining systemic energy homeostasis and balanced glucose- and lipid metabolism. Despite astrocytes are essential for neuronal metabolism and transmission, has been assumed to be less relevant for neuroendocrine regulation of body weight and food intake. Based on the fact that high fat diet intake induces rapidly astrogliosis in the hypothalamus [1], which is prior to excessive body weight gain [2], we investigated if hormonal and lipid sensing in astrocytes are required for maintaining energy homeostasis.

Methods: We crossed LepR-flox, InsR-flox or LPL-flox mice with GFAP-creERT2 mice in order to generate conditional loss function models for leptin, insulin or lipoprotein lipase signals in astrocytes.

Results: Leptin and Insulin conditional mouse models exhibited defects in their systemic responses to endocrine signals. Both postnatal ablation of LepR and InsR exhibited exaggerated fasting-induced overfeeding (1 hour: $p < 0.05$ and $p < 0.01$, respectively). Mice lacking leptin receptors in astrocytes also shown diminished suppression of feeding following a single leptin injection ($p < 0.05$, all mice on standard chow diet). Mice lacking insulin receptor in astrocytes shown impaired systemic responses to glucose challenges or insulin injections ($p < 0.02$ and $p < 0.03$, respectively), in spite of a modestly reduced fat mass/bw (wt: $9.6\% \pm 0.6$ vs KO: $5.3\% \pm 0.3$; $p < 0.05$, all mice on chow diet). Finally, impaired astroglial lipid uptake into CNS also caused accelerated weight gain on high fat diet ($p < 0.001$) and impaired glucose tolerance ($p < 0.05$) when compared to controls.

Conclusion: Our findings uncover an active role of astrocytes in the CNS control of energy homeostasis and glucose metabolism, where they seem to serve as functional targets of afferent hormone action and participate in nutrient sensing.

References:

- 1 Horvath TL et al: Proc Natl Acad Sci U S A. 2010 Aug 17;107(33):14875–80.
- 2 Thaler JP et al: J Clin Invest. 2012;122(1):153–162.

T1:RS1.3

Human adipose tissue macrophages are skewed in an anti-inflammatory direction in obesity

Karen Fjeldborg¹, Steen Bønløkke Pedersen¹, Holger Moeller², Bjørn Richelsen¹, et al.

¹Department of Endocrinology and Internal Medicine

²Department of Clinical Biochemistry

Introduction: The number of adipose tissue macrophages (ATMs) is increased in obesity and associated with low grade inflammation. In rodent models the phenotype of macrophages is changed to a more pro-inflam-

matory profile by obesity. We aimed to characterize the phenotype of human macrophages in relation to obesity and insulin resistance

Methods: Subcutaneous abdominal adipose tissue (AT) samples from lean and obese subjects were used to determine the gene-expression levels of the general macrophage markers (CD68 and CD14), M1/pro-inflammatory markers (TNF- α , MCP-1, and IL-6), and the M2/anti-inflammatory markers (CD163, CD206, and IL-10) by RT-PCR. Moreover, insulin resistance was determined by HOMA-IR.

Results: All macrophage markers were elevated in AT from obese compared to lean subjects ($p < 0.001$). To determine the phenotype of the macrophages we used the level of CD14 to adjust for the total number of macrophages, and found that the relative expression of CD163 and IL-10 were elevated, and TNF- α and IL-6 were relatively reduced in ATMs from obese compared with lean subjects (all $p < 0.05$). HOMA-IR was positively associated with CD14 expression ($r: 0.37$, $P < 0.001$) and in a multivariate regression analysis CD163 was found to be the only macrophage marker significantly associated with HOMA-IR ($\beta: 0.57$, $p < 0.05$).

Conclusion: There is an increased expression of macrophage markers in obesity, and in contrast to rodent models we found a relative preponderance of M2 and decrement of M1 markers in ATMs from obese compared with lean subjects. Moreover, the anti-inflammatory marker CD163 was the only macrophage marker positively associated with HOMA-IR after multiple adjustments.

T1:RS1.4

Neuropilin-1 is a co receptor of the leptin receptor OBRb and forms a new nuclear receptor complex regulating expression of genes involved in metabolism and cancer

Belaïd-Choucair Zakia¹, Cochet Claude², Dam Julie³, Filhole Odile², Goudin Nicolas⁴, Courtois Genevieve¹, Jocers Ralf³, Hermine Olivier⁴, et al.

¹INSERM U 1163ERL 8254, Institut Imagine, Université Sorbonne Paris Cité, Hôpital Necker, Assistance publique Hôpitaux de Paris

²INSERM U1036, iRTSV/BCI, CEA, Grenoble, France

³INSERM U1016, CNRS 8104, Institut Cochin, Université Paris Descartes, France

⁴Imagine-Hôpital Necker Enfants Malades – Université Paris Descartes

Introduction: The long isoform of the leptin receptor (OBRb) regulates appetite and energy homeostasis. Leptin and OBRb deficiencies are the main causes of obesity development and metabolic disorders. Leptin/OBRb axis is also involved in inflammation and cancer development. OBRb is a trans-membrane receptor, which upon leptin binding is phosphorylated by Jak2 at Tyr1077 and Thr1138 residues and subsequently stimulates both JAK/STAT and/or PI3K/AKT pathways. Our previous work on granulopoiesis regulation by adipocytes (Belaïd-Choucair et al, Stem cell, 2008) led us to identify neuropilin-1 (NRP-1) as a putative co-receptor of OBRb. Here, we further characterize the molecular properties and function of NRP-1/OBRb complex.

Methods: We used Proximity Ligation Assay, Bio-Layer Interferometry, ChIPseq, and RNA arrays technologies. The breast cancer cell lines MDA-MB231 (NRP-1 positive) and T47D (NRP-1 negative) were used as cellular models in vitro and in vivo.

Results: Leptin induces NRP-1/OBR complex formation, which then translocates into the nucleus after its phosphorylation by Casein Kinase 2 (CK2). NRP-1 is phosphorylated by CK2 as demonstrated in vitro and in vivo by phosphorylation assay and phospho-immunostaining, respectively. Specific CK2 inhibition by CK2 siRNA or by CX4945 prevented NRP-1/OBR complex formation and nuclear translocation. ChIPseq and transcriptomic analysis show that the complex regulates genes involved in metabolism and migration. In vivo this complex induces metastasis in a mouse model.

Conclusion: Our data open a new field of investigations in the biology of leptin and provide a rationale for potential new therapies such as CK2 inhibitors in cancer and metabolism disorders.

T2:RS1 – Stress & reward

T2:RS1.1

To eat or not to eat: Decision making under stress

João Cerqueira, Nuno Sousa, et al.

Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho

The neural representation of pleasure in the brain should be linked to decision-making processes and to the activity of corticostriatal networks. The implication of limbic regions of prefrontal cortex, including the orbitofrontal cortex, in the process of influencing decisions and affective regulation is growing. However, in this process it is becoming obvious that the locus of core pleasure or ‘liking’ reactions is largely restricted to hedonic circuits in nucleus accumbens (NAc) and ventral pallidum. Herein, we demonstrate, using both animal models and human studies, how the activity of different corticostriatal networks implicated in decision-making processes related to hedonic actions can be influenced by exogenous factors, such as exposure to stress. Based on the central role of dopaminergic transmission in these processes, we also provide evidence on how we can modulate the decision-making processes. Overall, we are making progress in understanding the underlying mechanisms and that the brain networks supporting the decision-making processes linked to the representation of pleasure, which can be of relevance to modulate several pathological conditions.

T2:RS1.2

Ghrelin and food reward

Suzanne Dickson, Rozita Shirazi, Karolina Skibicka

The Sahlgrenska Academy at the University of Gothenburg, Sweden

Introduction: Obesity has reached global epidemic proportions and there is therefore much need to understand mechanisms underlying excessive and uncontrolled food intake. Ghrelin, the only known circulating orexigenic hormone, stimulates feeding behavior via its CNS actions. In addition to its role in “metabolic hunger”, ghrelin potently increases food reward behavior. The neurochemical circuitry that links ghrelin to the mesolimbic reward system and to the increased food reward behavior remains unclear. Ghrelin receptors can be found on the ventral tegmental area (VTA) dopamine neurons (Abizaid et al. 2006) and ghrelin injection to the VTA is sufficient to drive food motivated behavior (Skibicka et al. 2011). It is, however, unknown which dopaminergic projections are relevant for ghrelin’s effects on reward, since VTA dopamine neurons send projections to several brain areas relevant for reward behavior including the nucleus accumbens (NAc), amygdala and prefrontal cortex. Here we examine whether VTA-NAc dopaminergic signalling is required for the effects of ghrelin on food reward and intake.

Methods: To measure food motivation/reward behavior, rats were trained in a progressive ratio sugar-induced operant behavior schedule. Chow intake was measured subsequent to the operant behavior test. A D1-like or a D2 receptor antagonist was injected into the NAc in combination with ghrelin microinjection into the VTA to investigate whether this blockade attenuates ghrelin-induced food reward behavior.

Results: VTA injection of ghrelin significantly increased food reward behavior and chow intake. Pretreatment with either a D1-like or D2 receptor antagonist into the NAc, completely blocked the reward effect of ghrelin, leaving chow intake intact. We also found that this circuit is potentially relevant for the effects of endogenously released ghrelin as both antago-

nists reduced fasting (a state of high circulating levels of ghrelin) elevated sucrose-motivated behavior but not chow hyperphagia.

Conclusion: Taken together our data identify the VTA to NAc dopaminergic projections, along with D1-like and D2 receptors in the NAc, as essential elements of the ghrelin-responsive circuits controlling food reward behavior. Interestingly the results also suggest that food reward behavior and the intake of chow are controlled by divergent circuitry, where NAc dopamine plays an important role in food reward but not in food intake.

T2:RS1.3

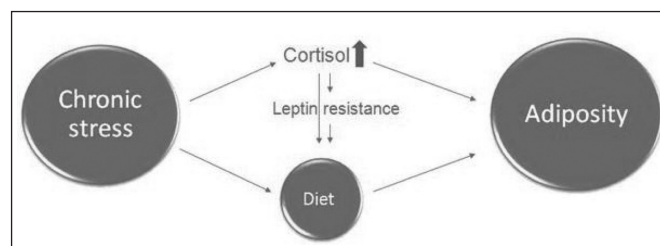
Children’s stress influences their diet and adiposity: Role of cortisol and leptin

Nathalie Michels¹, Isabelle Sioen¹, Liesbet Boone², Caroline Braet², Inge Huybrechts¹, Stefaan De Henauw¹

¹Department of Public Health, Ghent University, Belgium

²Department of Developmental, Personality and Social Psychology, Ghent University, Belgium

Introduction: Psychosocial stress and adiposity are important public health threats that have been mutually associated but underlying behavioral and hormonal factors still need to be revealed. We aim to study the longitudinal effect of children’s stress on diet and adiposity and to test the role of the hormones cortisol and leptin. The stress hormone cortisol might directly influence adiposity or might deteriorate dietary intake and food reward through leptin resistance (see figure).



Methods: In 312 Belgian children (5–12 y) of the ChiBS study, the two-year longitudinal stress-diet-adiposity relation was examined. Stress data (negative events, problem behavior, negative emotions), food consumption, psychological eating behavior and adiposity (BMI, fat% by BodPod, waist) were measured. At baseline, also salivary cortisol levels (4 samples/day) and fasting serum leptin were determined. Mplus cross-lagged analyses tested the longitudinal stress-diet-adiposity relations. Multilevel time modeling examined the relation of cortisol with diet and leptin.

Results: Children with a high stress score reported more sweet food consumption, emotional eating, external eating and restrained eating. Stress increased adiposity only in children with high sweet food consumption and cortisol. High cortisol was associated with an unhealthy diet especially with the sweet foods. High cortisol was also associated with higher leptin levels in girls.

Conclusion: The associations of cortisol with leptin and diet support the theory of cortisol-induced comfort food preference. Indeed, children’s stress deteriorates their diet which stimulates adiposity. This creates a perspective for multi-factorial obesity prevention, targeting stress (coping skills) and lifestyle factors (stress-induced eating) in parallel.

T2:RS1.4

Fasting Leptin is a Determinant of Food Reward in Overweight and Obese Individuals during Chronic Aerobic Exercise Training

Mark Hopkins¹, Catherine Gibbons², Phillipa Caudwell², Dominic-Luc Webb³, Per Hellström⁴, Erik Näslund⁵, John Blundell², Graham Finlayson²

¹Academy of Sport and Physical Activity, Faculty of Health and Wellbeing, Sheffield Hallam University, Sheffield, UK.

²Institute of Psychological Sciences, Faculty of Medicine and Health, University of Leeds, Leeds, United Kingdom.

³Department of Medical Sciences, Gastroenterology and Hepatology, Uppsala University, Uppsala, Sweden.

⁴Department of Medical Sciences, Uppsala University, Uppsala, Sweden.

⁵Division of Surgery, Department of Clinical Sciences, Danderyd Hospital, Karolinska Institutet, Stockholm, Sweden.

Introduction: Changes in food reward have been implicated in exercise-induced compensatory eating behaviour. However, the underlying mechanisms of food reward, and the physiological correlates of exercise-induced changes in food reward, are unknown.

Methods: Forty-six overweight and obese individuals completed 12 weeks of supervised aerobic exercise. Body composition, food intake and fasting metabolic-related hormones (glucose, insulin and leptin) were measured at baseline, week-six and post-intervention. On separate days, the reward value (explicit liking and implicit wanting) of an array of high and low fat foods were also assessed before a fixed energy test meal at baseline, week-six and post-intervention.

Results: Cross-sectional analyses indicated that fat mass ($r = 0.341$; $p = 0.041$) and fat-free mass ($r = 0.295$; $p = 0.045$) were associated with explicit liking for high fat versus low fat food. However, implicit wanting was associated with fat mass only ($r = 0.414$; $p = 0.010$). Fasting leptin was associated with both liking and wanting for high fat food ($r = 0.358$; $p = 0.023$ and $r = 0.401$; $p = 0.021$, respectively). Furthermore, a greater exercise-induced decline in fasting leptin following the exercise intervention was associated with increased liking for high fat foods ($r = -0.437$; $p = 0.018$), and this association remained after adjusting for changes in fat mass ($r = -0.373$; $p = 0.031$).

Conclusion: These data indicate that food reward has a number of independent physiological correlates. In particular, fasting leptin appears to play an active role in mediating food reward during exercise-induced weight loss.

T5:WS1 – Bariatric surgery: To whom and when?

T5:WS1.1

Bariatric Surgery: To whom and when and the aftermath?

Volkan Yumuk

Istanbul University Cerrahpasa Medical Faculty

Obesity is a chronic disease, a gateway to many other illnesses. Prevention and/or management are mandatory. Generally speaking, once the non-surgical treatments fail, bariatric surgery becomes the treatment choice in patients with a Body Mass Index (BMI) ≥ 40 kg/m² and BMI > 35 kg/m² having at least one co-morbidity. Physicians should play an active role as a part of the multidisciplinary team in patient selection according to the criteria in the current guidelines. Those patients who have diabetes mellitus before surgery should be followed closely by a medical team for glucose regulation and diabetic complications. Postoperative biochemical resolution in patients with type 2 diabetes should be assessed according to current scientific definitions for diabetes remission. Post-operative nutrition and physical activity issues, medical complications of bariatric surgery, weight regain, and indications for revision operations should

definitely be consulted with the team. Bariatric surgery for patients with type 2 diabetes and BMI < 35 kg/m² is currently a research area. Criteria for overall success should cover clear-cut goals of health improvement including both metabolic and non-metabolic aspects.

T5:WS2 – Food supplements: What/where is the evidence?

T5:WS2.1

Current Status of Nutrition and Health Claims in Europe

Hans Verhagen

National Institute for Public Health and the Environment (RIVM), Netherlands

Introduction: Functional foods are closely associated with claims on foods. There are 2 categories of claims on foods: nutrition claims and health claims. In the European Union, health claims on (functional) foods and food supplements must be scientifically substantiated. In December 2006, the European Union published its Regulation 1924/2006 on nutrition and health claims made on foods (http://eur-lex.europa.eu/LexUriServ/site/en/oj/2007/l_012/l_01220070118en00030018.pdf).

Methods: As concerns scientific evaluation, the European Food Safety Authority (EFSA) provides the scientific advice to the European Commission for health claims submitted under Regulation 1924/2006. As concerns general function health claims, in Europe more than 44,000 proposals were made, from which the European Commission prepared a list of about 4,600 submitted to EFSA for their scientific evaluation.

Results: Hitherto EFSA evaluated about two-thirds of these, which the large majority of them having a judgment “a cause and effect relationship has not been established”. EFSA has published the hundreds of opinions on health claims, part of which are positive, part which are negative and a few with insufficient evidence (<http://www.efsa.europa.eu/en/nda/ndaclaims.htm>; http://ec.europa.eu/food/food/labellingnutrition/claims/index_en.htm).

Conclusion: Regulation No 432/2012 was published on 25 May 2012 (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:136:0001:0040:EN:PDF>). A list of 222 general function health claims has been approved by the Commission. Now Europe has a list of authorized and non-authorized health claims: <http://ec.europa.eu/nuhclaims>. For the remaining ca. 1,500 claims on botanicals it is not clear if and how they will be evaluated as concerns their scientific substantiation. As from 14 December 2012 all claims that are not authorised or on hold/under consideration are prohibited.

T5:WS2.2

Aspects of food supplements legislation in Europe

Vessekla Duleva

Assoc. Prof. Vesselka Duleva, MD, PhD National Centre of Public Health and Analyses

Significant demand and use of food supplements increase requirements to ensure their safety. Free trade of goods, fair competition in the market and consumer health is the main priority of harmonized European Food law. The basic European legislative requirements for production and marketing of Food supplements are presented. Outlines the main aspects of harmonization and transposition of EU Food Law, problems of implementation and future needs for harmonization of currently unresolved elements of legislation of Food supplements such as the setting of Maximum levels of vitamins and minerals, a list of plants that are authorized for use in Food supplements and health claims legislation.

Special session – Adipokines in cardiometabolic diseases

1

Uncovering the (pre)adipocyte secretome

Renes Johan J.W.

Maastricht University Maastricht Proteomics Center NUTRIM School for Nutrition, Toxicology and Metabolism Dept. Human Biology Maastricht, The Netherlands

The adipose tissue has been recognized as an endocrine organ that secretes adipokines affecting neighbouring cells in the adipose tissue (paracrine effect) or cells from other organs after they have entered the blood stream (endocrine effect). Adipokines are important signaling molecules in energy homeostasis. However, a dysfunction of the adipose tissue during obesity results in altered adipokine profiles, which is associated with the development of obesity-related disorders. Proteomics research contributed significantly to the identification of adipokines. Today over 600 different adipokines, including many novel secretory proteins, have been identified from mouse and human (pre)adipocyte models. Still, the function of many of these remains to be determined. In addition, the secretion route of many adipokines from (pre)adipocyte cells remains unknown. However, the exosomal/microvesicle secretion route provides an interesting lead as microRNA molecules are also secreted in this manner and as such may also contribute to inter-organ signaling involving adipose tissue. Considering the obesity-induced detrimental effects on other organs, inter-organ signaling mediated by adipose tissue-derived factors may provide further insight in the etiology of obesity-related disorders.

2

Homo Diabetes: Linking adipose tissue to exposome

Yanev Stanislav S.G.¹, Rancic G.², Chaldakov G.N.³

¹Department of Drug Toxicology, Institute of Neurobiology, Bulgarian Academy of Sciences, Sofia, Bulgaria

²Department of Histology and Embryology, Medical Faculty, University of Niš, Niš, Serbia

³Laboratory of Cell Biology, Department of Anatomy and Histology, Medical University, Varna, Bulgaria

Since type 2 diabetes is obesity dependent disease, the term diabetes was adopted, and herein Homo diabetes is introduced. Genes have been found to account for only about 10% in the pathogenesis of diseases, and the remaining causes appear to be triggered by environmental exposures, which has led to the emergence of exposure science (the exposome concept). It is noteworthy that many pollutants accumulate mainly in the adipose tissue. Thus adipose tissue is an important participant in environmental molecular toxicology. Numerous lines of evidence demonstrate that exposure to persistent organic pollutants (POP) may – through disrupting glucose, lipid and adipokine homeostasis – contribute to the pathogenesis of diabetes and related diseases. The present lecture highlights an adipocentric approach to molecular toxicology (adipotoxicology), and thus discusses the role of adipose tissue in the accumulation, metabolism, and release of xenobiotics in cardiometabolic health and disease. Accordingly, the need for human biomonitoring of xenobiotics accumulation in adipose tissue is mandatory.

3

Homo obesus: A metabotrophin-deficient species

Nisoli Enzo E, Marco Fiore

Istituto di Biologia Cellulare e Neurobiologia. CNR Institute of Cellular Biology and Neurobiology. CNR Via del Fosso di Fiorano 64, 00143 Roma Italy

Diabesity is a new term which refers to type 2 diabetes mellitus and obesity found in one individual, hence Homo diabetes. It has been previously proposed the hypothesis that Homo obesus (man obese) is a metabotrophin-deficient species. Endogenous metabotrophins are in general signaling proteins including neurotrophins as nerve growth factor and brain derived neurotrophic factors, able to improve cardiovascular and metabolic homeostasis including that of lipids, glucose, energy, inflammation, angiogenesis and cognition. This hypothesis leads to a strong link between the central nervous system and some cardiometabolic diseases. Hence pharmacological manipulations of the secretion and/or signaling of metabotrophins might bring a therapeutic benefit for Homo diabetes. An important role in the physiology of both Homo obesus and Homo diabetes is played by the subtle tuning of oxidative stress due also to an unbalanced diet missing in natural antioxidant compounds. Here it has been shown that olive polyphenols, a main component of the Mediterranean diet known for their antioxidant properties, modulate central and peripheral nerve growth factor and brain derived neurotrophic factor to naturally transform both Homo obesus and Homo diabetes in Homo sapiens.

4

Chronic intermittent hypoxia induces features of NAFLD and modifies adipose tissue characteristics

Judith Aron-Wisniewsky¹, Emmanuelle Gras², Amandine Thomas², Diane Godin-Ribuot², Karine Clement¹, Jean Louis Pepin²

¹Institute of Cardiometabolism and Nutrition, Pitie -Salpêtrière Hospital, 75013Paris, France

²INSERM U1042, lab HP2, Grenoble University

Introduction: In obesity, chronic intermittent hypoxia (CIH) due to obstructive sleep apnoea induces NAFLD exacerbation. Whether this remain true in non-obese is unknown. By contrast, CIH induced no adipose tissue (AT) histological modifications in massive obesity. We aimed to evaluate the effect of a short CIH on both liver and subcutaneous and epididymal AT in non-obese mice.

Methods: 16 mice fed a chow-diet, were submitted during their sleep to either normoxia or 8 hours of CIH and compared to 6 mice PHD1-/- (enzyme regulating HIF1 α), on normoxia. After 14 days, expression of extra-cellular matrix, inflammatory and lipogenesis genes with PCR and immunohistological analysis were performed on liver and the two AT depots.

Results: Both CIH and PHD1 mutation induced a significantly increased expression of gene involved in lipogenesis (ACC, SREBP1c, FAS), fibrosis (Coll1, Coll3, TGF β), and inflammation (TNF α , IL1 β) compared to mice on normoxia (at least two-fold ratio). However, short CIH duration did not translate into histological lesions. Although mice submitted to CIH and PHD1-/- were significantly lighter than mice on normoxia, their epididymal AT was two-fold heavier. Furthermore, adipocyte size was increased in CIH and PHD1-/- mice, along with increased leptin gene expression in epididymal AT (p = 0.008). No difference was observed in inflammatory or extra-cellular matrix gene expression.

Conclusion: In lean mice, a short duration of CIH already induces the features of NAFLD at the gene expression levels that do not yet translate into histological lesions. Furthermore, CIH also seems to impact on corpulence and adipose tissue characteristics.

T6:RS1 – Beyond BMI

T6:RS1.2

Beyond the relationship between body weight and mortality

Tommy Visscher

Coordinator research Research centre prevention of overweight Associate lecturer Healthy city VU-Windesheim PO Box 10090 8000 GB ZWOLLE, The Netherlands

Introduction: Old studies on the relationship between body mass index and mortality suggest taking into account potential inverse relationships due to disease-induced weight loss around baseline, smoking status, age of participants and the length of follow-up. Aim of the present lecture is to discuss new studies on other indicators than BMI, and new studies on unhealthy life-years, and to discuss to what extent these 'new studies' are taking into account the 'old lessons.'

Methods: Literature search was performed by following major publications' citations through the Web of science and by a Pubmed-search for new studies.

Results: New studies suggest that waist circumference and WHR may indeed be better predictors for mortality than is BMI, although not confirmed in all studies. However, these new studies often lack an appropriate methodology. Studies on unhealthy life-years are still scarce but the few studies performed confirm that obesity is associated with an increased number of unhealthy life-years despite its association with mortality.

Conclusion: Prevention of obesity is likely to be cost-effective as evidence suggests that obesity reduction will lead to a reduction in unhealthy life-years. Unfortunately, however, we need to conclude that too many new studies failed to adopt the old methodology lessons when going beyond the relationship between body weight and mortality.

T6:RS1.3

Plasma omentin significantly predicts cardiovascular events independently from the presence and extent of angiographically determined baseline coronary artery disease

Christoph Saely¹, Andreas Leherer², Axel Muendlein², Alexander Vonbank¹, Daniela Zanolin², Kathrin Geiger², Philipp Rein¹, Heinz Drexel²

¹Department of Internal Medicine & Cardiology, Academic Teaching Hospital Feldkirch

²Vivit-Institute, Academic Teaching Hospital Feldkirch

Introduction: Some recent small cross-sectional studies have described associations of the new adipocytokine omentin with atherosclerosis. However, no prospective data on the power of omentin to predict cardiovascular events are available.

Methods: We therefore measured plasma omentin in a series of 295 patients undergoing coronary angiography for the evaluation of established or suspected stable CAD; cardiovascular events were recorded over a mean follow-up period of 3.3 years.

Results: During the follow-up period, 17.6% of our patients suffered cardiovascular events, corresponding to an annual event rate of 5.3%. Plasma omentin significantly predicted cardiovascular events both univariately (standardized adjusted HR = 1.409 [95% CI 1.173–1.694], $p = 2.52e-4$), after adjustment for age, gender, BMI, diabetes, hypertension, LDL cholesterol, HDL cholesterol and smoking 1.410 [95% CI 1.157–1.718], $p = 6.51e-4$], and after additional adjustment for the presence of angiographically determined significant CAD at the baseline angiography (HR = 1.515 [95% CI 1.234–1.862], $p = 7.50e-5$).

Conclusion: From this first prospective evaluation of the cardiovascular risk associated with plasma omentin we conclude that elevated omentin is a strong predictor of cardiovascular events independently from conventional cardiovascular risk factors and from the presence and extent of baseline CAD.

T6:RS1.4

Overfeeding-induced deterioration in insulin sensitivity is not associated with visceral or liver fat accumulation in non-obese males

Darcy Johannsen¹, Charmaine Tam², Jean-Marc Schwarz³, Eric Ravussin¹

¹Pennington Biomedical Research Center

²University of Sydney

³Touro University

Introduction: Accumulation of fat in the visceral abdomen and liver has been implicated as a primary driver of insulin resistance (IR); however, a direct link in humans between fat accumulation in these depots and IR development remains to be demonstrated.

Methods: We overfed 29 males (10 African-American [AA], 19 Caucasian, 27 ± 5 y, BMI 25.5 ± 2.3 ; mean \pm SD) 40% above baseline energy requirements for 8 weeks (15% protein, 44% fat, 41% CHO). All meals were consumed under supervision. Whole-body insulin sensitivity was determined by a hyperinsulinemic-euglycemic clamp (10 mU/m²·min insulin for 3 h with 6,6-2H2 glucose tracer), visceral adipose tissue (VAT) by MRI, intrahepatic lipid (IHL) by 1H-MRS, and body composition (fat mass [FM], fat-free mass [FFM]) by DXA.

Results: Participants gained 7.6 ± 2.1 kg ($9.3 \pm 2.8\%$) comprised of 4.2 ± 1.4 kg of fat. Glucose infusion rate decreased from 2.9 ± 0.9 to 2.4 ± 0.8 mg/kg FFM·min ($p < 0.0001$) but was not associated with the change in VAT ($r = -0.02$, $p = 0.94$), IHL ($r = -0.09$, $p = 0.65$) or total weight gain ($r = -0.18$, $p = 0.37$). Greater decline in insulin sensitivity was associated with greater increase in adiposity (relative FM gain; $r = -0.47$, $p = 0.01$) and circulating free fatty acids (FFA; $r = -0.37$, $p = 0.05$). There were no differences between Caucasian and AA males in the clinical or metabolic response to overfeeding.

Conclusion: Our findings suggest that a greater expansion of subcutaneous adipose tissue, rather than ectopic fat accumulation, promotes the early impairment in insulin sensitivity during calorie excess possibly by enhancing FFA (and other adipokine) release.

T3:RS1 – Childhood obesity management

T3:RS1.2

Childhood obesity management: Metabolic effects

Claudio Maffeis

Regional Center for Pediatric Diabetes, Clinical Nutrition, and Obesity, University of Verona, Italy

Childhood obesity treatment is a difficult and challenging task, due to the relatively high failure and relapse rate after transient improvement. The three main obstacles are: unstable motivation of the child, the difficulty to obtain long-term maintenance of an active parental involvement, and the dramatic pressure of the obesogenic environment, a formidable opponent to persistent diet and lifestyle change promoted by treatment. Nevertheless, consistent evidence is available on the high impact of treatment in reducing all metabolic disturbances (glucose intolerance and diabetes, NAFLD, dyslipidemia, hypertension) associated with fat mass excess. Interestingly, the benefits of therapy are not just a consequence of fat and weight loss but they may also occur independently from the reduction of adiposity. This is, per se, a strong argument for justifying childhood obesity treatment also if a weight loss effect is not obtained.

Physical activity, diet, drugs may help control, and even to reverse, metabolic complications of obesity. A new potential target of intervention may also be gut microflora, due to the favourable metabolic impact of microflora changes recently demonstrated in both obese animals and humans. Finally, bariatric surgery, whose experience is growing in the youngest, has also proved efficacy in promoting metabolic improvement in obese adolescents surgically treated.

Due to the epidemic impact of obesity, cost/effectiveness ratio of obesity co-morbidities treatment is a problem for both families and health care system. Cost/effectiveness ratio may be potentially improved by applying some selection criteria based on simple physical (waist circumference, BMI z score, etc) and/or biochemical (fasting plasma glucose, triglycerides, ALT) measures, in order to identify the subsample of obese children at the highest metabolic risk. Those children are those who may potentially benefit by intensive obesity treatment.

T3:RS1.3

Personalised nutrition perspectives – anti-inflammatory nutritional intervention selectively improves insulin sensitivity in overweight and obese adolescents wherein baseline metabotype predicts response

Connaughton¹, McMorrow¹, Healy², McGillicuddy¹, Lithander³, Roche¹

¹Nutrigenomics Research Group, UCD Conway Institute of Biomolecular and Biomedical Research, School of Public Health and Population Science, University College Dublin, Belfield, Dublin 4, Ireland

²Department of Endocrinology and Diabetes, St. James's Hospital, Dublin 8, Ireland

³Nutrition and Dietetics, University of Canberra, Australia, ACT 2601

Introduction: Anti-inflammatory nutritional approaches may attenuate obesity-induced insulin resistance. However, results from clinical studies are not entirely consistent, warranting increased focus on determinants of inter-subject variability particularly within young cohorts at high-risk. Baseline metabotype may partially discriminate responders from non-responders.

Methods: Metabolic effects of an anti-inflammatory nutritional supplement containing LC n-3 PUFA, vitamin C, vitamin E, and polyphenols, were determined in overweight and obese adolescents (n = 58; mean ± SD age 15.9 ± 1.6y; BMI 32.1 ± 6.5kg/m²) by an 8-wk randomised, cross-over, placebo-controlled intervention. Subjects who demonstrated >10% improvement in HOMA-IR were categorised as responders.

Results: Anti-inflammatory nutritional supplementation selectively reduced HOMA-IR in 40% of subjects (responders; supplement -32.05 ± 18.02% v placebo 13.13 ± 54.09%, p = 0.004). In comparison with non-responders, responding subjects demonstrated an adverse pre-treatment metabotype characterised by increased HOMA-IR, total cholesterol and LDL cholesterol despite similar BMI (p = 0.001, p = 0.029, p = 0.024, p = 0.236, respectively). Stepwise multiple regression analysis confirmed baseline HOMA-IR and LDL:HDL ratio as significant independent predictors of HOMA-IR response to anti-inflammatory supplementation (R² = 0.432, p < 0.001). On-going analysis is defining the molecular basis of the differential response.

Conclusion: These results demonstrate heterogeneity with respect to the insulin sensitising effects of anti-inflammatory nutritional supplementation. Despite similar BMI to non-responders, the insulin resistant and dyslipidaemic metabotype of responders enhanced the impact of anti-inflammatory nutritional approaches. This illustrates potential efficacy optimisation within the context of personalised nutrition.

This trial was registered at clinicaltrials.gov as NCT01665742.

T3:RS1.4

Czech Adolescents Evaluated for Antibodies to Human Adenovirus 36

Irena Aldhoon Hainerova¹, Hana Zamrazilova¹, Richard Atkinson², Lenka Dusatkova¹, Barbora Sedlackova¹, Petr Hlavaty¹, Zendra Lee², Marie Kunesova¹, Vojtech Hainer¹

¹Institute of Endocrinology, Prague

²Obetech Obesity Research Center, Richmond, VA, USA

Introduction: Human adenovirus 36 (Adv36) is associated with obesity in children. The aim was to determine the prevalence of Adv36 antibodies in different weight categories of adolescents and to evaluate the association of Adv36 infection with anthropometric parameters and cardiometabolic health risks.

Methods: In 1,179 Czech adolescents (85 underweight, 506 normal weight, 160 overweight and 428 obese) anthropometric (body weight, height, body mass index, circumferences, fat mass), biochemical and hormonal (lipid profile, glucose, insulin, liver enzymes, adiponectin) parameters, blood pressure, and Adv36 antibodies (ELISA) were evaluated.

Results: Of the total cohort, 26.5% were positive for Adv36 antibodies (underweight: 22.3%, normal weight: 21.5%, overweight: 40.0% and obese: 28.0%). The odds ratio for Adv36 antibody positivity evaluated vs. normal weight was 2.61 for overweight (95% confidence interval (CI): 1.77–3.86, p < 0.001) and 1.46 for obesity (95% CI: 1.07–1.99, p = 0.016). A significantly higher prevalence of Adv36 infection was observed in females in comparison to males (32.5 % vs. 19.7%; p < 0.001). Infected adolescents exhibited significantly higher body weight (p = 0.042), body mass index (p = 0.015), hip circumference (p = 0.004), body height z-score (p = 0.029), total body and trunk fat (p = 0.000), total cholesterol (TC) (p = 0.032) and low density lipoprotein cholesterol (LDL-C) (p = 0.007), but lower level of blood glucose (p = 0.007).

Conclusion: These results demonstrated an association of Adv36 antibodies with obesity and an even greater association with overweight. Adv36 positivity was related to increased fat mass, levels of TC and LDL-C, but to decreased level of blood glucose. No relation to adiponectin levels was revealed.

T2:WS1 – Balkan nutrition and healthy lifestyle

T2:WS1.1

Mediterranean diet for weight loss and other health benefits

Constantine Tsigos

HYGEIA Hospital, Athens, Greece

Several dietary plans have been recommended to reduce obesity and prevent cardiovascular disease, including very low-carbohydrate, low-carbohydrate, very low-fat, and Mediterranean diets. All these plans can achieve weight loss, but only the Mediterranean diet has extensive patient-oriented outcome data showing a significant risk reduction in mortality rates and in rates of fatal and nonfatal myocardial infarction, even in cases where weight loss is not achieved. Indeed, a dietary pattern like the Mediterranean diet, with high intakes of vegetables, fresh fruits, cereals, and olive oils and low intakes of saturated fats, can provide a wide spectrum of cardiometabolic benefits. It may prevent lipid abnormalities, systolic and diastolic blood pressure rise, arrhythmias, diabetes and obesity incidence, certain psychological disorders (depression), as well as the risk of major chronic degenerative diseases (including Alzheimer's disease). The amelioration of insulin sensitivity and the well recognised anti-inflammatory and antioxidant actions of the Mediterranean diet are key mechanisms mediating these benefits. Thus, if patients ask for a dietary recommendation, the Mediterranean diet should likely be recommended above others, together with recommendations regarding physical activity.

T2:WS1.2

Balkan diet in the treatment of obesity in Bulgaria

Handjieva-Darlenska

Department of pharmacology and toxicology, Medical Faculty, Medical University, Sofia, Bulgaria

Our recent studies show that the traditional Balkan cooking from the end of the 19th and the first half of the 20th century is much similar to the Mediterranean diet. Furthermore, the nutritional habits in all of the Balkan countries are stressing on an exclusive closeness. This fact is giving the right to define the Balkan healthy food or the Balkan diet. The traditional nutrition in the Balkan countries is responding to many of the major aspects of healthy food. From the nutritional prevention point of view, the results, related to the risks of developing a disease and their connection to the dietetic models, seem to be promising. The healthy effects of the integral dietetic models are of extremely importance in the nutritional prevention. The statement that the traditional Balkan nutrition from the past century has many beneficial effects regarding many diseases, including metabolic syndrome and the coronary heart disease, is gaining more and more supporters. The Balkan healthy food contains the highly active antioxidants resveratrol and pycnogenol, alpha-tocopherol, ascorbic acid, beta-carotene, selenium, bioflavonoids, and many other biologically-active substances. Besides the Bulgarian yoghurt and the typical kinds of cheese, here belong the traditional vegetables—a rich source of various flavonoids and carotenoids. With its rich content of healthy food ingredients the Balkan diet is used for prevention and treatment of obesity.

T2:WS1.5

Croatia: Facing traditional and contemporary nutrition, northern and southern eating patterns

Maja Baretić

University hospital Zagreb, Croatia

Croatia is developing European country, partially placed in Balkan region with many geographical differences and turbulent history. All those facts together with modern nutritional trends result in variety of food habits and eating patterns. Both northern and southern eating patterns are present, mix with contemporary influences, combining Mediterranean main dish and oriental dessert.

There are evident variations in dietary habits different regions. Population of Eastern and Northern regions more often use animal fats, add salt, consume less fruit and vegetables, eat more crabs, cakes and cured meat. Population of Southern and Western regions more often use vegetable oils; they also consume more fruit and vegetables, add less salt and consume less sweets and cakes. The highest prevalence of unhealthy dietary habits are present in Eastern and Central regions, while Coastal region and city of Zagreb have significantly lower prevalence of unhealthy dietary habits. Prevalence of harmful diet is higher in men in all regions. For females differences in dietary habits are not equally distributed, especially in Coastal and Mountainous regions. Significant differences among generation eating habit are present too, pointing to modern lifestyle influence.

As a conclusion, unhealthy dietary habits are noticed in one quarter of the adult population, regardless on the region in which they live. Croatia has high prevalence of obesity, and obesity-related cardiovascular diseases are the main cause of mortality and morbidity. Due to those facts it is important to keep some positive traditional aspect of eating and improve dietary behavior in everyday life.

T3:WS1 – Personalised treatment

T3:WS1.1

From syndromic to the generally ‘not eating well’ obese paediatric patient – approaches and solutions

Violeta Iotova

Department of Pediatrics and Medical Genetics, Medical University of Varna, Bulgaria

With the increasing trend of childhood and adolescent obesity the demand to the health care systems increases exponentially. One of the main requirements is to define clinically “simple” obesity. The latter term is still used to differentiate the pure accumulation of fat under the influence of environmental and/or family factors from diseases, causing or accompanied by obesity and more recently, from monogenic disorders. The Pediatric Endocrinologist is viewed as the health professional that should perform the diagnostic process, based also on the conception that obesity is a predominantly metabolic disorder. Although rare, monogenic conditions should not be omitted because of the possibility to treat some of them like leptin deficiency, with the probability to increase treatment options for the future. The pathological obesity, though, is just a small proportion from all obese pediatric patients. On the other hand, the number of patients increasing body fat content during childhood and adolescence is constantly expanding. This changes the epidemiology, presentation, course and outcome of typical pediatric conditions. A common example is the increasing prevalence of obese celiac disease patients or the increased mortality of young morbidly obese patients from swine flu. The process of obesity increase is very fast and requires constant effort to prevent unfavorable outcomes from knowledge gaps. The commonness of obesity makes it very easy for the doctor to overlook a serious underlying condition such as acquired primary hypothyroidism in a 9 year old girl with regular uterine bleedings or Cushing syndrome from pituitary origin in a very young patient /own observations/. Furthermore, the usual introductory sentence of a parent is “We brought him (her) to you, doctor, because he (she) doesn’t eat well and we don’t know why obesity is progressing.” Simple diagnostic and management approaches derived from extensive practice will be discussed.

Friday, 30 May, 2014

T2:RS2 – Sleep and cognition

T2:RS2.1

The role of quality sleep and circadian alignment in the regulation of energy balance

Gonissen, Hursel, Rutters, Westertep-Plantenga

Dept Human Biology, Maastricht University, Maastricht, The Netherlands

The observed decrease in sleep duration parallel to the increase in body weight has drawn attention to sleep as a possible contributor to the etiology of obesity. During sleep, rapid eye movement (REM) sleep and non-REM sleep alternate. Stage 3 and 4 of the non-REM sleep are collectively referred as slow-wave sleep (SWS). Inter-individual changes in sleep architecture, rather than total sleep time, appear to be related to endocrine and metabolic parameters. Furthermore, sleep restriction, besides reducing sleep duration, affects sleep architecture resulting in decreased quality of sleep, defined as the sum of SWS and REM sleep divided by total sleep time. Quality sleep reduction was positively associated with increased energy intake. These results suggest that sleep restriction studies may reflect changes in subject’s specific sleep architecture rather than the effect of shorter total sleep time.

Together with homeostatic processes, the circadian clock controls the sleep-wake cycle. Circadian misalignment resulted in a concomitant disturbance of the glucose-insulin metabolism and substrate oxidation. Circadian misalignment also resulted in disruption of the normal phase relationship between SWS and REM sleep, so that REM sleep was relatively phase advanced to SWS. REM sleep during second part of the night was inversely associated with the HOMA-IR index.

In conclusion, these studies highlight the importance of preservation of quality sleep and synchronization between circadian and metabolic processes in the regulation of energy balance.

T2:RS2.2

Sleep, memory and obesity

Hallschmid

Department of Medical Psychology and Behavioural Neurobiology, University of Tuebingen, Germany; German Center for Diabetes Research (DZD), Tuebingen, Germany; Institute for Diabetes Research and Metabolic Diseases of the Helmholtz Center Munich at the Un

Epidemiological studies suggest a relationship between short sleep duration and metabolic dysfunctions like obesity and type 2 diabetes, but the mechanisms behind these observations are largely unknown. Experimental investigations in humans indicate that sleep loss in comparison to sleep affects the balance between orexigenic and anorexigenic endocrine factors, resulting in increased hunger and an enhanced responsiveness to food cues, and moreover reduces energy expenditure. However, the obesogenic implications of sleep loss might extend to higher cognitive functions involved in the control of food intake. Thus, memory for food intake has been postulated to be an important modulator of ingestive behaviour: subjects who recall previous meals in comparison to subjects recalling neutral events decrease the consumption of palatable food. Amnesic patients tend to eat multiple meals if they are not reminded of their previous food intake. In animals, hippocampal lesions stimulate feeding and vice versa, high fat/high carbohydrate diets impair hippocampal function. Sleep has been shown in a large number of studies to support the consolidation of memory traces, with sleep-associated hormonal changes contributing to this vital function. Slow-wave sleep in particular benefits the formation of hippocampus-dependent declarative memory and, on the other hand, seems to be critical for peripheral glucose homeostasis. Taken together, these findings suggest that the contribution of sleep to the maintenance of energy homeostasis relies not only on its hormonal and peripheral effects but also implicates its beneficial impact on memory formation.

T2:RS2.3

Urinary Proteomics in Obstructive Sleep Apnoea with Obesity

Ian Seetho¹, Justyna Siwy², Amaya Albalat³, William Mullen³, Harald Mischak³, Robert Parker⁴, Sonya Craig⁴, Nick Duffy⁴, Kevin Hardy⁵, Jatin Burniston⁶, John Wilding¹

¹Department of Obesity & Endocrinology, University of Liverpool, UK

²Mosaiques diagnostics GmbH, Hannover, Germany

³BHF Glasgow Cardiovascular Research Centre, University of Glasgow, Glasgow, UK

⁴Department of Respiratory Medicine, University Hospital Aintree, Liverpool, UK

⁵Department of Diabetes & Endocrinology, St Helens & Knowsley Teaching Hospitals, UK

⁶School of Sports & Exercise Sciences, Liverpool John Moores University, UK

Introduction: Obstructive sleep apnoea (OSA) is a common complication of obesity and can have a substantial negative impact on a patient's quality of life and risk of cardiovascular disease. In this study, discovery profiling of urinary peptides was performed by capillary electrophore-

sis-mass spectrometry (CE-MS) in obese subjects with and without obstructive sleep apnoea without a history of coronary artery disease

Methods: Obese subjects with and without OSA were recruited from weight management clinics. Anthropometry, blood pressure and fasting blood samples were taken for measurement of metabolic syndrome components. Overnight polysomnography was conducted to confirm or refute OSA. Urinary samples were analysed by CE-MS. OSA patients were naïve to continuous positive airway pressure treatment.

Results: 61 OSA subjects (age 47 ± 9 years, BMI 42.6 ± 8.6 kg/m²); 31 controls (age 49 ± 10 years, BMI 39.3 ± 5.9 kg/m²) were studied; $p = ns$ for age and BMI. Apnoea-hypopnoea Index was higher in OSA patients (24 ± 18.6) than controls (2.6 ± 1.1 ; $p < 0.001$). Metabolic syndrome was present in 35(38%) OSA vs 4(13%) controls; $p < 0.05$). 24 polypeptides were found to be candidates for differential distribution ($p < 0.01$), although these differences did not reach significance when multiple testing was accounted for. Sequences were determined in 8 peptides demonstrating origins from collagens and fibrinogen alpha.

Conclusion: In this study, we report for the first time, urinary proteomic profile analyses using CE-MS in OSA and non-OSA obese groups. The differences in urinary proteomic profiles prior to adjustment for multiple testing, with increased metabolic syndrome in obese OSA subjects, suggests the potential for such methods for identifying obese patients at high risk for sleep apnoea.

T2:RS2.4

Evidence of metabolic syndrome at midlife and subsequent cognitive function

Emmanuelle Kesse-Guyot¹, Chantal Julia², Valentina Andreeva¹, Léopold Fezeu¹, Serge Hercberg², Pilar Galan¹

¹Université Paris 13, Sorbonne-Paris-Cité, Equipe de Recherche en Epidémiologie Nutritionnelle, Centre d'Epidémiologie et Biostatistiques, Inserm U1153, Inra U1125, Cnam, Univ Paris 5, Univ Paris 7

²Université Paris 13, Sorbonne-Paris-Cité, Equipe de Recherche en Epidémiologie Nutritionnelle, Centre d'Epidémiologie et Biostatistiques, Inserm U1153, Inra U1125, Cnam, Univ Paris 5, Univ Paris 7; Département de Santé Publique, Hôpital Avicenne

Introduction: Epidemiological evidence as regards the link between metabolic syndrome (MetS) and cognition is relatively scant and heterogeneous. Thus, we examined the cross-time associations of MetS status with cognitive performance in aging adults.

Methods: Using the French SU.VI.MAX cohort, we studied a sample of 2,788 participants. The presence of disorders comprising MetS was clinically evaluated in 1994–1996. Cognitive performance was assessed after a mean of 13 years via a battery of six validated instruments. The standardized individual test scores were summed to provide a composite cognitive performance measure and principal component analysis was performed to define performance scores on verbal memory and executive functioning. Associations between MetS and subsequent cognitive performance were examined via ANCOVA, providing estimates of mean difference and corresponding 95% confidence intervals.

Results: MetS status at midlife was not associated with subsequent cognitive function. However, a one unit increase in the number of MetS disorders present was associated with a decrease in the composite cognitive score (mean difference = -0.36 ; 95% confidence interval: $-0.68, -0.05$). Significant associations were also found between some MetS components (elevated glycaemia, central obesity and dyslipidemia) and specific cognitive domains.

Conclusion: This study supports the existence of an inverse cross-time association between the severity of MetS and subsequent cognitive performance. Given the worldwide population aging and the increase in MetS prevalence, there is an urgent need for recommendations as regards MetS-related consequences on cognitive aging.

T1:WS1 – Phenotyping by functional imaging

T1:WS1.2

Phenotyping by functional imaging: Adipose tissue

Kirsi Virtanen

Turku PET Centre, University of Turku and Turku University Hospital

Functional imaging of adipose tissue includes both structural imaging (distribution) by MRI or CT, and imaging of metabolic processes with positron emission tomography (PET) and appropriate tracers.

Distribution of adipose tissue to central (intra-abdominal) and peripheral (subcutaneous) locations have crucial effects on whole body glucose and lipid metabolism. Accumulation of intra-abdominal fat is associated with impaired glucose tolerance and increased levels of lipid markers in circulation. Phenotyping with adipose tissue distribution reveals the subjects at risk for metabolic disorders and associated co-morbidities, such as type 2 diabetes and cardiovascular diseases. Especially high risk is with subjects with ectopic fat accumulation in liver, which may be detected with proton spectroscopy (1H MRS).

Adipose tissue imaging with PET detects early insulin resistance in obesity. Uptake of glucose analog, 18FDG, during insulin stimulation by euglycemic hyperinsulinemic clamp, is clearly impaired in early phases of obesity (BMI 27 kg/m²) in subcutaneous and intra-abdominal adipose tissue. Other stimulations, such as acute cold exposure, may be used for the detection of functionally active brown adipose tissue (BAT) during PET studies. Functionally active BAT is associated with metabolically healthy phenotype. In addition, several other tracers (e.g. radiowater, fatty acid analog 18FTHA) may be used for functional imaging of adipose tissue.

T1:WS1.3

Brain imaging in obesity

P. Lozzo

This lecture will describe the imaging procedures and protocols that are used to address brain metabolism, functional activation, and morphology by positron emission tomography and/or magnetic resonance imaging. Specificities of each technique will be addressed. The brain is involved in the pathogenesis of obesity and its complications, including metabolic diseases and cognitive decline. Studies addressing the activation of brain regions in response to food anticipation have shown that reward-related areas may be hyperactive in obese subjects, in whom inhibitory areas appear less active. However, the obesity phenotype can be determined by a variety of causes, and it remains to be established if, within the obese population, one can identify brain patterns consistent with the origin of obesity. In addition, it is still unclear to what extent the abnormalities observed can be a consequence, rather than a cause of obesity. This lecture will address the issue of food addiction and the effects of weight loss on brain responses to food related cues. Abnormalities in insulin signaling/resistance and glucose exposure may underlie the loss of appetite control and the higher risk of cognitive decline observed in obese people. In fact, intranasal insulin therapy is under testing in both fields of obesity and neurodegenerative diseases. Evidence relating to this emerging field of investigation will be provided.

T5:ME1 – Meet the Expert: Current effective dietary approaches

T5:ME1.1

Lessons from PREDIMED: The Spanish Multicenter Study

Ramon Estruch, et al.

Internal Medicine Department, Hospital Clinic, IDIBAPS, CiBER OBN, Instituto de Salud Carlos III, Gobierno de España.

Introduction: The Mediterranean diet (MeDiet) is one food pattern reputed for its beneficial health. This diet is characterized by the abundant use of olive oil; high consumption of plant foods (fruits, vegetables, legumes, cereals, nuts and seeds); frequent but moderate intake of wine (especially red wine) with meals; moderate consumption of fish, seafood, fermented dairy products (yogurt and cheese), poultry and eggs; and low consumption of red and processed meat and sweets. Several epidemiological studies have pointed out that high adherence to MeDiet is associated with strong protection against cardiovascular disease (CVD). However, the highest level of scientific evidence only is obtained by the performance of randomized clinical trial that evaluate hard end-points as main outcome.

Methods: The PREDIMED (PREvención con Dieta MEDiterránea) study assessed the long-term effects of the MeDiet, without energy-restriction, on incident CVD in individuals at high risk. 7447 participants were randomized into three diet groups: MeDiet supplemented with extra-virgin olive oil (EVOO) (n=), MeDiet supplemented with nuts, and control diet (advice on a low-fat diet).

Results: After 4.8 years, 288 major CVD events occurred in 7447 participants. MeDiet+EVOO and MeDiet+nuts groups showed a 30% reduction in the incidence of CVD compared to the control group. Incident diabetes (273 cases) among 3541 non-diabetic participants diminished by 40% in the MeDiet + EVOO compared to the control group. After 1 year follow-up, participants in the MeDiet+nuts group showed a significant 13.7% reduction in prevalence of metabolic syndrome, compared to reductions of 6.7% and 2.0% in the MeDiet+EVOO and control groups, respectively. Despite the total energy intake was higher in both MeDiet groups, compared to the low-fat diet group, body weight and waist perimeter decreased in the three groups, but especially in the MeDiet+EVOO group. Analyses of intermediate markers of cardiovascular risk demonstrated beneficial effects of the MeDiets on blood pressure, lipid profiles, lipoprotein particles, inflammation, oxidative stress, and carotid atherosclerosis.

Conclusion: The PREDIMED results demonstrate that a high-unsaturated fat and antioxidant-rich dietary pattern such as the MeDiet is a useful tool in the prevention of cardiovascular disease. However, these protective effects of the traditional Mediet may be even greater if we upgrade the health effects of this dietary pattern, changing the common olive oil used for extra-virgin olive oil, increasing the consumption of nuts, fatty fish and whole grain cereals, reducing sodium intake, and maintaining a moderate consumption of wine with meals.

T5:ME1.2

The Nordic Diet

Thomas Meinert Larsen

Department of Nutrition, Exercise and Sports (NEXS), Faculty of Science, University of Copenhagen, Rolighedsvej 30, 1958 Frederiksberg C, Denmark

Introduction: The regional Mediterranean Diet has been associated with lower risk of disease, and it has been proposed that other regional diets could have similar health benefits. Therefore, during the last few years a number of randomized studies have been conducted in Scandinavia to document the health benefits of the Nordic Diet.

Methods: In the Danish SHOPUS project, the New Nordic Diet (NND), a gastronomically driven regional, organic, and environmentally friendly diet was tested in a free living individuals with 181 centrally obese men and women who were randomly assigned to either NND (high in fruit, vegetables, whole grains and fish) or an Average Danish Diet (ADD) for 26 weeks. Participants received cooking books and all foods ad libitum and free of charge using a shop model.

Results: 147 completed the intervention (81%) (NND 81%; ADD 82%). High dietary compliance was achieved, with significant differences in dietary intake between groups. Mean weight change was -4.7 kg (SEM 0.5) for NND versus -1.5 kg (SEM 0.5) for ADD (adjusted difference -3.2 kg (95% CI: -4.6 , -1.8 ; $p < 0.001$). NND induced greater reductions in systolic blood pressure (adjusted difference -5.1 mmHg (95% CI: -8.2 , -2.1)) and diastolic blood pressure (adjusted difference -3.2 mmHg (95% CI: -5.7 , -0.8)) than ADD.

Conclusion: The presentation will explain the results from the SHOPUS study, and give a broader view of the recent research that suggest that the Nordic Diet induces health benefits, including weight loss and reduction of blood pressure.

T5:ME1.3

Personalised dietary approaches: What works

Michael Gibney

University College Dublin

Introduction: Personalised nutrition can operate at three levels; Personalised dietary analysis, personalised phenotyping and personalised genotyping.

Methods: The Food4Me consortium has completed an internet based analysis of personalised nutrition at all three levels in a 7 country study. Very preliminary results will be presented. The main part of the presentation will be an overview of the challenges on the three levels of personalised nutrition.

Results: Personalised dietary analysis is a technology which is immediately available and operational. It works best if the analysis of the diet is directly related to WHO or IOM reference standards allowing the end-user to visualise their dietary analysis as within the acceptable range (green), well outside the acceptable range (red) and in between the two (amber). In the food4Me study, the 6 month retention rate was 80–90% and under-reporting was relatively low compared to standard face-to-face survey methodologies. The mean age of participants was 42 years and as sizeable number were over 50 years of age (16% 50–59 and 9% >60 years). Phenotyping was completed using postal delivered dried blood spots with a compliance level of 85%. Blood was analysed for individual fatty acids, glucose, carotenoids, cholesterol and triacylglycerol. Buccal swabs were used to obtain genomic data with a compliance level of 98%.

Conclusion: Whereas personalised dietary data is immediately viable, there are challenges to the use of phenotypic data and genomic data. In the case of the former, multiple blood metabolite analysis can lead to an unwieldy level of required feedback and thus there is growing interest in developing metabolotypes, clusters of individuals sharing common phenotypic data. As regards genomic data, the biggest barrier is an absolute dearth of intervention studies which might confirm what has been recorded in observational studies.

T6:WS1 – Endocrinopathies and obesity

T6:WS1:2

Obesity and the Polycystic Ovary Syndrome (PCOS)

Renato Pasquali

Div. of Endocrinology, Dept of Medical & Surgical Sciences, St. Orsola-Malpighi Hospital, University of Bologna, Italy

Obesity, particularly the abdominal phenotype, is undoubtedly the metabolic abnormality easier to detect at an early phase in PCOS and, sometimes, it even precedes the development of PCOS. It is also the most frequent metabolic abnormality in PCOS, although the exact prevalence of obesity in women with PCOS is unknown due to the lack of representative population-based data, therefore a clear understanding of causes of this association is still lacking. What we actually know from the studies is that PCOS and obesity are highly associated and that obesity, particularly the abdominal/visceral phenotype, worsens the metabolic and also the reproductive features of PCOS. Obesity is also strongly associated with the most feared metabolic co-morbidity in PCOS, that is T2D, possibly through its well known association with insulin resistance. Longitudinal studies have shown that there is a risk intrinsic to the syndrome to develop T2D and that this risk increases steadily with BMI, particularly over 30. The distribution and amount of body fat is significantly contributing to the expression and severity of the PCOS phenotype, however visceral fat enlargement in both lean and obese women with PCOS is unlikely to fully explain the metabolic abnormalities observed in PCOS women. In fact, it appears that the adipose tissue of PCOS has an aberrant morphology (hypertrophy, reduced vascularization) and function (increase sympathetic activity, hypoxia, low-grade inflammation, increased production of cytokines, chemokines, adipokines, local insulin resistant state). The cause of the abnormal structure and function of the adipose tissue in PCOS is unclear, but available evidence suggests that androgens could be indirectly involved.

T6:WS1.3

Hormonal alterations in obese children and adolescents: The focus on thyroid hormones

Thomas Reinehr

Department of Pediatric Endocrinology, Diabetes, and Nutrition Medicine University of Witten/Herdecke

The complex regulation of body weight explains at least in part the difficulties to maintain weight loss. Many hormones such as leptin, ghrelin, peptide YY (PYY), amylin, pancreatic polypeptide (PP), insulin, and thyroid hormones besides others have been identified influencing appetite and resting energy expenditure (REE). In obese children, most of these hormones are altered as adaptation process increasing resting metabolic rate and increasing satiety. Weight loss results in acute compensatory changes of these hormones in obese children, most of them reducing satiety and resting metabolic rate promoting weight regain. A moderate elevation of thyrotropin (TSH) concentrations, which is associated with triiodothyronine (T3) values in or slightly above the upper normal range, is frequently found in obese humans. High serum T3 levels in obesity and overfeeding suggest a role for T3 in metabolic adaptation to weight status: increased REE and thermogenesis in obesity and as a consequence the availability of accumulated energy for conversion into fat is diminished. A decline in REE and hunger parallel to changes of thyroid hormones, leptin, PYY, PP, insulin, and ghrelin have been measured in weight loss due to lifestyle intervention, which also persists for 1 year after end of intervention. Therefore, multiple compensatory mechanisms encouraging weight gain must be overcome in order to maintain weight loss in obese humans. Therefore, the high rate of relapse among obese human trying to loose weight has a physiological basis and is not simply the result of lack of motivation.

T3:WS3 – EASO COTF, PPHTF and WHO Europe Workshop Assessment Standards in obesity Management

T3:WS3.1

Advantages and disadvantages of potential thresholds for overweight and obesity in children

Joop van Raaij

National Institute for Public Health and the Environment RIVM, Netherlands

Introduction: Body Mass Index (BMI) is most frequently used measure for childhood overweight and obesity. Much confusion exists on the sets of BMI thresholds to be used to define overweight and obesity in children. As a consequence, inconsistency is observed in reports on the prevalence of overweight and obesity

Methods: Internationally and nationally published thresholds and reference populations to which a child's BMI can be compared, have been studied.

Results: Two main sets of thresholds are often used for international comparisons: the International Obesity Taskforce (IOTF) thresholds and the WHO 2007 Growth Reference for 5–19 years. IOTF thresholds are based on average values over a number of different reference populations and are aligned to obesity and overweight thresholds used for adults (30 and 25 kg/m²). The WHO 2007 thresholds are based on US data and match closely to obesity and overweight thresholds at age 19 years. For national applications national growth references are often used and thresholds are often related to certain centiles. Advantages and disadvantages of potential thresholds for overweight and obesity will be discussed. There is not yet enough scientific evidence on the relationship between each BMI threshold and potential short- and long-term health risks for the child.

Conclusion: As long as further evidence on health risks associated with specific BMI values is lacking, there is no justification for choosing for one particular set of thresholds. On the other hand, comparisons between studies strongly demand for one single set of thresholds.

T4:RS2 – Where are the anti-obesity drugs in Europe? Future Strategies

T4:RS2.1

Obesity Management: The North American Story

Sharma Arya AM

University of Alberta, Edmonton, Canada

In 2013, the American Medical Association voted to formally consider obesity a disease. This not only puts obesity on par with other “diseases” like hypertension or diabetes in terms of access to care and reimbursements but also reflects our increasing recognition that obesity is far more than simply a matter of “life-style choice”. Indeed, all evidence points to the fact that, one established, obesity becomes a chronic condition with important alterations in metabolic and hormonal function that act to stabilize body weight and ward off volitional attempts at weight loss. Indeed, only a minute proportion of obese individuals embarking on an “eat-less-move-more” approach to losing weight appear to be successful in the long-term. For most this remains a life-long struggle. The increasing use of bariatric surgery and the recent FDA approval of novel anti-obesity medications in the US are both reflective of the need for more effective treatments for obesity. The regulatory framework and some of the key challenges facing the expanded use and approval of these medication in the US and Canada will be discussed.

T4:RS2.3

Efficacy and safety of liraglutide 3.0 mg for weight management in overweight and obese adults: The SCALE™ Obesity and Prediabetes, a randomised, double-blind and placebo-controlled trial

Wilding¹, Astrup², Fujioka³, Greenway⁴, Halpern⁵, Krempf⁶, Lau⁷, Le Roux⁸, Violante Ortiz⁹, Jensen¹⁰, Pi-Sunyer¹¹

¹University of Liverpool, Liverpool, UK

²University of Copenhagen, Copenhagen, Denmark

³Scripps Clinica, La Jolla, CA, USA

⁴Pennington Biomedical Research Center, Baton Rouge, LA, USA

⁵University of Sao Paulo Medical School, Sao Paulo, Brazil

⁶University of Nantes, Nantes, France

⁷University of Calgary, Calgary, Alberta, Canada

⁸University College Dublin, Ireland

⁹Instituto Mexicano del Seguro Social, Ciudad Madero, Mexico

¹⁰Novo Nordisk A/S, Soeborg, Denmark

¹¹St Luke's-Roosevelt Hospital, New York, NY, USA

Introduction: The 56-week efficacy and safety of liraglutide 3.0 mg, as adjunct to diet and exercise, was investigated in overweight and obese individuals without T2DM.

Methods: Adults (BMI ≥ 27 kg/m² with comorbidities or ≥ 30 kg/m²) were randomised 2:1 to once-daily subcutaneous liraglutide or placebo plus diet (500 kcal/day deficit) and exercise. Randomisation was stratified by prediabetes status (ADA 2010) and BMI. *Clinicaltrials.gov* ID: NCT01272219.

Results: 3731 individuals were randomised (age 45.1 \pm 12.1 years, body weight 106.2 \pm 21.4 kg, BMI 38.3 \pm 6.4 kg/m², 61.2% with prediabetes). Liraglutide was superior to placebo on all weight loss (WL) related parameters (Table) and improved glycaemia, blood pressure and lipids (not shown). WL was independent of pre-treatment prediabetes status and BMI. The most common adverse events (AEs) with liraglutide were early onset nausea and diarrhoea. Most events were mild/moderate and transient. Gallbladder disorders and pancreatitis were more common with liraglutide (2.7 and 0.3 events/100 patient years of exposure [PYE], respectively) than with placebo (1.0 and 0.1 events/100 PYE). AE withdrawal was <10% in both groups. The safety profile was generally consistent with that of previous clinical trials with liraglutide for T2DM.

Conclusion: Liraglutide 3.0 mg, as adjunct to diet and exercise, was efficacious and generally well tolerated.

Table – Change baseline to 56-weeks, full-analysis-set, last-observation-carried-forward

	Liraglutide LS-mean	Placebo LS-mean	Estimated treatment-difference/Odds ratio [95% CI]
1. WL (%)*	-8.0	-2.6	-5.4 [-5.8;-5.0] p < 0.0001**
2. 5% responders (%)*	63.5	26.6	4.8 [4.1;5.6] p < 0.0001***
3. 10% responders (%)*	32.8	10.1	4.3 [3.5;5.3] p < 0.0001***
Waist circumference (cm)	-8.2	-4.0	-4.2 [-4.7;-3.7] p < 0.0001**
BMI (kg/m ²)	-3.0	-1.0	-2.0 [-2.2;-1.9] p < 0.0001**

*Co-primary-endpoints tested in hierarchical order, **ANCOVA, ***Logistic-regression

T1:RS2 – Future targets

T1:RS2.1

Mitochondria, ageing and exercise

Enzo Nisoli

Center for Study and Research on Obesity, Department of Biomedical Technology & Translational Medicine, University of Milan, Milan, Italy

With the increase of life expectancy, the older persons population has increased and is the highest consumer of medical services, due to the burden of age related health problems. Ageing is related not only to obesity and diabetes, with an increased cardiovascular risk, but also to cancer and neurodegeneration with cognitive decline and dementia. Hallmark of ageing and age-related diseases are impaired energy production and inflammation, also named “inflammageing”. No clear understanding of how ageing is affected by inflammation and how this can shorten healthspan, the length of time spend in good health. It is now appreciated that adipose, liver, pancreas, brain, and possibly muscle all experience an increase in inflammatory exposure in ageing and in aged-related disorders, including obesity.

Nutrients are major regulators of biochemistry and physiology in all living organisms, and fine changes in nutrient composition are linked to genetic and epigenetic control of processes linked to survival and healthspan. Though contentious yet, calorie restriction (CR), which defines the reduced intake of calories as foods without malnutrition, postpones the age-related diseases, including muscle degeneration, and hence extends healthspan and lifespan in many species. The molecular basis of this long known phenomenon are still elusive, albeit evidence seem to converge on the reduction of mitochondria-derived oxidants through the generation of new, more efficient organelles (mitochondrial biogenesis) (Nisoli et al., *Science* 310: 314–317, 2005). Branched-chain amino acids (BCAAs) are known to display several healthy effects both in animals and humans (Valerio et al., *Aging* 3: 464–478, 2011). Notably, we reported that a BCAA-enriched mixture (BCAAem), differently from other amino acid mixtures, promoted mitochondrial biogenesis in cardiomyocytes and skeletal myocytes differentiated in culture, as well as in heart and skeletal muscles of sedentary and trained, middle-aged (16–18 months) mice supplemented for 3 months in drinking water. Notably, muscle fibers (size and composition, in addition to their ultramicroscopic features) were rejuvenated in aged, supplemented mice. These results would suggest that BCAAem behaves as a CR-mimetic. Notably, dietary supplementation of amino acids was linked to reduction of inflammatory markers, both in circulation and in several tissues. Thus, BCAAem supplementation could be regarded as a novel nutrition-based tool of preventive/therapeutic relevance against the metabolic derangements of age.

T1:RS2.2

Control of adipocytes by the brain

Miguel López

Department of Physiology, CIMUS; University of Santiago de Compostela-Instituto de Investigación Sanitaria; Santiago de Compostela, 15782, Spain & CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn); Santiago de Compostela, 15706, Spain

Introduction: The “classical” hypothalamic neuropeptide view of energy balance has been extensively reviewed and revised during the last few years. Accumulating evidence indicate that modulation of lipogenesis de novo in the hypothalamus, through selective pharmacologic and genetic manipulation of acetyl-CoA carboxylase (ACC), AMP-activated protein kinase (AMPK), carnitine palmitoyltransferase-1 (CPT1), fatty acid synthase (FAS) and malonyl-CoA decarboxylase (MCD) enzymes, has a severe impact on body weight homeostasis.

Our current investigations have revealed that hypothalamic AMPK function in the ventromedial nucleus of the hypothalamus (VMH) is as an

important physiological mediator of brown adipose tissue (BAT) thermogenesis of relevance for the understanding and treatment of obesity.

T1:RS2.3

Inhibition of the elongation factor 1A attenuates diet-induced obesity metabolic dysfunctions in mice

Sofi Julien et al.

Singapore Institute for Clinical Science, Agency for Science, Technology and Research (A*STAR), Singapore

Introduction: Despite intensive efforts to better understand the biology of adipose tissue and worldwide awareness of obesity, the burden of the epidemic continues to grow and is expected to reach 60% of the global adult population by 2030. Besides its canonical role in protein synthesis, the elongation factor 1A1 (EF1A1) displays moonlight functions in oncogenic transformation, cell proliferation and cytoskeletal organization. At physiological doses, narciclasine, a selective inhibitor of EF1A1 displays marked anticancer activity in experimental preclinical models, including melanoma and gliomas. However, the function of EF1A1 in *in vivo* metabolism and energy balance has never been explored.

Methods: We used experimental animal diet-induced obesity model. Adult male were fed a high fat diet (HFD) and treated with narciclasine. Indirect calorimetry was used for oxygen consumption, food intake and locomotor activity measurements. Body composition and fat distribution were determined by Echo MRI and MRI, respectively. Blood and tissue lipid contents, gene ontology, qRT-PCR, histopathology were all assessed using high throughput technologies.

Results: Briefly, our data show that administration of narciclasine in mice fed a HFD leads to a significant reduction in visceral adipose tissue, increased energy expenditure and locomotor activity associated with a marked decrease of peripheral tissue lipid accumulation in brown adipose tissue, liver and muscles without affecting food intake.

Conclusion: We provide here convincing evidence that EF1A1 is involved in metabolism and energy balance in mammals. Targeting EF1A1 with narciclasine or any synthetic analogs could be a feasible approach to develop obesity therapies.

T1:RS2.4

Deficiency of mitochondrial nicotinamide nucleotide transhydrogenase predisposes C57BL6 mice to metabolic syndrome

Juliana Rovani¹, Gabriel Dorighello¹, Jean Vettorazzi¹, Luiz Rezende¹, Anibal Vercesi², Helena Oliveira¹

¹Dept Structural and Functional Biology, State University of Campinas, Campinas, SP, Brazil

²Dept Clinical Pathology, State University of Campinas, Campinas, SP, Brazil

Introduction: The nicotinamide nucleotide transhydrogenase (NNT) catalyses the production of NADPH, that is consumed by the mitochondrial antioxidant enzymatic system. Previous studies have shown that NNT mutation causes redox abnormalities in mitochondria and alterations in glucose and lipid metabolism in C57BL6/J mice from the Jackson Laboratory (B6-J). In this study we aimed at investigating whether the mice line that carries the NNT gene mutation (B6-J) are more susceptible to metabolic syndrome.

Methods: We determined visceral adiposity mass, liver triglyceride content, glucose tolerance, insulin resistance, and insulin secretion by isolated pancreatic islets in the mutant B6-J and control mice with functional NNT (C57BL6J/Uni).

Results: We demonstrated that B6-J mice exhibit increased visceral adiposity, increased liver triglyceride content, glucose intolerance, insulin resistance, and insulin hypersecretion. In face of these disturbances, mutant B6-J mice were submitted to food restriction (FR) or treatment with 2,4 dinitrophenol (DNP, a mitochondrial uncoupler that stimulates meta-

bolic rates) during 3 months. We observed that B6-J mutant mice under FR presented a reduction in adiposity and liver steatosis, improvement of glucose tolerance and insulin resistance and normalization of insulin secretion. After DNP treatment, B6-J mice showed no alterations in lipid disturbances but improved insulin resistance and insulin secretion.

Conclusion: These findings suggest that 1- the mouse line that carries NNT mutation is predisposed to develop metabolic syndrome, 2- both treatments, FR and DNP, correct, at least partially, the metabolic disturbances of B6-J mutant mice, and 3- FR regimen was more effective than DNP treatment.

Saturday, 31 May, 2014

T5: RS1 – Endocrine response to operation on healthy organs

T5:RS1.1

Are incretins the drivers of the metabolic effects of bariatric surgery?

Martin Haluzik

3Dept. of Medicine, 1Faculty of Medicine and General University Hospital, Charles University, Prague, Czech Republic

The incretins are peptide hormones released from small intestine during the meal absorption that stimulate insulin secretion from pancreatic beta-cells and reduce the excessive glucagon secretion by pancreatic alpha-cells. Of the two currently known incretins, only glucagon-like peptide-1 (GLP-1) based-therapies are used in the treatment of type 2 diabetes mellitus (T2DM).

Most of the studies have shown that malabsorptive procedures (e.g. biliopancreatic diversion, Roux-en-Y gastric bypass) consistently increase GLP-1 levels suggesting their possible involvement in diabetes improvement/ remission while only transient or no changes of GLP-1 levels are noted after purely restrictive procedures (e.g. gastric banding). Yet both types of procedures induce diabetes improvement or remission in a substantial number of patients albeit with higher rate in the malabsorptive operations. Decreased GLP-1 levels are present only in subset of T2DM patients while in some the GLP-1 concentrations are normal. Therefore, the partial resistance to GLP-1 effects appears to be another part of pathophysiological mechanisms behind T2DM. It is plausible that the improvement of diabetes compensation as well as the decrease in body weight might be effective in improving GLP-1 action although studies directly demonstrating these effects are still pending.

In conclusion, an increase in GLP-1 levels after some bariatric operations is an important but not a sole part of the mechanism behind metabolic improvements. Other mechanism, such as acute decrease in energy intake after bariatric operations, decrease in body weight, changes in food preferences, gut microbiota composition and possibly other yet unidentified mechanisms also contribute to the overall metabolic changes.

T5:RS1.2

Diabetes remission after bariatric surgery

Geltrude Mingrone

Department of Internal Medicine, Catholic University, Rome, Italy

Introduction: In the last few years a large amount of literature has been produced regarding the effects of bariatric surgery on diabetes, focusing on the possible mechanisms of action of this surgical approach in inducing remission of type 2 diabetes.

Bariatric surgery has the important merit of having shown the central role played by the small intestine in glucose homeostasis. The small intestine

and, in particular the duodenum and jejunum, respond to a dietary carbohydrates and/or fat by increasing the secretion of incretin, glucagon-like peptide 1 (GLP1) and gastric inhibitory polypeptide (GIP), which in turn stimulate insulin secretion.

Methods: It is widely recognized that the primary defect in type 2 diabetes is the skeletal muscle insulin resistance with a relative insulin secretion deficiency. In fact, in type 2 diabetic subjects the absolute insulin secretion after an oral glucose tolerance test (OGTT) exceeds that observed in subjects with normal glucose tolerance. However, there is a deficiency of insulin secretion relative to the high degree of insulin resistance of these subjects. After BPD insulin sensitivity is fully normalized independently of the degree of derangement of glucose metabolism, i.e. from impaired glucose tolerance to frank diabetes, and the first phase of insulin secretion, which is generally absent in diabetic subjects, is fully restored. A less impressive but still significant increase of the first phase of insulin secretion is observed also after RYGB. Interestingly, after RYGB there is a hypersecretion of incretin with subsequent increased insulin secretion which can determine reactive hypoglycemic episodes.

In addition to the secretion of incretin, the duodenum and the jejunum seem to possess a 'nutrient sensing'. In fact, contrary to glucose infusion into the portal vein, the infusion of glucose into the jejunum reduces in normal rats the hepatic glucose production, an effect which is reversed by the simultaneous administration of phorizin, a competitive blocker of sodium-glucose transporters located in the mucosa of the small intestine. This jejunal nutrient sensor is also required for the rapid resolution of diabetes in high fat diet and streptozotocin treated rats. During refeeding the jejunal nutrient sensing is disrupted allowing to increased circulating glucose levels.

Nutrient sensing and glucose homeostasis seem to be regulated by the ventromedial hypothalamus (VMH), where insulin receptors are expressed. VMH insulin receptor knockdown (IRkd) mice develop hepatic insulin resistance, glucose intolerance, increased glucagon and impaired insulin secretion. RYGB reduces hepatic glucose production, independent of body weight reduction, by 58% in high fat diet rats, but IRkd prevent this improvement suggesting that an increased VMH sensitivity to insulin can mediate this effect of bariatric surgery; however, the improvement of peripheral insulin sensitivity was unaffected by central insulin receptor knockdown. These data were confirmed in Zucker insulin resistant rats where rapid normalization in hepatic gluconeogenic capacity and basal hepatic glucose production required intact vagal innervations, while this was not necessary for restoration of insulin sensitivity.

A criticism in regards to the role of this jejunal nutrient sensing, which in animals was shown to inhibit the hepatic glucose production (HGP), arises from the fact that in humans the bypass of the entire jejunum, so that it is no further exposed to nutrients, improves significantly HGP as it was reported after bilio-pancreatic diversion.

Interestingly, the bypass of the duodenum and the proximal jejunum, as obtained by infusing simple nutrients into the mid jejunum, is associated with a significant improvement of whole body insulin sensitivity in both diabetic and non diabetic individuals.

Conclusion: In conclusion, some types of bariatric surgery are able to induce diabetes remission possibly through the improvement of hepatic and/or peripheral insulin resistance coupled with an improvement up to fully restoration of the first phase of insulin secretion.

T5:RS1.3

Rates, causes, and risk factors of 1-year mortality after bariatric surgery

Jennifer Wenjing Tao¹, Magdalena Plecka-Östlund¹, Yunxia Lu², Fredrik Mattsson¹, Jesper Lagergren³

¹Upper Gastrointestinal Surgery, Department of Molecular medicine and Surgery, Karolinska Institutet, Stockholm, Sweden

²Division of Coloproctology, Karolinska University Hospital Solna, Stockholm, Sweden

³Upper Gastrointestinal Surgery, Department of Molecular medicine and Surgery, Karolinska Institutet, Stockholm, Sweden and Section of Gastrointestinal Cancer, Division of Cancer Studies, King's College London, United Kingdom

Introduction: There is need for population-based research to assess the rates, causes and risk factors for short-term mortality following bariatric surgery.

Methods: This retrospective population-based cohort study included all patients who underwent bariatric surgery in Sweden in 1980–2010. Data were collected from nationwide high-quality registries and medical records. Patient characteristics, comorbidities and surgical procedures were assessed in relation to 1-year mortality through multivariate Cox proportional hazards regression, adjusted for potential confounding by age, sex, surgical procedure, surgical access, and comorbidity.

Results: Among 22,487 included patients (15,863 gastric bypass, 2,514 gastric banding, 3,277 vertical banded gastroplasty and 830 other bariatric procedures), the overall mortality rate within 1 year of surgery was 0.38% (n = 85). The most common causes of death were myocardial infarction (n = 14; 16%), anastomotic leak (n = 12; 14%), pulmonary embolism (n = 12; 14%), and sudden cardiac arrest (n = 11; 13%). Male sex (HR = 2.31; 95% CI 1.48–3.60), diabetes (HR = 2.47; 95% CI 1.44–4.23) and congestive heart failure (HR = 4.82; 95% CI 2.25–10.35) were independently associated with an increased risk of 1-year mortality, while age, hypertension, cerebrovascular disease, coronary heart disease, chronic obstructive pulmonary disease, asthma and surgical procedure were not. Open surgery was followed by an increased mortality compared to laparoscopic surgery in 2000–2010 (HR = 2.72; 95% CI 1.53–4.83), but not in 1990–1999 (HR = 0.39; 95% CI 0.11–1.32).

Conclusion: Mortality rates after bariatric surgery are low, with technical and non-surgical complications being the most common causes of death. Sex, congestive heart failure, diabetes and surgical access should be taken into account during the preoperative evaluation of obese patients.

T5:RS1.4

The one-year effect of Roux-en-Y gastric bypass surgery and intensive lifestyle intervention on systemic arterial stiffness – a non-randomized clinical study

Njord Nordstrand¹, Jøran Hjelmæsæth¹, Espen Gjevestad²

¹The Morbid Obesity Center, Vestfold Hospital Trust.

²The Morbid Obesity Center, Vestfold Hospital Trust Clinic Physical Medicine and Rehabilitation, Vestfold Hospital Trust, Stavern, Norway

Introduction: We have previously demonstrated that carotid-to-femoral pulse wave velocity is not affected by a large weight loss in morbidly obese individuals. In the present analysis we compared the 1-year within- and between group effects of an intensive lifestyle intervention program (ILI) and Roux-en-Y gastric bypass surgery (RGB) on the augmentation index (AI), a measure of systemic arterial stiffness.

Methods: AI was assessed by applanation tonometry (Sphygmocor®). A low-calorie-diet (<900 kcal/day) was given 7-weeks before RGB. The ILI-group underwent supervised training sessions 3 days/week (4–8 METs) and calorie restriction (1000 kcal/day) for 12 weeks, and was followed monthly thereafter. Statistics; Independent Samples T test, Analysis of Covariance.

Results: A total of 159 subjects, [ILI-group; 77 (62% women), RGB-group; 82 (66% women)] were included. There were no baseline differ-

ences between groups regarding AI, p = 0.737. At follow-up AI had increased from 22 (10) % to 23 (10) % in the ILI-group and from 21 (10) % to 23 (13) % in the RGB-group, both p ≥ 0.203, adjusted mean (95% CI) difference between groups 2 (–3, 7) %, p = 0.407. At baseline mean (SD) BMI was 42.0 (5.0) kg/m² in the ILI-group and 45.9 (5.9) kg/m² in the RGB-group, p < 0.001. Weight-loss (95% CI) at follow-up was 13.9 (11.4, 16.4) kg in the ILI-group and 41.9 (39.1, 44.7) kg in the RGB-group, both p < 0.001, adjusted mean (95% CI) difference between groups 27.6 (24.0, 31.1) kg, p < 0.001.

Conclusion: Long-term systemic arterial stiffness measured by AI in morbidly obese individuals was not affected by a large weight-loss

T5:WS4 – Successful weight loss/weight control programmes

T5:WS4.2

Nutritional therapy for weight management – from trials to clinical settings

Mette Svendsen

Division of endocrinology, obesity and preventive medicine, Oslo University Hospital

Nutritional therapy for weight management has to be evidence based. The Look AHEAD (Action for Health in Diabetes) trial showed that an intensive lifestyle intervention was effective in maintaining a clinically significant weight loss in 50% of participants for 8 years. The most important weight control behaviors are frequent monitoring of weight, higher levels of physical activity and adherence to energy-reduced diets. A variety of dietary patterns are effective for weight loss, however the Mediterranean diet is the only one that has been shown to reduce mortality from cardiovascular disease. In a clinical setting, individualization is the key element. Based on BMI, co-morbidities and cardiovascular risk factors weight loss and health goals are discussed with patients and various treatment options are considered. The intensity of the intervention depends on the patient's willingness and ability to change as well as current physical activity level, eating pattern, eating behavior, food choices and portion sizes. Patients are given evidence-based information about physical activity and diet and then asked to choose the behavior changes that they wish to start with. The frequency and length of follow-up is dependent on which outcomes will be monitored and the need for support. Goals are adjusted over time and more intensive treatment options are discussed as needed. Specific patient cases will be discussed showing how to apply these principles in practice.

ORAL SESSION

Wednesday, 28 May, 2014

T1:OS1 – Brown Adipose Tissue

T1:OS1.1

Comparative gene array analysis of human deep neck and subcutaneous adipose tissue progenitor cells

Daniel Tews¹, Verena Schwar¹, Theresia Weber², Marc Scheithauer³, Tobias Fromme⁴, Martin Klingenspor⁴, Thomas F. Barth⁵, Peter Möller⁵, Pamela Fischer-Posovszky¹, Martin Wabitsch¹

¹Division of Pediatric Endocrinology and Diabetes, University Medical Center Ulm

²Department of Surgery, University Medical Center Ulm

³Clinic of Otorhinolaryngology, University Medical Center Ulm

⁴Molecular Nutritional Medicine, Technical University Munich

⁵Department of Pathology, University Medical Center Ulm

Introduction: Studies in animal models revealed that brown and white adipocytes derive from different progenitor cells. Molecular characteristics of these cells have not been investigated in detail in humans. Here we sought to identify novel markers of human brown adipocyte progenitor cells.

Methods: Paired deep neck and subcutaneous adipose tissue samples from n = 52 subjects were taken and subdivided for analysis by immunohistochemistry (n = 26) and quantitative real-time PCR (n = 14), respectively. Progenitor cells were isolated from paired tissue samples of n = 12 patients and were differentiated into adipocytes *in vitro*. Expression profile of progenitor cells was assessed by gene array analysis. Real-time PCR was performed to assess mRNA expression of selected genes.

Results: Progenitor cells isolated from deep neck and subcutaneous adipose tissue show marked differences in gene expression pattern. In 355 differentially regulated (<1.5 fold) genes, we found genes encoding 32 transcriptions factors, 25 surface proteins and 14 receptor ligands. Validation by qPCR confirmed *ADH1B* as highest expressed in deep neck progenitor cells. *In vitro* differentiated adipocytes from the deep neck adipose tissue were characterized by elevated *UCP1* and classical brown marker gene expression.

Conclusion: The ability of human adipocyte progenitor cells to differentiate into brown-like adipocytes is depot-specific and is based on intrinsic differences in gene expression. Our data provide potential molecular targets involved in the genetic determination of brown adipocyte precursor cells.

T1:OS1.2

Browning effects of the cold receptor *trpm8* activation in human white adipocytes

Marco Rossato¹, Marnie Granzotto¹, Veronica Macchi², Andrea Porzionato², Lucia Petrelli², Rosario Rizzuto³, Vincenzo Vindigni⁴, Raffaele De Caro², Valentina Silvestrin¹, Roberto Vettor¹

¹Clinica Medica 3, Department of Medicine – DIMED, University of Padova, Italy

²Department of Molecular Medicine – University of Padova, Italy

³Department of Biomedical Sciences – University of Padova, Italy

⁴Department of Neurosciences – University of Padova, Italy

Introduction: The uncoupling protein 1 (UCP1) is a hallmark of brown adipocytes and the pivotal player for cold-induced thermogenesis in

these cells. Recently ‘browning’ of white adipose tissue (WAT), with massive up-regulation of UCP1, has been confirmed after physiological and pharmacological manipulations. We investigated the expression of the cold-sensing receptor TRPM8 in human WAT and the effects of its activation by natural and synthetic agonists.

Methods: The stromal vascular fraction from human WAT was isolated and pre-adipocytes were differentiated to mature adipocytes in adipogenic medium. We investigated the expression of TRPM8 receptor in human adipocytes together with the effects of its activation by natural (menthol) and synthetic agonists (icilin) on adipocyte cytoplasmic calcium concentrations, UCP1 expression, genes regulating mitochondrial biogenesis, glucose uptake, heat production, mitochondrial potential and cell ultrastructure with TEM.

Results: TRPM8 receptor is expressed in human white adipocytes and its activation induces a rise in [Ca²⁺]_i along with the induction of UCP1 expression, increased glucose uptake, mitochondrial potential and heat production with no changes in the expression of the master genes regulating mitochondrial biogenesis. The induction of a “brown-like” phenotype in human white adipocytes after TRPM8 activation is supported by ultrastructural morphological changes of mitochondria morphology and intracellular localization around lipid droplets.

Conclusion: Our findings provide evidence that human white adipocytes express the cold receptor TRPM8 which activation induces a cellular phenotype resembling that of brown adipocytes thus suggesting a role for this cold-sensing receptor in the control of WAT metabolism and whole body energy balance in human.

T1:OS1.3

Effect of the n-3 LC-PUFA EPA on white-to-brown transition of primary human adipose-derived stem cells

Manuela Elsen¹, Schoemaker², van Tol², Romacho¹, Eckel¹

¹Paul-Langerhans-Group for Integrative Physiology, German Diabetes Center

²Mead Johnson Nutrition, Nijmegen, The Netherlands

Introduction: Browning of white adipose tissue (AT) may counteract obesity. We recently showed that BMP4 and BMP7 induce the white-to-brown transition of primary human adipose-derived stem cells (hASCs). PUFAs and their metabolites are potential PPAR γ ligands and dietary n-3 PUFAs increase oxidative metabolism in white AT and adaptive thermogenesis in brown AT, suggesting a role for PUFAs in the white-to-brown transition. Therefore, we investigated direct effects of the n-3 LC-PUFA EPA on browning of hASCs in comparison to oleic acid (OA) as non-essential fatty acid and BMP4 or BMP7.

Methods: Primary hASCs isolated from the subcutaneous depot were challenged with EPA (20 μ M), OA (20 μ M) or BMPs (50ng/ml) during adipocyte differentiation (12 days). Lipid accumulation was measured by Oil Red O staining and gene expression was assessed by qRT-PCR.

Results: Treatment of hASCs with EPA but not OA increased lipid accumulation to similar extents as BMPs. The BMP-mediated enhancement of PPAR γ and C/EBP α expression was absent in OA-treated hASCs and EPA slightly increased C/EBP α . Neither EPA nor OA altered expression of the white-specific marker Tcf21, which was reduced by BMPs. Remarkably, UCP1 expression was strongly enhanced (7-fold) after EPA exposure, while OA did not induce UCP1 expression. This EPA-mediated effect on UCP1 expression was comparable to that of the BMPs.

Conclusion: In conclusion, chronic exposure to physiological concentrations of the n-3 LC-PUFA EPA induces browning of hASCs, providing a potential mechanism for the beneficial effects of dietary n-3 LC-PUFAs on metabolism. The non-essential fatty acid OA has no effect on white-to-brown transition.

T1:OS1.4

Regulation of the conversion of white to brown adipocytes by arachidonic acid metabolic pathway

Rayane GHANDOUR, et al.

IBV, CNRS UMR7277, INSERM U1091, Univ. de Nice Sophia-Antipolis, NICE.

Introduction: The recent discovery of functional brown adipocytes in adult humans has led to the consideration of their use to increase energy expenditure in the treatment of obesity. We decided to study the effect of an excess of poly unsaturated fatty acids $\omega 6$ on brown adipocytes formation.

Methods: Our team developed a unique cell model for studying the late steps of human brown adipogenic differentiation, the hMADS cells (human-Multipotent Adipose-Derived-Stem). We studied the effect of arachidonic acid (ARA) or its metabolites, prostaglandins (PGs) of series 2 treatments of hMADS cells, on the differentiation process.

Results: Our data show different effects of the prostaglandins studied. Thus, $PGF2\alpha$ and $PGE2$ inhibit the conversion of white adipocytes into brown adipocytes through a pathway involving intracellular calcium, MAPK and PPAR γ . Meanwhile, $PGE 2$ is also able to induce this conversion via a cAMP-dependent pathway. This dual capacity might be due to the diversity of EP membrane receptors and their different signaling pathways

Finally prostacyclin ($PGI2$) induces this conversion through a pathway involving PPARs and IP receptor.

Conclusion: These results show that the effect of ARA on the conversion of white adipocytes into brown adipocytes depends on three factors: i) the nature of prostaglandins synthesized ii) the secreted amount and iii) the presence of different receptors on the adipocyte's membrane.

Our results suggest that in addition to promoting the formation of white adipocytes, excess of polyunsaturated fatty acids in diets may increase their deleterious effect, altering the process of "browning" in the white adipose tissue.

T1:OS1.5

The adipose tissue endocannabinoid-synthesizing enzyme NAPE-PLD plays a major role on the control of glucose, lipid metabolism and energy homeostasis

Lucie Geurts¹, Amandine Everard¹, Thibaut Duparc¹, Nathalie Delzenne¹, Serge Luquet², Patrice Cani¹

¹Université catholique de Louvain, Louvain Drug Research Institute, Walloon Excellence in Life sciences and BIotechnology (WELBIO), Metabolism and Nutrition Research Group, Brussels, Belgium.

²Unité «biologie fonctionnelle et adaptative» (BFA), université Paris Diderot-Paris 7, CNRS EAC 4413, 4, rue Marie-Andrée-Lagroua-Weill-Hallé, bâtiment Buffon, case courrier 7126, 75205 Paris cedex 13, France.

Introduction: Obesity and associated metabolic disorders are characterized by an expansive growth of adipose tissue, low-grade inflammation, and altered endocannabinoid (eCB)-system tone. *N*-acylethanolamines (NAEs) constitute a family of eCB-related bioactive lipids implicated in the regulation of energy homeostasis and inflammation. Some NAEs have been associated with adipose tissue development, whereas others have been shown to improve glucose homeostasis and inflammatory tone.

Methods: To understand the exact role of NAEs produced in adipose tissue, we generated mice invalidated for the enzyme synthesizing NAEs (NAPE-PLD) in adipose tissue, using the Cre-Lox system. Mice were divided into four groups of treatment: Wild type (WT) mice fed with a normal control-diet (CT), mice knock-out (KO) for NAPE-PLD in adipose tissue fed CT diet (KO-CT), WT mice fed with a high-fat diet (HF) and mice KO for NAPE-PLD in adipose tissue fed with a HF diet (KO-HF). Mice were treated for 8 weeks.

Results: KO-CT mice gained more weight and fat mass, developed glucose intolerance and hyperinsulinemia. These phenomena are exacerbated under HF-diet. When exploring adipose tissue metabolism, we found

that KO mice developed a marked inflammatory tone (e.g., macrophage infiltration) and altered lipid metabolism compared to WT mice.

Conclusion: Our data demonstrate that adipose tissue NAPE-PLD plays a major role in physiological conditions for maintaining an adequate homeostasis of the adipose tissue. Moreover, we identified adipose tissue NAPE-PLD as a major contributor for the regulation of energy storage and thereby constitute a target to regulate adipose tissue development during obesity and associated metabolic disorders.

T1:OS1.6

Circulating endocannabinoids are associated with cardiometabolic parameters in an adiposity-independent fashion in normal weight subjects

Flaminia Fanelli, Ilaria Belluomo, Marco Mezzullo, Margherita Baccini, Daniela Ibarra Gasparini, Elena Casadio, Renato Pasquali, Uberto Pagotto

University of Bologna – S.Orsola-Malpighi Hospital

Introduction: Obesity is characterized by the hyperactivation of the Endocannabinoid System (ECS) in brain and peripheral tissues and by increased circulating levels of endocannabinoids (cECs) as anandamide (AEA) and 2-arachidonoylglycerol (2AG). However, it is still debated whether in absence of overweight/obesity cECs are only modulated by adiposity or if they are associated with cardiometabolic parameters.

Methods: We recruited 155 healthy normal weight (NW, BMI: 18.5–24.9kg/m²) drug-free volunteers (18–90y) that, after informed consent, gave blood in fasting condition. Plasma cECs were measured by a validated liquid chromatography–tandem mass spectrometry method.

Results: In females (n = 94), AEA (p = 0.014) and 2AG (p < 0.001) increased with age; AEA correlated with BMI (p = 0.022), waist circumference (WC, p = 0.009), triglycerides (p < 0.001) and insulin (p = 0.029), while 2AG correlated with diastolic (p = 0.010) and systolic (p = 0.001) blood pressure (DBP and SBP, respectively), glucose (p = 0.004) and triglycerides (p < 0.001). In males (n = 61), 2AG correlated with BMI (p = 0.038), glucose (p = 0.014), triglycerides (p < 0.001), insulin (p = 0.028), and both 2AG (p = 0.008) and AEA (p = 0.031) negatively correlated with HDL. We further performed a stepwise multiple regression showing that triglycerides independently correlated with AEA (p = 0.003) and 2AG (p = 0.001) in females and with 2AG in males (p < 0.001). In females, 2AG independently correlated also with SBP (p = 0.016) and glucose (p = 0.021), while in males AEA independently correlated with SBP (p = 0.038) and negatively correlated with HDL (p = 0.047). No independent associations were observed between cECs and BMI, WC or age.

Conclusion: Our study highlights that in normal weight condition cECs are independently associated with a cluster of cardiometabolic markers but not with adiposity parameters.

T2:OS1 – Diet, Physical activity and Behaviour

T2:OS1.1

Mediterranean diet, overweight and body composition in children from eight European countries: Cross-sectional and prospective results from the IDEFICS study

Gianluca Tognon¹, Antje Hebestreit², Anne Lanfer³, Louis A. Moreno⁴, Valeria Pala⁵, Alfonso Siani⁶, Michael Tornaritis⁷, Stefaan De Henauw⁸, Toomas Veidebaum⁹, Denes Molnár¹⁰, Wolfgang Ahrens², Lauren Lissner⁷

¹Public Health Epidemiology Unit, Department of Public Health and Community Medicine, University of Gothenburg, Gothenburg, Sweden

²Leibniz – Institute for Prevention Research and epidemiology – BIPS, Bremen, Germany

³Leibniz – Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany

⁴GENUD (Growth, Exercise, Nutrition and Development) research group, University of Zaragoza, Zaragoza, Spain

⁵Nutritional Epidemiology Unit, Department of Preventive & Predictive Medicine, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

⁶Institute of Food Sciences, Unit of Epidemiology and Population Genetics, National Research Council, Avellino, Italy

⁷Research and Education Institute of Child Health, Strovolos, Cyprus

⁸Department of Public Health/ Department of Movement and Sport Sciences, Ghent University, Faculty of Medicine and Health Sciences, Ghent, Belgium

⁹National Institute for Health Development, Tallin, Estonia

¹⁰Department of Pediatrics, Medical Faculty, University of Pécs, Hungary

Introduction: The role of a Mediterranean-like dietary pattern in childhood obesity prevention is unclear. Therefore, we investigated its popularity among European children and the association with overweight and obesity.

Methods: Weight, height, waist circumference, and skinfolds were measured at baseline (n = 16,220) and after two years (n = 9,114) in children from eight European countries, recruited during the IDEFICS study. Diet was evaluated by a parental food frequency questionnaire (FFQ, 43 foods) and by a single 24h dietary recall. The Mediterranean diet score (MDS) was calculated based on food frequencies (FFQ) and associated with various overweight and obesity indicators both cross-sectionally and prospectively. An alternative score based on food quantities was calculated from recall data.

Results: High MDS were inversely associated with overweight including obesity (OR = 0.85, 95% CI: 0.77; 0.94) and percent fat mass (β = -0.22, 95% CI: -0.43; -0.01) independently of age, sex, socioeconomic status and country. High MDS at baseline inversely predicted high changes in BMI (OR = 0.87, 95% CI: 0.78; 0.98), waist circumference (OR = 0.87, 95% CI: 0.77; 0.98) and waist-to-height ratio (OR = 0.88, 95% CI: 0.79; 0.99). The classification of countries based on adherence levels differed when calculating the score from food frequencies or quantities. In Italy and Sweden differences between weekdays and weekend days were shown.

Conclusion: The promotion of a Mediterranean dietary pattern should be part of EU obesity prevention strategies and should be particularly intense in those countries where low levels of adherence are detected.

T2:OS1.2

Obesity is associated with a strong liking for fat sensation

Aurélien Lampuré¹, Amélie Deglaire², Pascal Schlich², Katia Castetbon³, Sandrine Péneau¹, Serge Hercberg¹, Caroline Méjean¹

¹Université Paris 13, Sorbonne Paris Cité, Equipe de Recherche en Épidémiologie Nutritionnelle (EREN), Centre d'Épidémiologie et Biostatistiques Paris Nord, Inserm (U1153), Inra (U1125), Cnam, Université Paris 5, Université Paris 7, Bobigny, France

²Centre des Sciences du Goût et de l'Alimentation, UMR6265CNRS / UMR1324INRA/Université de Bourgogne, Dijon, France

³Institut de veille sanitaire (InVS), Département maladies chroniques et traumatisme, Unité de surveillance et d'épidémiologie nutritionnelle (USEN), Saint-Maurice, France Université Paris 13, Sorbonne Paris Cité, Unité de surveillance et d'épidémiologie

Introduction: Overconsumption of fat has been identified as risk factor of obesity. Besides, fat contributes to eating pleasure thanks to its sensory properties and influences food choices. Little is known regarding the influence of liking for fat on nutritional status. First, we determined among socio-demographic, economic, psychological, lifestyle and health characteristics, which ones were potential confounding factors of the relationships between fat liking and weight status, by studying their association with liking. Then, we estimated associations between weight status and fat liking, adjusted for factors previously identified.

Methods: This study was conducted among 37181 participants of the NutriNet-Santé cohort study. Multinomial logistic regression models were performed to assess associations between fat liking and individual factors, and then between weight status and fat liking, stratified by gender.

Results: In both genders, smoking, alcohol consumption, low income and uncontrolled eating were positively associated with a high fat liking while age and cognitive restraint were inversely associated. Only in women, emotional eating, pregnancy, having a child and menopause were positively associated with a high fat liking. Regarding weight status, individuals with high fat liking were more likely to be overweight (men: OR = 1.47, 95% CI [1.25–1.71], women: OR = 1.45 [1.31–1.60]) or obese (men: OR = 1.90 [1.49–2.43], women: OR = 2.00 [1.74–2.31]) than those with low fat liking, adjusted for individual characteristics.

Conclusion: This study demonstrates that fat liking is associated with higher risk of obesity and should be considered as determinant of weight status, but further studies are needed to better understand the causal framework of this relationship.

T2:OS1.3

Appetite and gut hormone responses to moderate-intensity continuous exercise versus high-intensity interval exercise, in normoxic and hypoxic conditions

Daniel Bailey¹, Lindsey Smith¹, Bryna Christmas¹, Lee Taylor¹, David Stensef², Kevin Deighton², Jessica Douglas², Catherine Kerr¹

¹University of Bedfordshire

²Loughborough University

Introduction: Exercise and hypoxia may influence the release and metabolism of gastrointestinal hormones that regulate appetite. However, limited data is available exploring the influence of exercise intensity and exercise in hypoxic conditions. This study investigated the effects of continuous moderate-intensity exercise and high-intensity interval exercise in normoxic and hypoxic conditions on appetite responses and gut hormone concentrations.

Methods: 12 males completed four different trials in a random order: 1) moderate-intensity normoxic exercise (MN), 2) moderate-intensity hypoxic exercise (MH), 3) high-intensity interval normoxic exercise (HN), and 4) high-intensity interval hypoxic exercise (HH). Treadmill exercise was performed for 50 min (in an environmental chamber for hypoxic conditions at 14.5% O₂) 1 h 45 min after breakfast, with a standardised test meal consumed 60 min post-exercise. Linear mixed models were used to determine differences in appetite and hormone variables between conditions across time.

Results: Area under the curve for perceived hunger was 10% higher in HN than MH (p = 0.07), satisfaction 10% higher in HH than HN (p = 0.03), and prospective food consumption 18% lower in HH compared to MH and MN (p = 0.03). GLP-1 was higher 30 min post-test meal in MH compared to HN and MN (p < 0.5). Glucose was 6% lower during HN than MH (p = 0.002) and lower immediately after exercise (p = 0.10) and 30 min post-test meal (p = 0.01) in HN than MH.

Conclusion: High-intensity interval exercise and hypoxia appear to suppress appetite and glucose, and elevate GLP-1 more than traditional continuous moderate-intensity exercise. High intensity exercise in hypoxia may lead to optimal appetite suppression.

T2:OS1.4

Role of food hedonics examined under sedentary and physically activated states on exercise-induced weight loss.

Graham Finlayson, Catherine Gibbons, Phillipa Caudwell, John Blundell

University of Leeds

Introduction: Some individuals are driven to overeat due to excessive hedonic responsiveness to high fat foods. It is unknown whether these responses differ during sedentary or physically activated states or whether hedonics play a role in those who reduce overweight through exercise.

Methods: We examined hedonic measures of explicit liking (subjective ratings) and implicit wanting (speed of forced-choice) for an array of high and low fat foods. 37 overweight/obese adults (BMI = 30.97 ± 3.8 kg/m²; age = 41.1 ± 9.3 yrs) were assessed before (sedentary) and after (activated) a 12-week program of supervised exercise (N = 27) or no exercise control (C: n = 14). Exercisers were classified as Responders (R: n = 14) or non-Responders (NR: N = 13) depending on observed vs expected body composition changes from measured energy expenditure from exercise.

Results: In sedentary state, NR showed a bias towards high fat relative to low fat foods on all hedonic outcomes ($P < 0.01$) while R showed equivalent scores and C showed intermediate bias towards high fat foods. In activated state, appeal bias for high fat foods was lower in NR compared to responses prior to exercise training ($P < 0.01$), while there was no change in C. R showed an increase in liking for high fat vs low fat foods compared to before the intervention ($p < 0.01$) while implicit wanting scores decreased ($P < 0.05$).

Conclusion: Exercise-induced weight loss was associated with a dissociation between components of food hedonics with a simultaneous increase in explicit liking and decrease in implicit wanting for high fat food. Exercise may have an additional protective benefit for food intake control when sedentary overweight/obese individuals engage in regular exercise.

T2:OS1.5

Aerobic plus Resistance Training on pro-anti-inflammatory adipokines in obese adolescents

Carolina Ackel-D'Elia¹, Raquel Campos², Deborah Masquio¹, Ana Paulo Clemente², Bárbara Dal Molin Netto², Lian Tock³, Sergio Tufik², Marco Túlio de Mello², Ana Dâmaso²

¹Universidade Federal de São Paulo

²Universidade Federal de São Paulo – UNIFESP

³Weight Science

Introduction: to investigate the effects of Aerobic plus Resistance Training on bicycle *versus* treadmill exercise on pro-anti-inflammatory adipokines in These adolescents engaged on an interdisciplinary therapy.

Methods: A total of 86 obese adolescents (42 in bicycle training group and 44 in treadmill training group) were enrolled for 1 year of interdisciplinary weight-loss therapy (clinical, nutritional, exercise, physiotherapy and psychological).

Results: Both groups presented significant improvement for body fat mass, body lean mass, waist circumference, visceral and subcutaneous fat, QUICK, total cholesterol, VLDL-cholesterol, triglycerides, systolic and diastolic blood pressures, adiponectin, leptin, adiponectin/leptin and leptin/adiponectin ratios. Visceral/subcutaneous ratio, HOMA-IR and LDL-cholesterol improved significantly only in bicycle training group. Additionally, delta values were significant higher in bicycle than in treadmill training groups for body fat mass, body lean mass, HOMA-IR and QUICKI. Finally, for the entire population, Δ leptin to adiponectin ratio correlated positively with Δ body fat mass and negatively with Δ VO₂ submaximum (AT) and maximum and Δ adiponectin to leptin ratio correlated positively with Δ body lean mass and Δ QUICKI and negatively with Δ body mass, Δ body fat mass, Δ waist circumference, Δ visceral fat, Δ subcutaneous fat and Δ HOMA.

Conclusion: Long-term interdisciplinary therapy was effective in improving pro-anti-inflammatory adipokines in obese adolescents and bicycle training seems to promote better benefits than treadmill training.

Conflict of interest: Nothing to disclose.

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T2:OS1.6

Metabolic benefits of eccentric endurance exercise in overweight and obese individuals

Philipp Rein¹, Christoph Saely¹, Alexander Vonbank¹, Simone Geller-Rhomberg², Daniela Zanolin², Andreas Leiberer², Heinz Drexel²

¹Department of Internal Medicine & Cardiology, Academic Teaching Hospital Feldkirch

²Vivit-Institute, Academic Teaching Hospital Feldkirch

Introduction: Eccentric endurance exercise (e.g. hiking downwards) is less strenuous than concentric exercise (e.g. hiking upwards) but data on its potential to reduce cardiovascular risk are scarce.

Methods: We allocated 68 overweight and obese sedentary individuals to an exercise intervention program, consisting of hiking downwards the same route over two months. For the opposite way, a cable car was used where compliance was recorded electronically. The difference in altitude was 540 meters; the distance was covered three to five times a week. A matched group of 12 individuals served as a control group. Fasting and postprandial metabolic profiles were obtained at baseline and after the two months period.

Results: Compared with baseline, eccentric endurance exercise significantly lowered fasting glucose (99 ± 17 vs. 96 ± 13 mg/dl; $p = 0.036$) as well as glucose tolerance following the oral intake of 75 g glucose (250 ± 49 vs. 228 ± 54 mg*dl-1 h; $p < 0.001$), whereas these parameters remained unchanged in the control group ($p = 0.495$ and $p = 0.182$, respectively). Furthermore, eccentric endurance exercise significantly improved triglyceride tolerance in a standardized oral fat challenge test (2121 ± 1398 vs. 1744 ± 1143 mg*dl-1 h; $p < 0.001$), whereas triglyceride tolerance did not change significantly in the control group ($p = 0.695$). Body mass index was slightly but significantly lowered in the eccentric endurance exercise group (29.6 ± 3.1 vs. 29.2 ± 3.3 kg/m²; $p = 0.004$) but not in the control group ($p = 0.237$).

Conclusion: Eccentric endurance exercise is a promising new exercise modality with favorable effects on both fasting and postchallenge metabolism.

T4:OS1 – Trends, prevalence & determinants

T4:OS1.1

Foresight: Tackling Obesities. Six years on

Laura Webber¹, Tim Marsh¹, Divajeja¹, Retat¹, Brown¹, McPherson²

¹UK Health Forum

²Oxford University

Introduction: Foresight: Tackling Obesities (2007) used Health Survey for England data up until 2005 to model the future epidemiological and economic impact of the projected rise in obesity. This high profile report led to the establishment of 'healthy weight, healthy lives', – the first cross government policy to tackle obesity anywhere in the world. Six years on the team have rerun the Tackling Obesities simulation to see how the predictions made have changed.

Methods: A dual module microsimulation model was utilised to estimate the future disease and cost burden of obesity-related coronary heart dis-

ease (CHD), stroke, type 2 diabetes and 7 obesity-related cancers. The model tested three hypothetical scenarios and estimated the impact on morbidity and healthcare costs: scenario 1: BMI trends continue to rise unabated, scenario 2: a 1% reduction in population BMI, scenario 3: a 5% reduction in population BMI.

Results: In some age groups there is evidence of flattening obesity trends. However, while the picture is more optimistic than those observed in Foresight, the rates are still high (40% obesity in males and females estimated by 2050), predicting continued high rates of obesity-related diseases and subsequent health care costs.

Conclusion: The message remains the same: England will face increasing future burdens of Type 2 Diabetes, Cardiovascular diseases and cancer which will place an unsustainable burden on both the health service and the economy. The government needs to act in order to achieve a downward trend in obesity rates and avoid massive costs to the health system caused by obesity-related chronic diseases.

Conflict of interest: None to declare

T4:OS1.2

Obesity: A public health threat in Hungary. Previous trends and recent prevalence of obesity in 2013

Imre Rurik, et al.

University of Debrecen, Hungarian Society for the Study of Obesity

Introduction: The increasing ratio of overweight and obese people means a growing challenge for the Hungarian population, economy and health care provision alike. The previous wide-range evaluation about the nutritional status of Hungarian inhabitants was completed in 1988.

The aim of this study was to collect and present updated prevalence data. **Methods:** Anthropometric, educational and morbidity data of persons above 18 years were registered at primary care encounters for any reasons in all geographical regions of Hungary.

Results: The data (BMI, waist circumference, educational level) of 40,331 individuals (16,544 men and 23,787 women) were analyzed. The overall prevalence for overweight was 40.4% among men and 31.3% among women, while the relevant figures for obesity were recorded at 32.0% and 31.5%, respectively. Abdominal obesity was found in 37.1% of males and 60.9% of females. The data were presented according to age by decades as well. The highest odds ratio of overweight was registered in the group with middle educational level and the lowest odds ratio of obesity in the group with the highest educational level. The highest proportion (35.4%) of obese people lived in villages and 28.9% in Budapest. Distribution of overweighted persons were: Budapest (37.1%), other cities (35.8%) and villages (33.8%). Registered metabolic morbidities were strongly correlated with BMIs and both were inversely related to the level of urbanization.

Conclusion: Over the previous decades, there has been a shift in the distribution of population toward being overweight and moreover obese. This shift was most prominent among males, mainly belonging to the younger generation.

T4:OS1.3

Stable prevalence of obesity in Swedish schoolchildren from 2008 to 2013, but signs of widening socioeconomic gap in girls

Agneta Sjöberg¹, Lotta Moraeus², Lauren Lissner²

¹Department of Food and Nutrition, and Sport Science, University of Gothenburg, Gothenburg, Sweden

²Department of Public Health and Community Medicine, Public Health Epidemiology Unit, University of Gothenburg, Gothenburg, Sweden

Introduction: We follow 5-year prevalence of overweight, obesity and thinness in 7–9-year-old children in West Sweden, and investigate whether trends differed by gender and socioeconomic status.

Methods: Repeated cross-sectional anthropometric measurements of totally 3492 children in grades 1–2 were performed in 23 schools in 2008, 2010 and 2013. For BMI-classification the IOTF- and WHO growth references were used. Percentage of inhabitants with high education in the school-area was used for socioeconomic classification.

Results: Overall time-trends by IOTF-references for overweight (17.7%/19.3%/18.8%), obesity (3.2%/3.3%/3.1%) and thinness (6.5%/4.7%/6.9%) were fairly stable in 2008, 2010 and 2013. Similarly, using WHO-references, trends in overweight (25.7%/28.0%/27.2%) and obesity (7.9%/7.3%/8.4%) were stable although higher than IOTF-values, and prevalence of thinness was lower (0.5%/0.5%/0.6%). Using the IOTF-reference, significant gender differences were observed in these trends, i.e. gender-time interactions for normal-weight ($p = 0.012$), and thinness ($p = 0.0067$). The socioeconomic gradient for overweight and obesity was clear by both classification systems. Using IOTF-reference, this gap increased for obesity among girls ($p = 0.024$).

Conclusion: The prevalence of overweight and obesity did not change over five years but among girls we observed decreasing prevalence of normal weight and increasing thinness. Using the higher cut-points for obesity from IOTF-references, it was also possible to detect growing inequality among girls, implying that the epidemic of more extreme obesity may continue in some groups even when total overweight and obesity are stable. In the absence of continued national surveillance we can draw conclusions about West Sweden and only guess what happens in the rest of Sweden.

T4:OS1.4

The trends in overweight and obesity among 7-years old school children in Bulgaria

Vesselka Duleva, Stefka Petrova, Lalka Rangelova

National Center of Public Health and Analyses

Introduction: The rising of overweight and obesity in children during the last decades is a health problem. Childhood obesity accelerates throughout the Europe with alarming trends. Bulgaria is included in the WHO Childhood Obesity Surveillance Initiative (COSI) and the first national survey on representative sample of 7-years old schoolchildren was carried out in 2008, the second national survey was conducted in 2013 year.

Methods: The survey followed the protocol of the WHO COSI, which was jointly developed by the WHO Regional Office for Europe and the member states. The national sample of 7-years old schoolchildren are enrolled – 2511 in 2008 years and 3353 children in the same age are sampled in 2013 year. The weight and height are measured with standardized anthropometric equipment and methods according to the Protocol. Overweight and obesity are assessed by BMI, WHO growth reference for school-age children and adolescent, 2007 are applied.

Results: In 2008 the prevalence of overweight (including obesity) among boys is 28.2% and those in girls – 27.9%, obesity rate is high – 12.8% among boys and 11.8% for girls. The data from 2013 present the highest prevalence of overweight and obesity – the rate of overweight (including obesity) among boys is 32.4% and in girls – 28.6%, obesity levels are – 15.7% among boys and 12.2% for girls.

Conclusion: The data show negative trends in overweight and obesity in 1-st grade schoolchildren in Bulgaria, the prevalence of overweight and obesity among boys and girls are increased between 2008 and 2013 years, especially in studied boys.

T4:OS1.5

Comparison of overweight and obesity prevalence in Czech young school children and adolescents

Marie Kunesova¹, Hana Zamrazilova¹, Irena Aldhoon Hainerova², Bohumil Prochazka³, Jana Vignerova¹, Jana Parizkova¹, Petr Hlavaty¹, Barbora Sedlackova⁴, Lenka Dusatkova⁵, Vojtech Hainer¹

¹Obesity Management Centre, Institute of Endocrinology, Prague, Czech Republic

²Obesity Management Centre, Institute of Endocrinology, Prague, Czech Republic Department of Pediatrics and Center for Research of Diabetes, Metabolism and Nutrition, Third Faculty of Medicine, Charles University, Prague, Czech Republic

³Pediatric Clinic, Kutná Hora, Czech Republic;

⁴Obesity Management Centre, Institute of Endocrinology, Prague, Czech Republic Faculty of Science, Charles University, Prague, Czech Republic

⁵Obesity Management Centre, Institute of Endocrinology, Prague, Czech Republic, Faculty of Science, Charles University, Prague, Czech Republic

Introduction: Overweight and obesity prevalence in childhood and adolescence increased although in last years the increase was attenuated. Factors related to obesity and overweight development were compared in representative cohorts of the Czech young school children and adolescents.

Methods: Representative samples of young school children (n = 2,497) aged 6.5–7.5 years and adolescents (n = 1,542) aged 13.0–17.9 years were examined in 2009 and 2010. Family history, birth weight, breastfeeding duration, sleep length, food frequency and physical activity were assessed. Relation of individual factors to BMI in both age cohorts was examined. Overweight and obesity prevalence was estimated. Mann-Whitney, Chi-Square test and O2PLS were used for evaluation.

Results: Overweight and obesity prevalence in adolescents is 29,7 % in boys, 24,0 % in girls, in young school children 13,3% in boys, 15,0% in girls*. Breastfeeding (p = 0,08) and frequency of fruit consumption (p < 0,001) were more often in young school children. In adolescents more often consumption of fish (p < 0,001) was found. Predictive factors of BMI SDS were higher birth weight, consumption of skimmed and full milk and “light” drinks, negative relation was found to breastfeeding and sleep duration. Time spent on PC, TV viewing and occurrence of hypertension, type 2 DM and dyslipidaemia in family contributed positively to BMI.

Conclusion Overweight and obesity prevalence was higher in adolescents compared to young school children. More often breastfeeding was reported in younger school children, more often fruit consumption and less often consumption of fish. Family history of hypertension, type 2 DM and dyslipidaemia contributed to higher BMI SDS.

*According to Czech references.

T4:OS1.6

Eating and lifestyle behaviors among adolescents in Vlora's city, Albania

Fatjona Kamberi¹, Yllka Bilushi², et al.

¹Free professional

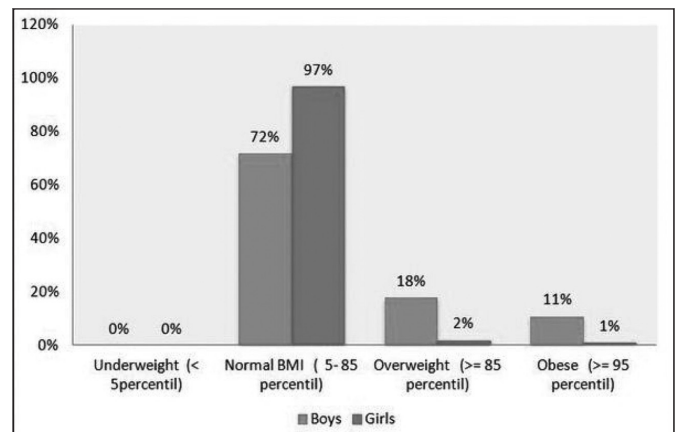
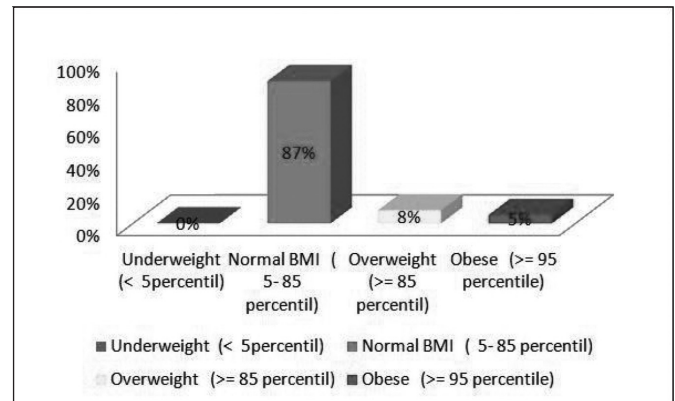
²University of Vlora, Public Health care department

Introduction: Prevalence of overweight and obesity in childhood and adolescence, food behaviors and incorrect lifestyles have increased drastically over the years. The study aims to highlight the influence of nutrition and lifestyle have on BMI and to identify risk factors associated with overweight and obesity in adolescence in context of life's globalization.

Methods: This is a cross-sectional study of 199 adolescents, class X–XII, High school “Ali Demi”, Vlora's city, May 2013. The data were collected via self-administered questionnaire. Adolescents were classified as either normal weight, overweight and obese according to international sex and age specific Body Mass Index cut-off points. BMI was calculated separately for boys and girls on basis of references they were made respectively for weight and height.

Results: Overweight and obesity prevalence in all participants in the study 8% and 5%. This prevalence is higher in boys than girls. By analyzing the other variables for eating behaviors, lifestyle and physical activity among adolescents under study highlighted not clear touch from life's globalization. Although the higher prevalence of overweight and obesity in boys, studied other variables should be considered within normal. This can be explained by the fact that in general girls are more careful about their physical aspect.

Conclusion: The socioeconomic characteristics, nutritional behaviors, physical activity and life style in general are essential to the health and quality of life. Education and health eating is not only the nurse role, but a social intervention which aims to promote behavior broad, sustained and coherent with psycho-physical health of the individual.



Thursday, 29 May, 2014

T5:OS1 – Surgical management

T5:OS1.1

Health outcomes at 3 years after Laparoscopic adjustable gastric banding (LAGB) in adolescents

Myriam Dabbas¹, Naziha Khen-Dunlop², Caroline Telion³, Yves Aigrain², Olivier Goulet¹, Yann Revillon²

¹Pediatric Gastro-enterology and Nutrition, Necker-Enfants malades hospital, APHP, Paris, France.

²Pediatric Surgery, Necker-Enfants malades hospital

³Anesthesiology, Necker-Enfants malades hospital

Introduction: In France, since 2008, LAGB is considered for adolescents with severe obesity. Lap band induces weight loss and short-term

health improvements, but little is known about long-term outcomes in adolescents.

Methods: All adolescents were included in prospective longitudinal assessment and entirely managed by a pediatric team. Patients were recruited after one year follow up and undergo an initial screening process prior to surgery and 6 months, 12 months and then annually after surgery.

Results: At baseline: participants (n = 35) were 14 to 18 years old, 26 % were males. Median BMI was 45 (38–57) and median weight was 125 kg (78–182). Co morbidities data demonstrated a high incidence of insulin resistance and 75% of metabolic syndrome. Three years after surgery median weight loss was 42 kg (2–57) corresponding to a percentage of excess weight lost of 69% (3–100). The majority of weight loss was evident 1 year after surgery (26 kg and 42% of EWL). Weight tends to stabilize after the second year (34 ± 6.5 versus 33.7 ± 7.8 of mean BMI at 2 and 3 years respectively, p = ns) An improvement in metabolic status was demonstrated (with HOMA-IR decreasing from 5.9 ± 3.5 to 0.99 ± 0.2, p < 0.00 and the resolution of 85% of dyslipidemia). Complications occurred generally after 2 years (failure rate of 14%).

Conclusion: Among severe obese adolescents there was substantial weight loss and an improvement of metabolic profile three years after LAGB. Patients require an important professional support, (12 visits in the first, 9 the second and 5 in the third year were recorded).

T5:OS1.2

Three years durability of the improvements in health-related quality of life (HR-QoL) observed after gastric banding: Results from the QUALITY study

Luca Busetto, Enrico Mozzi, Angelo Schettino, Francesco Furbetta, Cristiano Giardiello, Giancarlo Micheletto, Vincenzo Pilon

Italian Group for the Lap-Band (GILBplus group)

Introduction: Improvements in HR-QoL occur after bariatric surgery. Sustainability of these changes over time remain debated.

Methods: Prospective three-year multicenter Italian QUALITY study on changes of HR-QoL in obese patients treated with gastric banding. Inclusion criteria: BMI³40 kg/m² (BMI³35 kg/m² if complicated obesity) and age 18–60 years. 230 patients (53 M and 177 F) analyzed at 6 Italian bariatric centres. HR-QoL investigated with the SF-36 questionnaire.

Results: BMI was 41.4 ± 5.4 kg/m² at baseline, declined to 33.8 ± 5.8 kg/m² 12 months after surgery (P < 0,001), and further reduced to 31.9 ± 5.1 kg/m² 36 months after surgery (P < 0,001 vs 12 months). Scores in the SF-36 subscales were lower than in the general Italian population at baseline. The physical component summary score (PCS) was 51.9 ± 11.6 at baseline, improved to 79.2 ± 15.4 at 12 months (P < 0,001), and stabilized to 79.8 ± 15.6 at 36 months. The mental summary score (MCS) was 52.3 ± 11.8 at baseline, improved to 75.2 ± 17.3 at 12 months (P < 0,001), and stabilized to 74.2 ± 17.5 at 36 months. A decline >10 points between 12 and 36 months in the summary scores was observed in 22.0% of the patients for PCS, and in 26.8% for MCS. In a multiple linear regression analysis, deterioration in HR-QoL in the 12–36 months period was associated to the presence of better HR-QoL values at 12 months and to a more pronounced reduction of the self-perceived effect of the banding at 36 months.

Conclusion: Improvements in HR-QoL observed in the first year after surgery maintained up to the third year after gastric banding.

T5:OS1.3

Incretins secretion and glucose metabolism in the long-term period after biliopancreatic diversion performed for morbid obesity

Natalya Mazurina¹, Ekaterina Troshina¹, Natalia Ogneva¹, Yuriy Yashkov²

¹Endocrinology Research Center, Moscow, Russia

²Endosurgery and Lithotripsy Center, Moscow, Russia

Introduction: Glucose metabolism and stimulated incretins have been studied in morbidly obese and operated patients.

Methods: The patients of the 1st group (MO) had BMI > 40 (n = 22) and no history of diabetes mellitus. Patients after biliopancreatic diversion (BPD) were included in the 2nd group (n = 23). The 3rd group were normal weight controls (n = 22). Blood glucose levels, IRI, GLP-1, GIP and glucagon during the OGTT were measured in all patients.

Results: In MO group fasting glucose, IRI and HOMA-IR were maximal (p < 0.001). Impaired glucose metabolism was revealed in 68.2% of patients (n = 10). In the BPD patients postprandial glucose (120 min) was lower, in 17.4% we found postprandial hypoglycemia (<2.8 mmol/l). Stimulated IRI concentration was significantly higher in the BPD group (p = 0.026). Fasting and stimulated GLP-1 were significantly higher in BPD (p = 0.037 and p = 0.022 respectively). MO patients had higher fasting and stimulated GIP and glucagon levels.

Conclusion: Glucose intolerance and insulin resistance incidence is higher in MO patients. Hyperglucagonemia, increased GIP levels and decreased GLP-1 levels are observed in MO. Stimulated plasma IRI and GLP concentrations are significantly increased in BPD patients and may cause postprandial hypoglycemia.

T5:OS1.4

Evaluation of protein requirements before and 3 months after bariatric surgery in patients with morbid obesity

Aurélié Masgrau¹, Anne Mishellany-Dutour², Karem Slim³, Maude Robert⁴, Emmanuel Disse⁵, Nathalie Feugier⁶, Laure Gabert⁶, Pascale Le Ruyet⁷, Christelle Guillet⁴, Justine Gallo¹, Magalie Miolanne⁸, Nicolas Farigot⁸, Joelle Goudable⁶, Martine Laville⁵, Yves Boirie⁹

¹UNH, UMR 1019 INRA/Université d'Auvergne

²CRNH Auvergne, UEN

³CHU Clermont-Ferrand, Service de Chirurgie digestive

⁴CH Lyon Sud, Service de Chirurgie digestive

⁵CH Lyon Sud, Unité de Nutrition Endocrinologie Métabolisme – CRNH Rhône-Alpes

⁶CRNH Rhône-Alpes

⁷Lactalis, recherche et développement

⁸CHU Clermont-Ferrand, Service de Nutrition Clinique

⁹UNH, UMR 1019 INRA/Université d'Auvergne – CHU Clermont-Ferrand, Service de Nutrition Clinique

Introduction: Bariatric surgery in obese patients enables long-lasting weight loss and reduces comorbidities but is accompanied by protein deficiency leading to a loss of muscle mass. Thus, protein deficiency should be compensated on the basis of individual protein needs. However, protein requirement related to morbid obesity and after bariatric surgery have not been defined, and recommendations on protein requirement in this population are lacking. The objective of this study was to determine protein requirement of obese subjects before and after sleeve gastrectomy (SG) and gastric bypass (BPG) to develop practical recommendations.

Methods: 19 obese patients (BMI 43.1 ± 1.1 kg / m²), aged 25–61 years, were studied before and 3 months after SG (n = 13) or GBP (n = 6). Average protein needs (APN) and safe protein intakes (SPI) were evaluated by measuring nitrogen balance at two levels of nitrogen intake.

Results: APN before operation was 0.73 ± 0.15g/kgBW/d, corresponding to a SPI of 1.03g/kgBW/d. Weight loss was 19 ± 1kg 3 months after the SG, 19 ± 2 kg after GBP. Spontaneous protein intake was at 0.38 ± 0.14g/kgBW/d and 0.46 ± 0.17g/kgBW/d respectively. APN after SG and GBP

were 0.62 ± 0.15 g/kgBW/d and 0.50 ± 0.14 g/kgBW/d respectively. The corresponding SPI were 0.92 g/kgBW/d and 0.78 g/kgBW/d.

Conclusion: Safe protein intake for morbidly obese patients is higher than for non-obese adults (0.83g/kg/d). Three months after surgery, protein requirements decrease regardless of the type of surgery, but spontaneous intakes fail to cover protein needs. These results provide strong evidences of new specific recommendations for morbidly obese patients before and after bariatric surgery.

T5:OS1.5

Prevalence of iron, folic acid and vitamin B12 deficiency in obese patients undergoing different bariatric surgery techniques

Ana Saavedra¹, Maria Costa¹, Sandra Belo², Cláudia Nogueira², Joana Oliveira², Filipe Cunha², Eva Lau², Ana Santos³, Paula Freitas², Ana Varela², Joana Queirós², Flora Correia⁴, Davide Carvalho², et al.

¹Department of Endocrinology, Diabetes and Metabolism – Hospital of St. John, Oporto, Portugal

²Department of Endocrinology, Diabetes and Metabolism – Hospital of St. John, Oporto, Portugal Faculty of Medicine, Oporto University, Portugal

³Department of Clinical Epidemiology, Predictive Medicine and Public Health, Oporto, Portugal Faculty of Medicine, Oporto University, Portugal

⁴Department of Endocrinology, Diabetes and Metabolism – Hospital of St. John, Oporto, Portugal Faculty of Nutrition and Food Sciences, Oporto University, Portugal

Introduction: Micronutrient deficiency is an important complication after bariatric surgery due to changes in the absorption and/or lower intake. Iron, folic acid and vitamin B12 (vitB12) deficiencies are common in these patients.

Objective: Compare the prevalence of iron, folic acid and vitB12 deficiencies at 12 months of follow-up after three different surgical techniques: gastric banding (GB), Roux-en-Y gastric bypass (RYGB) and gastric sleeve (GS).

Methods: Retrospective cross-sectional study of a population of 465 obese patients undergoing bariatric surgery between Jan/2010 and Dec/2011. Were included those with evaluation of these micronutrients. Patients with no record about nutritional supplementation were excluded. We defined deficiency as serum iron <60 mg/dL, transferrin saturation <20% or serum ferritin <15 ng/mL; folic acid <2.2 ng/mL; vitB12 <200 pg/mL.

Results: We could not observe statistical significant differences when comparing iron deficiency among the different surgeries (N: 340 patients – GB 53.3% vs. RYGB 44.9% vs. GS 1.9%, $p = 0.295$). Only 1 patient had a deficit of folic acid and 18 patients had vitB12 deficiency. Although RYGB was associated with a larger number of patients with vitB12 deficiency (N: 226 patients – RYGB 83.3% vs. GB 16.7%), there was no statistically significant difference.

Conclusion: Iron deficiency is very common after bariatric surgery, being more prevalent in GB and RYGB, but the differences between the 3 procedures wasn't statistically significant. VitB12 deficiency is rare in the first year after surgery because body reserves are high and the deficit of folic acid is even less common.

T5:OS1.6

Early changes in brain metabolism following vagal stimulation

Charles-Henri Malbert, et al.

INRA Dept of Human Nutrition

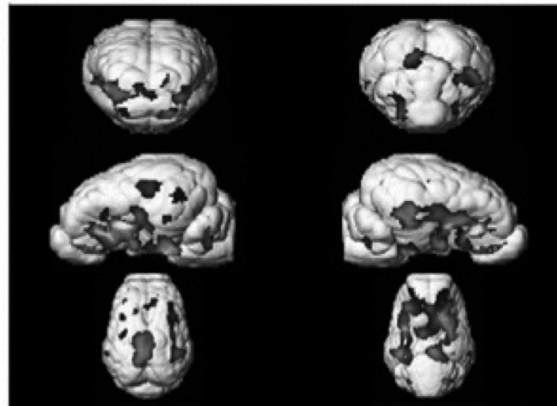
Introduction: Vagal stimulation is an effective neurophysiological treatment for epilepsy or depression. We recently demonstrated its potential to reduce food intake. However, the mechanism of action remains unclear especially because of the latency between the onset of stimulation and the

actual reduction in food intake. The aim of our study as to evaluate the changes in brain metabolism obtained by FDG PET scanning 7 days after the onset of vagal.

Methods: 6 pigs were fitted with two set of silicone vagal cuff comprising each two platinum electrodes using a laparoscopic approach of the abdominal vagi. 6 additional animals were sham operated. Stimulation was started the following day and continued until the PET imaging session. Stimulation parameters were identical those formerly used by our group. For PET scanning, the animals were anesthetized using isoflurane and artificially ventilated. FDG Images were acquired 45 minutes after injection using a HR+ scanner. The data were analyzed with statistical parametric mapping (SPM 8).

Results: Four areas were activated by vagal stimulation compared to sham animals ($p < 0.0001$ with FDR): cingular cortex, putamen, caudate nucleus and substantia nigra/tegmental ventral area. All these areas participate to the reward network.

Conclusion: Vagal stimulation activates almost all the areas included in the reward network. This activation explains several of the behavioral effects obtained by chronic vagal stimulation. Furthermore, the massive activation of the reward network at an early stage of the chronic stimulation suggests that brain imaging might be used as a tool to optimize the vagal stimulation parameters.



Metabolic changes between vagal stimulated vs sham animals. ($p < 0.0001$ with FDR).

T3:OS1 – Childhood obesity: Early origins & management

T3:OS1.1

The association between differences in gestational weight gain and differences in birth weight, body mass index and blood pressure in young adulthood. A male sibling study

Elina Scheers Andersson¹, Per Tynelius¹, Thorkild Sørensen², Finn Rasmussen¹

¹Karolinska Institutet, Department of Public Health Sciences

²University of Copenhagen, Institute of Preventative Medicine

Introduction: Large maternal gestational weight gain (GWG) is positively associated with birth weight (BW) and increased risk of overweight and obesity in the offspring. A weak association has also been found between GWG and offspring blood pressure (BP) in adulthood. However, as these associations might be explained by shared genetic or environmental factors between mother and offspring, we aimed to investigate these effects by comparing differences in GWG with differences in offspring BW, BMI and BP at 18y.

Methods: By using Swedish nation-wide record-linkage data, we identified women with at least two male children (full brothers) born 1982–1989. We used fixed effects regression models to analyze associations within sibling-pairs.

Results: We had complete data on the mothers' GWG, offspring BW and BMI for 8187 male sibling-pairs. In terms of adult BP, data on 4775 sibling-pairs was available. The mean GWG in the first and second pregnancy was 14.1 kg (SD = 4.2) and 13.8 kg (SD = 4.1), respectively. Adjusted fixed effects regression models indicated a positive association between differences in maternal GWG and differences in siblings' BW, 26 g per 1-kg increase in weight gain (95% confidence interval [CI]: 22.7–28.5), while no associations were found with neither BMI nor BP at 18y in the offspring.

Conclusion: This study showed, when taking those genetic and environmental factors which do not vary between pregnancies into account, positive associations between differences in GWG and differences in BW, but no associations with adult BMI or BP.

T3:OS1.2

Maternal Body Mass Index in relation to overweight/obesity in small children

Stefka Petrova

National Center of Public Health and Analyses, Sofia, Bulgaria

Introduction Overweight and obesity in the population including children is a serious and increasing public health problem. Early determinants of the obesity epidemic need to be studied in order to develop effective preventive measures. We examined the impact of maternal BMI, gestational weight gain (GWG) and postnatal growth on overweight among children 1–5 years old.

Methods Cross-sectional and retrospective surveys on a nationally representative sample of 2468 children aged 0–5 years and their mothers were conducted. Height and weight of all subjects were measured. Data about birth weight (BW), postnatal growth, pre-pregnancy weight and GWG were obtained by interviews and medical records. BMI of children was assessed using WHO growth standards.

Results The prevalence of mothers with pre-pregnancy underweight was 18.9%, those with overweight – 12.3% and obesity – 3.4%. Pre-pregnancy overweight/obesity was significant risk factor for subsequent overweight of children aged 1–5 years (16% vs. 5% overweight children born from mothers with pre-pregnant overweight vs. normal weight, despite of GWG and BW). Women with pre-pregnant obesity, compared with normal-weight mothers, had higher incidence of excessive GWG (70.4% vs. 33.9%) and higher incidence of macrosomia (27% vs. 4.3%) which correlated with overweight of children. Accelerated postnatal growth (0–3 months) of infants with normal BW increased the risk for overweight of children aged 1–5 years. Maternal obesity during the study correlated to overweight/obesity of children (OR 2.54).

Conclusion Overweight/obesity of mothers in pre-pregnancy and during the early childhood of their children exert significant influences on the onset of children's overweight.

T3:OS1.3

Ethnic-differences in objectively-measured PA among 5–6 year old children in the UK

Gemma Knowles, Miranda Pallan, Neil Thomas, Emma Lancashire

University of Birmingham

Introduction: Lifestyle factors such as physical activity (PA) and inactivity may contribute to ethnic-differences in chronic disease risk.

Methods: Using cross-sectional baseline data from an obesity prevention trial in the UK, we explored ethnic-differences in PA and sedentary behaviour in an ethnically-diverse cohort of 5–6yr children. 1050 children (52% male, 56% white, 31% South Asian, 7% black African/Caribbean)

wore an Actiheart monitor for 5-days. Ethnic-differences in PA (total PA, light-intensity PA (LPA) and moderate-vigorous PA (MVPA)) and sedentary time were assessed by multilevel linear regression models adjusted for potential confounders.

Results: Overall, MVPA was higher among South Asian boys (B = 13.7min/day, 95% CI: 0.1, 27.3) but lower among South Asian girls (B = -16.4min/day (28.7, 4.1)) compared with their white British peers. At weekends, Pakistani boys did 19min/day (0.90, 37.0) more MVPA compared with white British boys, Bangladeshi girls did 79min/day more LPA compared with white British girls (95% CI: 6.7, 179.5), and black African girls did 23min/day less MVPA (95% CI: -49.3, 2.7, p = 0.07). During the school day, total PA was lower among Pakistani girls (B = -0.131 m/s² (-0.205, -0.056)) but higher among black African/Caribbean boys (B = 0.13 m/s² (0.02, 0.23)), and MVPA was higher among black African boys (B = 9.4 (0.8, 18.0)) but lower among Pakistani girls (B = -10.8min/day (-16.1, -5.6)) compared with their white British peers.

Conclusion: Ethnic- and sex-specific interventions may be required to increase PA among young children. In particular, studies should focus on increasing MVPA among South Asian girls.

T3:OS1.4

Prediction of BMI change with treatment in obese children: The role of waist-to-height ratio

Claudio Maffei, Mara Tommasi, Francesca Tomasselli, Marco Marigliano, Alberto Sabbion, Anita Morandi

Regional Center for Pediatric Diabetes, Clinical Nutrition and Obesity.

Introduction: Selection of subgroups of obese children with different sensitivity to treatment allows to differentiate treatment strategies, leading to better cost/effective ratio of intervention. Waist-to-height ratio (WtH-r) is a simple potential candidate as discriminating variable. We tested the hypothesis that WtH-r measured before the beginning of an obesity treatment program, could be a predicting factor of the clinical outcome.

Methods: A sample of 206 obese 6–16-year-old children and adolescents were recruited. Anthropometry (height, weight, waist circumference) and metabolic parameters (lipid profile, plasma glucose, serum insulin, ALT) were measured. Each patient participated in a multidimensional treatment program in an outpatient obesity public service clinic. Therapy was based on a 6-month educational program on nutrition, lifestyle and physical activity. At the end of the program BMI was re-measured.

Results: Both BMI and WtH-r at recruitment were associated with BMI change (BMI_{follow-up}-BMI_{recruitment}) (r = -0.22, P < 0.01; r = 0.17, P < 0.05, respectively). Fasting plasma glucose (FPG, r = -0.17, P < 0.05) and age (r = -0.18, P < 0.01) were also associated with BMI change. Logistic regression analysis showed that WtH-r was associated with BMI change independently of age, sex and BMI (OR, c.i.: 1.10, 1.02–1.19), FPG = ns.

Conclusion: Children with similar age and BMI but different abdominal fat accumulation (WtH-r) responded differently to a weight loss program: the higher the WtH-r, the lower the BMI change. WtH-r may be useful to identify obese children who are more sensitive to intervention and those who need more intensive therapy.

T3:OS1.5

Triglycerides/HDL-cholesterol ratio in a population of adolescent overweight / obese (ow/ob): A new diagnostic marker of insulin resistance (IR) and Metabolic Syndrome (MS)?

Mosca, Mercurio, De Lucia, Piedimonte, Roma, Giacomini, Malara, Vania

Dept. of Paediatrics and Paediatric Neuropsychiatry, "Sapienza" University of Rome, Italy

Introduction: IR is important in the development of several pathologies. Atherogenic index of plasma [AIP = Log₁₀(triglycerides/HDL-C)] was

suggested as predictive value for IR in adults(1). Three more studies(2–4) (2008: 67; 2011: 594; 2012: 943 cases) on paediatric patients with either obesity or no cardiovascular risks, supported the hypothesis that AIP>0.21 can be a useful marker of IR and MS independently of age, gender, pubertal development.

Methods: To verify the correctness of the hypothesis, we enrolled a much larger population of 1239 ow/ob adolescents (aged 13.10 ± 2.95 ; F 54.79%), excluding those with overt MS. Main parameters studied: Z-BMI, WtHR, HDL-C, TG, SBP, DBP, Glu, IRI.

Results: AIP resulted 0.165 ± 0.270 and significantly correlated (0.10 to 0.38) with SBP, Z-BMI, IRI, IR-HOMA, WtHR. Its predictive value was 0.72, with specificity of 95%. Besides, AIP was >0.21 in 615 cases (49.63%), 339 of which (55.12%) had IR (IR-HOMA>2.5) and higher values of Z-BMI (2.07 vs. 1.85), IRI (17.01 vs. 11.38), IR-HOMA (3.66 vs. 2.47) ($p < 0.01$). Risk of IR in ow/ob adolescents with AIP>0.21, however, corresponded to an OR of just 1.11 (95% CI = 0.72–1.71).

Conclusion: Although AIP moves nicely along several indexes of MS, its chances to identify correctly the risk of developing IR or MS(2–3) and to predict positively the presence of IR seem quite low, unlike previously described in smaller populations.

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T3:OS1.6

Effect of a multidisciplinary childhood obesity intervention on insulin sensitivity and magnetic resonance spectroscopy (MRS) measured muscle fat

Cillius Esmann Fonvig¹, Dorthe S. Bille¹, Elizaveta Chabanova², Tenna R.H. Nielsen¹, Torben Hansen³, Oluf B. Pedersen³, Henrik S. Thomsen², Jens-Christian Holm¹

¹The Children's Obesity Clinic, Dept. of Pediatrics, Copenhagen University Hospital Holbæk, DK-4300 Holbæk, Denmark

²Department of Diagnostic Radiology, Copenhagen University Hospital Herlev, DK-2730 Herlev, Denmark

³The Novo Nordisk Foundation Center for Basic Metabolic Research, Section of Metabolic Genetics, Faculty of Health Sciences, University of Copenhagen, DK-2200 Copenhagen, Denmark.

Introduction: Fat deposition in non-adipose tissue is an important predictor of cardiovascular disease and carries more risk than ordinary fat accumulation in subcutaneous fat deposits. The ectopic fat deposition in non-adipose tissue, including skeletal muscle, has potential deleterious effects including the development of insulin resistance. AIM: To investigate the changes in muscle fat and insulin sensitivity during childhood obesity treatment.

Methods: Seventy-one children and youths, 8–20 years of age (median 12) with a body mass index (BMI) above the 90th percentile at enrolment to childhood obesity treatment, were assessed by anthropometry, fasting blood samples (glucose, insulin and lipids), and muscle fat by MRS, at enrolment and at follow-up.

Results: During 12 months of intervention the 71 children and youths (36 girls) decreased their BMI standard deviation score (-0.3 , 95% CI = $[-0.4; -0.2]$); though more in boys than in girls (-0.5 vs -0.1 , $p < 0.0001$). The boys significantly reduced their visceral adipose tissue mass and low density lipoprotein (LDL) cholesterol, whereas the girls did not. Further, there were no changes in muscle fat content or insulin sensitivity. Multiple linear regressions revealed an association between muscle fat and visceral adipose tissue mass ($p = 0.02$). We found no significant interactions between muscular fat and insulin sensitivity.

Conclusion: The multidisciplinary childhood obesity treatment induced a weight loss in boys and girls, and only boys reduced their visceral adipose tissue mass and LDL cholesterol. No changes were observed in muscle fat and insulin sensitivity, which may suggest a differentiated fat compartment regulation in obesity.

T4:OS2 – Prevention strategies

T4:OS2.2

Mindfulness is associated with weight status in a large sample of adult participants from the Nutrinet-Santé cohort

Géraldine Maëlle Camilleri, Caroline Méjean, France Bellisle, Serge Hercberg, Sandrine Péneau

Université Paris 13, Sorbonne Paris Cité, Equipe de Recherche en Epidémiologie Nutritionnelle (EREN), Centre d'Epidémiologie et Biostatistiques Paris Nord, Inserm (U1153), Inra (U1125), Cnam, Université Paris 5, Université Paris7, Bobigny, France

Introduction: Mindfulness is a new adaptive approach to weight maintenance. Mindfulness can be defined as a nonjudgmental awareness of the present moment experience. There is some evidence of the efficacy of mindfulness-based interventions for weight loss. However this psychological concept has been rarely explored in observational studies. We therefore aimed at studying the relationship between mindfulness scores and weight status in a large sample of adult general population.

Methods: A total of 14,336 men and 51,269 women aged ≥ 18 years participating in the NutriNet-Santé cohort were included in this cross-sectional analysis. Self-reported weight and height were collected as well as mindfulness levels using the Five Facets Mindfulness Questionnaire (FFMQ). The association between mindfulness, its subscales (categorized into quintiles) and weight status was assessed using logistic regression models adjusted for socio-demographic and lifestyle factors.

Results: Women with higher scores of mindfulness were less likely to be overweight (quintile 5 vs 1: OR = 0.77, 95% CI: 0.73–0.83). All subscales (Describe, Act with awareness, Nonjudgment and Non-reactivity) were negatively associated with the risk of being overweight but the strongest negative association was found for the Observe subscale (quintile 5 vs 1: 0.76 [0.71–0.80]). In men, there were no significant associations except for the Observe and Non-reactivity subscales.

Conclusion: This is the first study to examine relationships of mindfulness with weight status in a large nationwide sample. The results suggest that everyday life mindfulness attitude can influence weight status and could be a promising approach to obesity prevention.

T4:OS2.3

Educational differences in dietary intake and compliance to recommendations among the adult population of Lausanne

Ana-Lucia Mayen-Chacon, Pedro Marques-Vidal, Silvia Stringhini
IUMSP – Institut de Médecine Sociale et Préventive

Objective: To describe the relationship between education, dietary intake and compliance to the national dietary recommendations.

Methods: Data was drawn from a cross-sectional, population based study (CoLaus) including 4338 adult participants (53% women, mean age 57.6 (SD 10.5) years). Education was categorized as: high (tertiary education), middle (upper secondary education) and low (lower secondary education or lower). Dietary intake was assessed using a validated food frequency questionnaire. Dietary intake was assessed as energy, macro and micro nutrient intake.

Results: Compared to the high education group, individuals in the low education group had significantly lower intake of total fat and higher mean intake of carbohydrates. Non-significant differences in energy intake were found between education groups for both sexes. Greater compliance to recommendations was found for most macronutrients in the low education group. For example, for men, the Odds Ratio (OR) (95% Confidence Interval (CI)) for protein intake compliance of the lower vs. higher education group was 1.35 (1.00–1.82), and the OR for total fat intake was 1.51 (1.18–1.94). In women, these analyses were non-signifi-

cant. For micronutrients, few analyses between education and compliance to recommendations were significant. For example, saturated fatty acids in men (1.4 (1.05–1.86)) and retinol in women (1.79 (1.21–2.64)).

Conclusion: In this sample, individuals in the low education group seem to have a better diet, complying to the protein and fat recommendations. These associations were statistically significant in men. Due to the link between diet and chronic disease, leading diet towards the recommendations in all education groups is advised.

T4:OS2.4

Associations between urban neighbourhood social environment and obesity – a systematic review (the SPOTLIGHT project)

Ketevan Glonti¹, Joreintje Mackenbach², Harry Rutter¹, et al.

¹European Centre on Health of Societies in Transition, London School of Hygiene and Tropical Medicine, London, UK

²The EMGO Institute for Health and Care Research, Department of General Practice and Elderly Care Medicine, VU University Medical Center, Amsterdam, the Netherlands

Introduction: Socio-ecological models suggest that social environments within urban neighbourhoods are important upstream determinants of obesity. The aim was to identify possible associations between the social environments of urban neighbourhoods and adult obesity.

Methods: We reviewed studies focused on adults (aged 18+) conducted in high-income countries, that investigated the role of social environmental constructs within neighbourhoods in terms of their association with obesity outcomes. Six databases for primary studies were searched: MEDLINE, EMBASE, PsycINFO, Scopus, Web of Science and the Cochrane Library. We restricted our search to studies published in English between January 1995 and October 2013. A quality appraisal tool was used to evaluate methodological quality of the included studies.

Results: Ten studies were included. The overall methodological quality was rated as moderate to strong. The strongest associations with reduction in the odds of being overweight and/or obesity were found for social capital and collective efficacy, although few studies found statistically significant associations. There was heterogeneity in the definitions and metrics of obesity, social environmental constructs and neighbourhood.

Conclusion: Two social environmental factors, namely social capital and collective efficacy, were the most studied factors. There was some evidence that these factors were associated with reduction in obesity rates, but the research conducted to date has not robustly identified significant relations. We highlight challenges in this field and provide recommendations for further research, and for consistency of definitions of terms.

T4:OS2.5

Key results and implications from The Sogndal school-intervention study – a prospective controlled intervention study of two-year school-based 60 minutes daily physical activity on cardiovascular disease risk factors

Geir Resaland

Førde Hospital Trust

Introduction: Pathological processes of atherosclerosis begin in childhood and progress throughout life. Consequently, there is a need for preventive strategies early in life and physical activity is an important tool for primary prevention of cardiovascular disease (CVD). The aim of this study was to investigate the effects of a physical activity school-based intervention on CVD risk factors including cardiorespiratory fitness (CRF) in nine-year-old children.

Methods: Intervention-school children (n = 125) carried out 60-minute daily physical activity over two school years. Control-school children (n = 131) had 45 minutes of physical activity minutes twice weekly. We analyzed serum glucose, insulin, total cholesterol, high density lipoprotein

cholesterol and triglyceride. Peak oxygen uptake was directly measured during a treadmill protocol. Also body mass, height, weight, blood pressure and waist circumference were measured

Results: We found a significant greater beneficial development in CRF, blood pressure, total cholesterol to high-density lipoprotein cholesterol ratio and triglyceride in intervention-school children than in control-school children. Those children in the I-school with the least favorable starting point experienced the most beneficial effect of the intervention.

Conclusion: A daily school-based physical activity intervention can significantly beneficially modify children's CVD risk profile. Therefore, daily physical activity should be given due consideration in the design of school policies. To further test the successful results of this study we have set up a cluster-randomized controlled trial: "Active Smarter Kids" (N = 1400). The trial is funded by the Norwegian Research Council, and also includes outcomes on academic performance and quality of life.

T4:OS2.6

Promoting health equity in European children: Design and methodology of the prospective EPHE (Epoche for Promoting Health Equity) evaluation study

Krystallia Mantziki¹, Achilleas Vassilopoulos², Gabriela Radulian³, Jean-Michel Borys⁴, Maria João Gregório⁵, Pedro Graça⁶, Stefaan de Henauw⁷, Svetoslav Handjiev⁸, Tommy Visscher⁹, Jacob Seidell¹⁰

¹VU University of Amsterdam, The Netherlands

²Agricultural University of Athens, Greece

³University of Medicine and Pharmacy Bucharest, Romania

⁴Protéines, France

⁵University of Porto, Portugal

⁶Directorate General of Health, Portugal

⁷Ghent University, Belgium

⁸BASORD, Bulgaria

⁹Windesheim, Netherlands

¹⁰VU University of Amsterdam

Introduction: Reducing health inequalities is a top priority of the public health agendas in Europe. The EPHE project aims to analyse the added value of an intervention program based on EPODE methodology, adopted for the reduction of socioeconomic inequalities in childhood obesity. The interventions that will be implemented by this project focus on four energy balance-related behaviours (fruit and vegetable consumption, fluid intake, sedentary behaviour, sleep duration) and their determinants. This article presents the design of the effect evaluation of the EPHE project.

Methods: This is a two-year prospective follow-up evaluation study, which will collect data on the energy balance-related behaviours of 6–8 year olds and their potential family-environmental determinants, depending on the socio-economic level of the parents. For this purpose a parental self-reported questionnaire will be constructed and disseminated in selected communities of seven European countries (Belgium, Bulgaria, France, Greece, Portugal, Romania, The Netherlands).

Results: The questionnaire assesses the socioeconomic status of the parents (5 items) and the dietary (12 items), sedentary (2 items) and sleeping (4 items) behaviour of the child. Alongside potential family-environmental determinants are assessed. The sample will be recruited from schools of a selected medium-sized city in each participant country.

Conclusion: This study will evaluate the effects of the EPHE community-based programs. Furthermore, it will provide evidence for socioeconomic inequalities related to children's specific energy balance-related behaviours and family environmental determinants, in seven European countries.

Special oral session – Around the world in a day

1

Obesity trends in Himalayan Mountain Villages between 1995 and 2013: Role in Diabetes?

Syed Shah¹, Mubarak Shah², Mahtab Jan³, Ali Khan³

¹Institute of Public Health, College of Medicine and Health Sciences, United Arab Emirates University

²District Hospital, Gilgit Baltistan

³Aga Khan Health Service Gilgit

Introduction: This study was conducted to assess the trends in prevalence of overweight and obesity among adults in Himalayan mountain villages.

Methods: Two independent population based were conducted in 1995 and 2013 in Gilgit Baltistan region of Pakistan in random samples of men and women aged 18 years and older. The total number of participants with complete height and weight measurements was 4,674. WHO cut-offs were used to define overweight, obesity (BMI, 25–29, and 30).

Results: Overall, during the study period, obesity increased from 2.3% in 1995 to 12.5% in 2013. Prevalence of overweight increased from 11.5% in 1995 to 27.1% in 2013. Of the 1,077 participants examined in 2013, 69 (6.4%) had type 2 diabetes and 82 (7.6%) were pre-diabetics. Statistically significant ($p < 0.05$) correlates for type 2 diabetes were elevated waist circumference (Adjusted Odds ratio (AOR)=4.06; 95% CI 2.16, 7.64), age (AOR = 1.03; 95% CI 1.021, 1.054), and elevated waist circumference (Adjusted Odds ratio AOR = 2.17; 95% CI 1.16, 4.06). Significant correlates for pre-diabetes included obesity (AOR = 15.96; 95% CI 7.77, 32.78) and age (AOR = 1.02; 95% CI 1.01, 1.05).

Conclusion: Overweight and obesity is rapidly growing public health burden in the rural population of Pakistan. Overall obesity and central obesity were significant correlates for type 2 diabetes and pre-diabetes in the high mountain study populati

2

School-based obesity prevention intervention in Chilean children: Effective in controlling, but not preventing obesity

Juliana Kain, Barbara Leyton, Fernando Concha

INTA, University of Chile

Objective: To evaluate the effectiveness of a 12-month multi-component school-based obesity prevention intervention.

Setting: 9 elementary schools in Santiago, Chile.

Subjects: 6–8 y old low-income children (N = 1474).

Methods: Randomized stratified controlled study; 5 intervention/4 control schools. Intervention included training teachers to deliver nutrition contents and to improve the quality of PE classes, training kiosk owners and limited parental participation. We determined teacher's degree of implementation, % healthy snacks brought from home, children's nutrition knowledge, nutritional status, duration of PE classes and % time in moderate/vigorous activity (MVA). Effectiveness was determined by comparing changes in BMI Z between intervention and control children by sex, using PROC MIXED.

Results: The main results show that in boys, % obesity increased non-significantly in both types of schools. In girls, it increased in control schools, while decreasing slightly in intervention schools (both non-significant). MVA and % class time in MVA was low and declined from 24.5 to 16.2% and remained unchanged (24.8 to 23.7%) in classes conducted by untrained and trained teachers respectively. In boys, BMI Z declined from 1.33 to 1.24 and increased from 1.22 to 1.35 in intervention and control schools respectively. In girls, BMI Z remained unchanged in intervention schools, while increasing significantly in control schools (0.91 to

1.06, $p = 0.024$). The interaction group * time was significant for boys ($p < 0.0001$) and girls ($p = 0.004$).

Conclusion: This intervention was effective in controlling obesity, but not reducing it. Even though this outcome may seem poor, results showed that when no intervention is implemented, obesity increases.

3

Obesity among adults in Kazakhstan: Prevalence and risk factors

Turegeldy Sharmanov, Shamil Tazhibayev, Oksana Dolmatova, Altyn Sarsembayeva, Orynkul Mukasheva, Baurzhan Zhussupov, Ayan Yergaliyeva

Kazakh Academy of Nutrition

Introduction: This study examines the obesity prevalence and the association between demographic, social and behavioral drivers of obesity among people aged 18–64 in Kazakhstan.

Methods: We used a cross-sectional study design to estimate the role of factors for having obesity with body mass index (BMI) ≥ 30 kilograms per meter squared among 3016 individuals aged 18–64 years from a representative national sample of 2100 households. Data were collected through individual interviews. Height and weight of respondents were measured. A logistic regression model was used to identify adjusted estimations of odds ratios (OR) and 95% confidence interval (95% CI) of risk factors in two groups – with and without obesity.

Results: We identified 686 respondents with BMI equals 30 and more (prevalence 22.7%). Obese respondents were more likely to be older (OR = 4.0, 95% CI = 2.02–7.9 for 25–34 years old; OR = 8.0, 95% CI = 4.15–15.43 for 35–49 years old; OR = 14.78, 95% CI = 7.68–28.45 for 50–64 years old, the reference category – 18–24 years old); females (OR = 1.92, 95% CI = 1.51–2.44); Russians (OR = 1.4, 95% CI = 1.06–1.85, the reference category – Kazakhs); live in rural area (OR = 1.92, 95% CI = 1.52–2.44) and in provinces located in North Kazakhstan (OR = 1.61, 95% CI = 1.07–2.41, the reference category – Central Kazakhstan); consume fat food at least daily (OR = 1.31, 95% CI = 1.05–1.65).

Conclusion: Our study identified modifiable and non-modifiable risk factors of obesity in Kazakhstan that can be used for targeting obesity prevention efforts.

4

Prevalence of overweight and characteristics of body fat composition among urban and rural school-children in Taiwan

Nain-Feng Chu¹, Hsiu-Yueh Su², Bi-Yun Chen³, Isabel Tzou³, et al.

¹Taitung Hospital, Ministry of Health and Welfare, Taiwan, School of Public Health, NDMC, Taipei, Taiwan

²School of Nutrition and Health Sciences, Taipei Medical University, Taipei, Taiwan

³School of Public Health, NDMC, Taipei, Taiwan

Introduction: To evaluate the prevalence of overweight among school children at urban and rural area in Taiwan and examine the characteristics of body composition among these children.

Methods: We conducted school-wide survey among children at urban and rural area in 2006 and 2012. Body height and weight were measured using standard scales and BMI was calculated as kg/m^2 . We measured body composition using the Tanita body composition analyzer (TBF-410GS). Percentage of body fat (%BF) was obtained for further analyses.

Results: Totally, 1263 urban and 577 rural children were included for this study. The mean BMI for boys was 21.6 ± 4.2 at urban and 21.0 ± 4.2 at rural area and for girls was 20.5 ± 3.5 and 20.3 ± 3.4 at urban and rural area (no statistical difference). But the %BF was 22.2 and 18.9 ± 6.9 for

urban and rural boys ($p < 0.001$), and was 26.2 ± 7.8 and 24.5 ± 7.1 for urban and rural girls ($p < 0.01$).

The overall prevalence of overweight was 38.3% in boys and 24.6% in girls for urban children and was 30.4% and 20.5% for rural children. The mean BMI was no statistical difference between urban and rural area (26.0 vs. 26.3 for boys and 25.4 vs. 25.4 for girls). However, the %BF was higher for urban overweight children when compared with rural overweight children (28.8 vs. 26.5 for boys, $p < 0.05$ and 36.5 vs. 32.9 for girls, $p < 0.001$).

Conclusion: Using BMI as cut-off points of overweight for children at urban and rural area may be biased (or underestimate for the urban children). Body fat composition may be a more appropriate criteria for children comparing with different areas.

5

Gender difference in intra-individual double burden of malnutrition among urban Tunisian adults

Jalila El Atti¹, Mohamed Hsairi², Hajer Aounallah-Skhiri², Pierre Traissac³, Agnès Gartner³, Houda Ben Gharbia¹, Chiheb Ben Rayana¹, Francis Delpeuch³

¹INNTA (National Institute of Nutrition and Food Technology), Tunis, Tunisia & SURVEN Unit (Nutritional Surveillance and Epidemiology in Tunisia research laboratory)

²INSP (National Institute of Public Health), Tunis, Tunisia & SURVEN Unit (Nutritional Surveillance and Epidemiology in Tunisia research laboratory)

³IRD (Institut de Recherche pour le Développement), NUTRIPASS Unit, IRD-UM2-UM1, Montpellier, France

Introduction: In the context of nutrition transition, North-African countries are facing rapid increases in overweight/obesity while under-nutrition such as anaemia and iron deficiency (ID) remains highly prevalent. This study aimed at comparing the variation of this double burden at individual levels with environment and socioeconomic among Tunisian urban men and women.

Methods: Cross sectional survey (stratified two-stage clustered sample) of 1689 female and 930 male, 20–49 y living in the Great Tunis. Overweight, obesity and abdominal obesity were defined using WHO criteria. Anaemia was defined by gender specific WHO cut-offs and ID by serum ferritin concentration ($< 15 \mu\text{g/L}$), after correction for inflammation (CRP $> 5 \text{ mg/L}$ and/or orosomucoid $> 1 \text{ g/L}$). Adjusted associations for geographic and socioeconomic characteristics (educational level, marital and professional status, household economic level, age, parity) were assessed by logistic regression.

Results: The coexistence of overweight/anaemia was much higher ($P < 0.0001$) among women vs. men (25.7%[22.9–28.6] vs. 3.7%[2.4–5.7]) as was obesity/anaemia (12.8%[11.1–14.7] vs. 1.2%[0.6–2.3]) and abdominal obesity/anaemia (16.7%[14.2–19.3] vs. 1.0%[0.5–2.0]). Similar results were observed for the association of overweight/obesity/abdominal obesity with ID. Overweight/anaemia was associated with age for both genders while obesity/abdominal obesity with anaemia were related to married status and parity for women and household economic level for men. The same risk factors were observed for overweight/obesity/abdominal obesity with ID.

Conclusion: A quarter of women presented double burden whereas less than 4% of men were affected. Except age which is associated in both genders, determinants were physiological in women and economic in men inducing nutrition interventions targeted at women as group at risk.

Friday, 30 May, 2014

T6:OS1 – Cardiometabolic interactions

T6:OS1.1

Effects of therapeutic weight loss and metabolic improvement on P wave dispersion in overweight and obese patients

Anna Giulia Falchi¹, Chiara Muggia¹, Ilaria Grecchi¹, Carmine Tinelli²

¹Department of Internal Medicine and Therapeutics, Clinica Medica II, Vascular and Metabolic Diseases, IRCCS Policlinico San Matteo Foundation, Pavia, Italy

²Clinical Epidemiology and Biometric Unit, IRCCS Policlinico S. Matteo Foundation, Pavia, Italy

Introduction: Obesity represents an independent risk factor for the development of atrial fibrillation. Atrial electrophysiology can be represented by a basic, noninvasive ECG indicator: P wave dispersion. Our aim is to investigate the effects of therapeutic weight loss and metabolic improvement on P wave dispersion in obese and overweight patients.

Methods: We performed a post hoc analysis of prospectively gathered data from a randomized clinical trial. 32 healthy overweight and obese patients [16 males and 16 females (respectively mean age \pm sd: 48 ± 11.8 and 48 ± 12 years; mean body mass index (BMI) \pm sd: 32.1 ± 3.4 and $33 \pm 3.9 \text{ kg/m}^2$)] were examined for six months. They were treated with a hypo caloric balanced diet (-500 Kcal/day), aiming at 5% weight loss at the 6th month. Glycaemia, lipid profile, and an electrocardiogram (ECG) have been checked at t0 and t6. ECGs were transferred to a personal computer via a scanner and then magnified 400 times to examine P wave dispersion.

Results: Both responders and not responders (mean weight loss \pm sd respectively $-8.6 \pm 2.92 \%$ and $-1.76 \pm 2.59 \%$) ameliorated metabolic profile, especially responders [glucose level -6.5% ($p = 0.008$), LDL -6.9% ($p = 0.04$)]. Responders showed a more significant P wave dispersion reduction [$-0.42 \pm 0.22 \text{ ms}$, $-34.87 \pm 12.76 \%$ ($p = 0.004$)], than not responders [$-0.13 \pm 0.34 \text{ ms}$; $-8.34 \pm 32.44 \%$ ($p = 0.008$)]. The correlation analysis between the decrease of P wave dispersion and weight loss revealed good degree of correlation ($r = 0.6$ $p = 0.0001$).

Conclusion: Our findings suggest that weight loss induces a significant reduction on P wave dispersion.

T6:OS1.2

Correlation between Pulse Wave Velocity and Heart Rate Variability in Young Patients with Metabolic syndrome

Krasimira Hristova¹, Ivy Shuie²

¹National Heart Hospital Sofia, Bulgaria

²School of the Built Environment •Heriot-Watt University •Edinburgh, UK

Introduction: To investigate the correlation between pulse wave velocity (PWV) and heart rate variability (HRV) in young patients with metabolic syndrome (MS). Pulse wave velocity (PWV) is the most popular index for assessment the arterial stiffness

Methods: The analysis was performed in 45 patients – 22 men and 23 women mean age – 21–40 years with MS. And 10 normal volunteers. The PWV were examined a non-invasive digital volume pulse (DVP) measuring system using a dual channel simultaneous measurement method. The changes of systolic and diastolic blood pressure and of pulse rate after active standing were registered noninvasive

The RR intervals were recorded by means of MP 100 computerized system with ECG module and the maximal –minimal interval during deep breathing (HRdb), the Valsalva ration (VR), and the 30 :15 ratio were calculated automatically

Results: The PWV of MS group is significantly higher than those of normal blood pressure. ($P < 0.05$), the reflexion index (RI) and arterial stiffness index (SI) parameters in MS group are markedly higher than those in controls. RR variability is positively related with PWV in two groups, but the correlation in MS group is better than those in controls. Our results reveal abnormal cardiovascular responses with significant decrease of the HRdb response, the VR and the 30:15 ratios in the patients in comparison to the controls. The abnormalities were asymptomatic in 59% of the patients.

Conclusion: PWV should be as another important clinic index to evaluate the risk and the effect of MS treatment to young patients. Autonomic nerve function disorder may be lead to MS too.

T6:OS1.3

Sympathetic nervous system activation and lipid metabolism: the NEO study

Hillebrand¹, Swenne¹, Maan¹, Biermasz¹, de Koning¹, de Roos¹, Lamb¹, Jukema¹, Rosendaal¹, den Heijer², Rensen¹, de Mutser¹

¹Leiden University Medical Center, Leiden, The Netherlands

²VU Medical Center, Amsterdam, The Netherlands

Introduction: We hypothesize that SNS activation is associated with higher serum triglyceride concentrations and non-high-density lipoprotein concentrations, lower high-density lipoprotein concentrations, and with higher intrahepatic triglyceride content.

Methods: Baseline analysis of data of the Netherlands Epidemiology of Obesity study. Heart rate was estimated from a 10 second 12-lead electrocardiogram and heart rate variability was calculated over 24 hours. Fasting serum cholesterol concentrations were measured. Serum triglycerides were measured fasting and 30 min and 150 min after a liquid mixed meal. Intrahepatic triglyceride content was measured by 1H-magnetic resonance spectroscopy. We performed multivariate linear regression analyses.

Results: After exclusion of missing data ($n = 496$), 6174 participants were included: 44% men, mean (SD) age: 56 (6) years and mean BMI 26 (4) kg/m². Per 10 beats/min, total cholesterol concentration was 0.06 mmol/L (95% CI: 0.02, 1.10) higher and fasting serum triglyceride concentration was 5.8% (3.9, 7.8) higher. Heart rate was not associated with serum HDL or LDL concentrations. Postprandial triglyceride concentrations were 5.2% (3.5, 6.9) higher 30 minutes, and 4.4% (2.6, 6.3) higher 150 minutes after the liquid mixed meal. Intrahepatic triglyceride content was 13.1% (7.7, 18.7) higher after adjustment for confounding factors. Associations with heart rate variability were similar.

Conclusion: SNS activation was associated with higher fasting total cholesterol and higher serum triglyceride concentrations, and with higher intrahepatic triglyceride content. These results may imply that SNS activation alters the lipid profile, and that abnormal lipid concentrations are a therapeutic target to prevent the negative cardiovascular consequences of increased SNS activation.

T6:OS1.4

Epicardial adipose tissue and cardiometabolic parameters in obese women

Mirjana Sumarac-Dumanovic¹, Jelena Milin-Lazovic², Danica Stamenkovic-Pejkovic², Danka Jeremic², Goran Cvijovic¹, Ana Gligic², Snezana Polovina², Dragan Micic¹

¹Faculty of medicine, University of Belgrade, Center of Obesity, Clinical Center of Serbia

²Center of Obesity, Clinical Center of Serbia

Introduction: Epicardial fat pad (EFP) is a visceral fat type, which functions as metabolically active endocrine organ. Besides being a marker of cardiovascular risk, due to its anatomical and functional closeness (paracrine interactions) with the myocardium, EFP can play an important role in the structural changes of the left ventricle, which are associated with

obesity. The aim of study was to examine the relationship among epicardial fat pad thickness (EFPT), left ventricular mass, insulin sensitivity and trunk obesity parameters in obese women.

Methods: In 36 overweight and obese women (BMI = 34.13 ± 4.84 kg/m², age = 37.89 ± 30.10 g), without hypertension and diabetes echocardiogram with determination EFPT and measurement of regional (trunk) of adipose tissue using osteodensitometry were done. Fasting plasma glucose nad insulin were measured and HOMA index calculated. Based on the mean values of EFPT (6 mm), respondents were divided into two groups (group 1: EFPT \leq 6mm, group 2: EFPT $>$ 6mm). Significant difference was found by using t test.

Results: In Group 2 (EFPT $>$ 6 mm) registered statistically significantly higher BMI (32.36 ± 3.43 vs. 36.51 ± 5.41 , $p < 0.05$), HOMA-IR (3.76 ± 1.60 vs. 5.32 ± 2.08 , $p < 0.05$) and left ventricular mass (176.54 ± 44.28 vs. 209.64 ± 43.07 , $p < 0.05$). Statistically significant correlation exists between EFPT and BMI ($r = 0.583$, $p < 0.001$), trunk fat tissue ($r = 0.409$, $p < 0.05$), HOMA-IR ($r = 0.414$, $p < 0.05$) and left ventricular mass ($r = 0.506$, $p < 0.001$).

Conclusion: Our study showed positive correlation between epicardial fat thickness, left ventricular mass and insulin resistance suggesting potential role of EFPT in obesity-related myocardial structural changes.

T6:OS1.5

Akt/mTORC1 activation and oxidative stress promote the growth of dysplastic hepatocytes through increased apoptosis and compensatory proliferation in livers of obese and diabetic mice

Arfianti, Lee, Heydet, Larter, Barn, Teoh, Farrell

Liver Research Group, The Australian National University, Canberra, Australia

Introduction: Obesity and type 2-diabetes are independent risk factors for hepatocellular carcinoma (HCC). We previously reported that DEN-induced hepatocarcinogenesis is accelerated in obese and diabetic *foz/foz* NOD.B10 mice [JGH 2011; 26 (Suppl):4]. The present study aims to investigate the role of insulin-related signaling pathways and oxidative stress during early stage of obesity-induced HCC

Methods: Male *foz/foz* and lean wild type littermates were injected with DEN (10mg/kg i.p.) at 12–15 days of age; controls were injected with vehicle (saline). At 12 weeks post-DEN injection, dysplastic hepatocytes were identified by glutathione S-transferase pi (GST-pi) immunohistochemistry (IHC). Hepatic genes and proteins were examined by real-time polymerase chain reaction (RT-PCR), immunoblotting, and immunohistochemistry (IHC). Cellular oxidative status was assessed by GSSG/GSH level.

Results: DEN-treated *foz/foz* mice exhibited a higher number of GST-pi-positive cells compared to respective lean mice. There was corresponding increased proliferative and apoptosis markers in obese mice, owing to up-regulation of the cell cycle regulators (cyclin D1, cyclin E) and pro-apoptotic Bax, respectively. Livers of *foz/foz* and lean showed equivalent increased in GSSG/GSH levels, but only *foz/foz* mouse livers demonstrated induction of redox-sensitive transcription factors Nrfl/2. Interestingly, Akt and mTOR phosphorylation were enhanced in livers from DEN-injected obese mice, indicating mTOR complex 1 (mTORC1) activation. The functional relevance of this for control of hepatocyte growth was evident by enhanced phosphorylation of both p70S6K1 and eIF-4B.

Conclusion: The present study indicates that Nrfl/2-mediated oxidative stress response and Akt/mTORC1 activation contribute to enhanced growth of dysplastic hepatocytes during early stages of obesity-accelerated hepatocarcinogenesis.

T6:OS1.6

Circulating anti-Müllerian hormone levels in relation to nutritional status and selected adipokines levels in polycystic ovary syndrome

Magdalena Olszanecka-Glinianowicz¹, Paweł Madej², Aleksander Owczarek³, Jerzy Chudek⁴, Piotr Skalba²

¹Health Promotion and Obesity Management Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

²Department of Endocrinological Gynecology, Medical University of Silesia, Katowice, Poland

³Division of Statistics in Sosnowiec, Medical University of Silesia, Katowice, Poland

⁴Pathophysiology Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

Introduction: Numerous data indicate that adipokines participated in PCOS pathogenesis. It is suggested that AMH level is a marker of follicular disturbances severity in PCOS. The aim of the study was to analyze the impact of nutritional status and selected adipokines on plasma AMH levels in PCOS women.

Methods: A cross-sectional study involving 87 PCOS (48 obese) and 67 Non-PCOS women (36 obese). Anthropometric parameters were measured and body composition was determined by bioimpedance method. In the fasting state serum glucose, androgens, FSH, LH, SHBG, insulin, AMH, apelin-36, adiponectin, leptin and omentin-1 were measured.

Results: Plasma AMH levels were significantly higher in PCOS than in Non-PCOS group (7.8 ± 4.3 ng/mL vs. 4.4 ± 2.4 ng/mL; $p < 0.001$). Moreover AMH levels were higher in both PCOS and Non-PCOS normal weight than in obese subgroups (8.9 ± 4.4 ng/mL vs. 7.0 ± 4.0 ng/mL; $p < 0.05$ and 5.1 ± 2.4 ng/mL vs. 3.9 ± 2.3 ng/mL; $p < 0.05$). There were negative correlations between AMH levels and anthropometric parameters (body mass, BMI, fat mass and percentage as well as waist circumference) and plasma omentin-1 concentrations ($R = -0.28$, $p < 0.001$; $R = -0.30$, $p < 0.001$; $R = -0.36$, $p < 0.001$; $R = -0.34$, $p < 0.001$; $R = -0.23$, $p < 0.01$ and $R = -0.20$, $p < 0.05$, respectively) in all study group. In multiple regression analysis circulating AMH levels variability was explained by omentin-1 levels and anthropometric parameters (excluding waist circumference).

Conclusion: Nutritional status is the factor influencing the circulating AMH levels independent of PCOS. It seems that omentin-1 levels is the link between nutritional status and AMH secretion.

T1:OS2 – Genetic, epigenetic & omics

T1:OS2.1

Haploinsufficiency of the retinoblastoma protein gene associates with browning of white fat

Petar Petrov, Andreu Palou, Joan Ribot, María Luisa Bonet

Laboratory of Molecular Biology, Nutrition and Biotechnology-Nutrigenomics, Universitat de les Illes Balears-CIBEROBN

Introduction: Mice haploinsufficient for the retinoblastoma protein gene (Rb1^{+/-} mice) are protected against diet-induced diabetes [1], and mouse embryo fibroblasts derived from Rb1^{-/-} embryos are committed to a brown adipose differentiation pattern [2]. We aimed to study the effects of Rb1^{+/-} on white adipose tissue (WAT) browning in adult mice.

Methods: Rb1^{+/-} mice and WT littermates fed a normal fat diet were used ($n = 8-11$ /group). Body weight and composition, glucose tolerance, insulin sensitivity, indirect calorimetry, and gene expression in WAT and brown (BAT) adipose tissue were analyzed. Stromal cells were derived from WAT and BAT depots and differentiated in vitro to adipocytes in the presence of vehicle or rosiglitazone.

Results: Compared to WT, adult Rb1^{+/-} mice displayed equal body weight but decreased adiposity; increased insulin sensitivity; improved blood lipids; increased rectal temperature; and a reduced respiratory

quotient. Ppara, Cpt1b, Pdk4 and Cidea gene expression and Ucp1 protein were up-regulated in WAT of Rb1^{+/-} mice. Differentiated Rb1^{+/-} WAT-derived adipocytes had increased Pparg, Ppargc1a, Prdm16 and Cpt1b expression both under basal conditions and in the presence of rosiglitazone.

Conclusion: In adult mice under a normal fat diet, haploinsufficiency of the Rb1 gene associates with reduced adiposity and improved metabolic profile together with paramount signs of WAT browning. Furthermore, preadipose cells resident in WAT depots of Rb1^{+/-} animals appear to retain an increased capacity for brown adipogenesis.

References:

- 1 Mercader J. et al, *Am.J.Physiol.Endocrinol.Metab.* 2009;297;E184–93.
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T1:OS2.2

Identification of epigenetic changes upon adipocyte differentiation in the human SGBS cell line

Gheldof, Holzwarth, Valsesia, Marquis, Hager

Nestlé Institute of Health Sciences

Introduction: A profound understanding of adipogenesis is highly relevant in the study of obesity. Our current knowledge of the regulatory mechanisms underlying this complex process is however not comprehensive yet. Moreover, most studies on the role of chromatin regulation in adipogenesis have been carried out in the murine pre-adipocyte cell line 3T3-L1. It is currently not known how well the regulatory mechanism in this aneuploid mouse cell line represents the human physiology. We propose to study the chromatin structure of the human SGBS pre-adipocyte cell line, derived from adipose tissue of a patient with Simpson-Golabi-Behmel syndrome with retained capacity for adipogenic differentiation.

Methods: We used the FAIRE-seq method (Formaldehyde Assisted Isolation of Regulatory Elements) to map open chromatin regions in both SGBS and 3T3-L1 cells at various stages of the differentiation process.

Results: By comparing the pre-adipocyte chromatin state with that in fully differentiated mature adipocytes, we identified epigenetic changes upon differentiation in SGBS cells, and assessed these changes relative to those derived from mouse 3T3-L1 adipocytes. Integrating these data with existing functional genome element datasets (such as those from the Encode consortium) will help us to better understand the regulatory mechanisms involved in adipocyte differentiation.

Conclusion: This study forms the foundation for investigation of regulatory profiles of primary adipocytes obtained from adipose tissue of individuals with metabolic traits of interest, such as weight gain resistance.

T1:OS2.3

Mitochondria-related effects and epigenetic changes induced by incretins and humanin in pancreatic β -cells

Beata Kiec-Wilk¹, Joanna Goralska², Anna Polus², Barbara Zapala², Tera Staszal², Maciej Malecki³, Aldona Dembinska-Kiec²

¹Department of Metabolic Diseases, Jagiellonian University Medical College, Krakow, Poland Department of Clinical Biochemistry, Jagiellonian University Medical College, Krakow, Poland

²Department of Clinical Biochemistry, Jagiellonian University Medical College, Krakow, Poland

³Department of Metabolic Diseases, Jagiellonian University Medical College, Krakow, Poland

Introduction: Glucose-dependent insulinotropic peptide (GIP) and Glucagon-like peptide-1 (GLP-1) are incretins demonstrate antiapoptotic and proliferative effects on β -cells. Humanin (HNG) suppresses apoptosis and exerts anti-inflammatory properties. Tumour necrosis factor alpha (TNF-alpha) activates the inflammatory processes, mitochondrial dysfunction and apoptosis of β -cells paralleled by insulin resistance.

Aim: The effects of incretins and humanin on the β -cell mitochondria function, under cytokine-induced stress, was followed.

Methods: The line of pancreatic beta-cells BTC6 was preincubated with HNG (4 μ M), GIP/GLP-1 (100nM) for 20hrs before the challenge with TNF-alpha (5ng/ml) for the last 4hrs. The flow-cytometry method evaluated the changes in mitochondrial membrane potential and apoptosis. Caspases activity was analysed. High resolution respirometry estimated oxygen consumption, parallel ATP-generation was estimated. Gene expression was analysed by qRT-PCR. The changes in global DNA methylation was measured using quantification kit.

Results: GIP ($p = 0.044$) and humanin ($p = 0.052$) prevented the TNF-alpha induced late apoptosis of BTC6 cells. Caspase-9 and caspase-8 ($p = 0.047$) activation as well as the changes in routine respiration rate and ATP-production was observed. The TNF-alpha activated expression of pro-inflammatory and stress-response genes. HNG ($p = 0.032$) and GIP ($p = 0.016$) enhanced DNA methylation, reduced by incubation with TNF-alpha.

Conclusion: It seems that GIP and humanin exert beneficial effects promoting β -cells survival under cytokine-induced stress. Incretins prevent β -cells dysfunction, partially by the mitochondria-related pathways. Among various mechanisms involved in these effects, DNA methylation can play important role.

T1:OS2.4

DNA methylation mediates the effect of maternal smoking during pregnancy on birth weight of the offspring

Küpers¹, Xu², Jankipersadsing³, Barzani¹, Scholtens¹, Wang², Corpeleijn¹, Snieder¹

¹Department of Epidemiology, University of Groningen, University Medical Center Groningen, the Netherlands

²Georgia Regents University, Augusta, Georgia, USA

³Departments of Pulmonology and Genetics, University of Groningen, University Medical Center Groningen, the Netherlands

Introduction: Maternal smoking during pregnancy is associated with low birth weight in offspring and DNA methylation may mediate this pathway. We studied the effect of maternal smoking during pregnancy on DNA methylation in cord blood and whether this mediated the effect on birth weight.

Methods: We compared 129 Dutch children exposed to maternal smoking during pregnancy with 126 unexposed to maternal and paternal smoking. DNA methylation was measured using the Infinium HumanMethylation450 Beadchip. First, we performed epigenome-wide regression analyses using Limma. Second, we continued with gene-specific mediation analysis using the Sobel test, after principal component analysis in the significant signals. Third, we performed functional enrichment analysis. We adjusted analyses for maternal age, education, pre-pregnancy BMI, gender and gestational age.

Results: We found 71 differentially methylated cytosine-phosphate-guanine (CpG) sites (False Discovery Rate <0.05) in 33 genes, of which 23 survived Bonferroni correction. These 23 CpGs mapped to nine genes: *AHRR*, *GFII*, *MYOIG*, *CYP11A1*, *NEUROG1*, *CNTNAP2*, *FRDMD4A*, *LRP5* and *TRAPPC9*. CpGs in *GFII* and close to *NEUROG1* mediated the effect of maternal smoking on birth weight (Sobel test $p < 0.05$). Differential methylation of these two genes explained 38.7% and 21.9% of the effect of maternal smoking on birth weight. Most enriched Gene Ontology terms pointed towards immune processes.

Conclusion: Maternal smoking during pregnancy was associated to cord blood methylation differences in 33 genes. This was the first study to show a mediating role of methylation in the association between maternal smoking during pregnancy and birth weight of the offspring.

T1:OS2.5

Global DNA methylation and hydroxymethylation during pregnancy: The effect of pre-pregnancy BMI and gestational weight gain

Sara Pauwels¹, Katrien Poels², Roland Devlieger³, Gudrun Koppen⁴, Lode Godderis⁵, Greet Vansant²

¹Department of Public Health and Primary Care, Environment and Health, Kapucijnenvoer 35blok D box 7001, 3000 Leuven, Belgium and Flemish Institute of Technological Research (VITO), Unit Environmental Risk and Health, Vlasmeer 7, 2400 Mol, Belgium

²Department of Public Health and Primary Care, Environment and Health, Kapucijnenvoer 35blok D box 7001, 3000 Leuven, Belgium

³Department of Development and Regeneration, University of Leuven, Belgium and Department of Obstetrics and Gynecology, University Hospitals of Leuven, Belgium

⁴Flemish Institute of Technological Research (VITO), Unit Environmental Risk and Health, Vlasmeer 7, 2400 Mol, Belgium

⁵Department of Public Health and Primary Care, Environment and Health, Kapucijnenvoer 35blok D box 7001, 3000 Leuven, Belgium and IDEWE, External Service for Prevention and Protection at work, Interleuvenlaan 58, 3001Heverlee, Belgium

Introduction: Epigenetic modifications, e.g. DNA methylation, have the ability to change the susceptibility to metabolic diseases like obesity. DNA methylation can change during a life course due to environmental exposures like hormones, diet,... In this rapidly evolving field, other epigenetic modifications, such as hydroxymethylation, have been discovered recently. Its biological function is not yet clear, but it is thought to be an intermediate in the DNA de-methylation pathway.

Aim: In this preliminary study, we want to investigate whether maternal global DNA methylation and hydroxymethylation changes during pregnancy. The possible influence of pre-pregnancy BMI and gestational weight gain was studied.

Methods: 13 women (age range: 25–34 years, BMI range: 18.7–32.8 kg/m²) were recruited pre-conceptionally. Peripheral fasted blood samples of the mother were taken before pregnancy, during each trimester, at delivery and 6 weeks postpartum. Both global DNA methylation and hydroxymethylation were measured using LC-MS/MS.

Results: No significant changes in global DNA methylation ($p = 0.34$) and hydroxymethylation ($p = 0.54$) across pregnancy could be observed. Despite the small sample size, we observed a significant decrease in global methylation between the third trimester and time of delivery (-0.17% , $p = 0.03$). Pre-pregnancy BMI was negatively correlated with hydroxymethylation in the first trimester ($r = -0.69$, $p = 0.009$). Gestational weight gain was positively correlated with hydroxymethylation in the third trimester ($r = 0.71$, $p = 0.007$).

Conclusion: This first pilot study gives an indication that total DNA methylation is rather stable over pregnancy. This will be further studied in a larger group of women together with the analysis of specific DNA methylation changes.

T1:OS2.6

Lung transcriptomics in Metabolic Syndrome

Sofía Rodríguez-Peredo¹, Ashley Castellanos-Jankiewicz², Ivan Imaz-Rosshandler², José Muñoz-Sánchez³, Jorge Meléndez-Zajgla², Roxana Carbó-Zabala⁴, Elizabeth Tejero-Barrera², Vilma Maldonado-Lagunas², Laura del Bosque-Plata²

¹National Institute of Genomic Medicine (INMEGEN) & National School of Biological Sciences of the National Polytechnic Institute (IPN-ENCB)

²National Institute of Genomic Medicine (INMEGEN)

³National School of Biological Sciences of the National Polytechnic Institute (IPN-ENCB)

⁴National Institute of Cardiology-Ignacio Chávez (INC-IGNACIO CHÁVEZ)

Introduction: The metabolic syndrome (MetS) is a complex disorder related with decreased lung function in humans[1], so it is necessary to explore the molecular and metabolic pathogenic mechanisms by which this can take place.

Methods: 3 controls and 3 MetS groups of male Wistar rats were used. Animals were fed with Chow diet *ad libitum*. Control animals drank water and the treated group received a 30% sucrose solution for 6 months after weaning to induce MetS. Rats were decapitated, serum and lungs were obtained. Metabolic parameters were measured in fasting serum. Lungs were used for RNA isolation and expression analysis using the GeneChip[®] rat gene 1.0 ST array; the data was processed using R/Bioconductor software and the robust multichip average algorithm. Three different enrichment tools were used for analysis (DAVID Bioinformatics, IPA and GSEA).

Results: MetS animals presented abnormalities that included hyperinsulinemia, insulin resistance, dyslipidemia and visceral obesity. The preliminary microarray analysis showed 6545 transcripts were differentially expressed ($p < 0.05$) in lung tissue between MetS and controls. Differentially expressed genes belong to lipid and carbohydrate metabolism pathways, as well as inflammation and cancer.

Conclusion: These preliminary results suggest that MetS is a condition associated with molecular changes that may contribute to decline of lung function, specifically affecting pathways related to cancer and inflammation. This work needs further research to analyze specific genes present in the physiology of lungs with MetS.

Reference:

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T2:OS2 – Psychosocial perspectives

T2:OS2.1

Non-normative eating behavior in prebariatric patients with binge-eating disorder and night eating syndrome

Sabrina Baldofski¹, Beate Herbig², Wolfgang Tigges³, Christian Jurowich⁴, Stefan Kaiser⁵, Christine Stroh⁶, Arne Dietrich¹, Almut Rudolph¹, Anja Hilbert¹

¹Leipzig University Medical Center, IFB AdiposityDiseases

²Schön Klinik Hamburg Eilbek Bariatric Clinic

³Department of General Surgery, Asklepios Clinic Hamburg

⁴Department of General Surgery, University Hospital Würzburg

⁵Department of Visceral, Pediatric and Vascular Surgery, Hospital Konstanz

⁶Department of General, Abdominal and Pediatric Surgery, SRH Municipal Hospital Gera

Introduction: Previous studies revealed high prevalence rates of non-normative eating behaviors in prebariatric patients. Specific forms of these behaviors (e.g., loss of control eating) were associated with less successful long-term weight reduction after surgery. However, less is known about other forms of non-normative eating behavior and their associated factors. Therefore the present study sought to investigate prevalence rates of binge-eating disorder (BED) and night eating syndrome (NES) according to DSM-5 and their associations with other non-normative eating behaviors and eating disorder psychopathology in bariatric surgery patients. **Methods:** Within a German consecutive multicenter registry for the longitudinal assessment of psychosocial aspects in bariatric surgery (Psychosocial Registry for Bariatric Surgery – PRAC) non-normative eating behavior and eating disorder psychopathology were preoperatively assessed using a clinical interview and self-report questionnaires.

Results: Of the $N = 225$ prebariatric patients, 11.3% were diagnosed with BED, while 14.4% and 9.3% reported objective and subjective binge-eating episodes, respectively. Diagnostic criteria for NES were met by 14.4%. In comparison to prebariatric patients without eating disorder symptoms, BED and NES were associated with greater emotional eating and eating in the absence of hunger. Moreover, patients with BED reported higher levels of eating disorder psychopathology and food addiction than patients with NES.

Conclusion: Diagnoses of BED and NES were associated with other non-normative eating behaviors and eating disorder psychopathology in prebariatric patients. In particular, the results suggest a greater impairment regarding addictive eating behaviors and eating disorder psychopathology in BED. Within the registry study, these associations will be analyzed longitudinally.

T2:OS2.2

Study on stress related changes in obese females

Vandeva¹, Popova¹, Kirilov², Tsurakova³, et al.

¹Clinic of Metabolic Endocrine Diseases and Dietetics, University hospital “Queen Giovanna-ISUL”, Medical University of Sofia

²Clinical center of Endocrinology and Gerontology, Medical University of Sofia

³Department of public relations, University hospital “Queen Giovanna-ISUL”, Sofia

Introduction: The prevalence of obesity and overweight is increasing in society as well as the stress. Stress could influence not only food intake but also the psychological state. The aim of our study was to investigate the levels of some hormones, food intake and symptoms of anxiety and depression in overweight and obese females who reported being under stress

Methods: Anthropometric, hormonal measurements of leptin, ghrelin and cortisol, 24 hour food intake recall, Hamilton anxiety and depression scale, stress test and statistical analysis in a group of 34 hospitalized females with overweight and obesity (group 1) and 20 healthy controls (group 2) were conducted.

Results: Mean BMI, levels of desacylghrelin, leptin and cortisol in group 1 were $32,7 \pm 5,8$ kg/m², $177,6 \pm 90,0$ pg/ml, $105,4 \pm 38,4$ ng/ml and $79,0 \pm 47,2$ nmol/24h respectively. There was statistically significant difference in the levels of ghrelin ($p < 0,05$) and leptin ($p < 0,000$) b/w group 1 and 2 as well as in the levels of stress ($p < 0,05$), depression and anxiety ($p < 0,01$). The mean daily energy, carbohydrate, protein and fat intake in group 1 was $1789,2 \pm 894,7$ kcal, $175,3 \pm 104,6$ g, $68,5 \pm 29,6$ g, $89,6 \pm 44,0$ g respectively. There wasn't any statistically significant difference in these values b/w the two groups.

Conclusion: Obese females had higher levels of stress, depressive and anxiety symptoms than normal controls. BMI and the fat mass were the main factors responsible for the difference in the hormonal levels.

T2:OS2.3

Attitudes of health care professionals towards female obese patients

Claudia Sikorski¹, Melanie Lupp², Heide Glaesmer³, Elmar Brähler³, Hans-Helmut König⁴, Steffi G Riedel-Heller²

¹Institute of Social Medicine, Occupational Health and Public Health & IFB AdiposityDiseases, University of Leipzig

²Institute of Social Medicine, Occupational Health and Public Health, University of Leipzig

³Institute of Medical Psychology and Medical Sociology, University of Leipzig

⁴Department of Medical Sociology and Health Economics, Hamburg-Eppendorf University Medical Center

Introduction: The health care setting has been reported to be one main source of weight stigma repeatedly, however studies comparing different professions have been lacking.

Methods: Six hundred eighty-two health care professionals (HCP) of a large German university hospital were asked to fill out a questionnaire on stigmatizing attitudes, perceived causes of obesity and work-related impact of obesity. Stigmatizing attitudes were assessed on the Fat Phobia Scale (FPS) based on a vignette describing a female obese patient.

Results: Only 25% graded current health care of obese patients to be “good” or “very good”. Sixty-three per cent of all HCPs “somewhat” or “strongly” agreed that it was often difficult to get the resources needed in

order to care for obese patients. The mean FPS score was comparable to that in the general public ($M = 3.59$), while nursing staff showed slightly more positive attitudes compared to physicians and therapists. Higher age, higher BMI and ascribing personal responsibility for obesity to the individual were associated with a higher level of stigmatizing attitudes. The nursing staff agreed on obesity as an illness to a greater extent, while physicians attributed obesity to the individual.

Conclusion: In summary, by making complex models on the causes of obesity known among health care professionals, stigmatizing attitudes might be reduced. Ongoing further education for health care professionals ought to be part of anti-stigma campaigns in the medical field.

T2:OS2.4

Mandatory menu energy labelling and socio-economic disparities in overweight and obesity

Danja Sarink¹, Anna Peeters¹, Rosanne Freak-Poli², Kathryn Backholer¹

¹Baker IDI Heart and Diabetes Institute

²Monash University

Introduction: In high income countries, those with a lower socioeconomic position (SEP) have a higher prevalence of obesity and consume fast food more frequently than those with a higher SEP. Mandatory menu labelling is a policy intended to enable healthy choices and reduce obesity. The impact of this policy on socioeconomic disparities in obesity is unclear. We aimed to summarise evidence of differential effectiveness of menu labelling by SEP, based on an intervention logic pathway.

Methods: Databases and reference lists were searched in October 2012, using terms for menu labelling, food outlet, and SEP. The differential effect of menu labelling by SEP was summarised across key stages of the intervention logic pathway.

Results: Eight studies that reported the effect of menu labelling by SEP were identified. Only one of the five studies that reported an overall reduction in calories or foods purchased found reported a differential effect by SEP, with a greater reduction in those with a higher SEP. One study found lower label use for lower SEP groups. Additionally, six studies of low income populations were identified. Two of these studies reported difficulties in understanding and use of labels, one reported improved calorie estimation of meals, two reported no change in calories purchased, and one reported slightly healthier choices.

Conclusion: Based on the limited evidence, it seems unlikely that mandatory menu energy labelling will reduce socioeconomic disparities in overweight and obesity. Whether it will increase these inequalities is unclear and further evidence on different contexts and regions is needed.

T2:OS2.5

Towards an understanding of socioeconomic differences in fruit consumption: A descriptive study of food reward value

Rachel Pechey¹, Pablo Monsivais², Theresa Marteau¹

¹Behaviour and Health Research Unit, University of Cambridge

²Centre for Diet and Activity Research, University of Cambridge

Introduction: Adults of lower socioeconomic status (SES) purchase and consume less fruit. This study aimed to assess the extent to which this is explained by differences in reward value of fruit.

Methods: Participants ($n = 732$) reported explicit attitudes to fruit, general eating motivations, and fruit consumption. A subset of participants ($n = 229$) completed measures of implicit attitudes to fruit, and, having chosen between vouchers for fruit or magazines, could complete tasks to increase the chances of receiving their preferred voucher. Indicators of SES included individual-level (occupational group, income, education) and area-level (residence-based).

Results: Males and lower SES participants reported eating less fruit. Moreover, gender appeared to modify the association between some SES indicators and fruit consumption, with SES being a stronger predictor for males. Participants' implicit (but not explicit) attitudes towards fruit were similarly patterned: lower SES males had more negative implicit attitudes. SES and gender differences (but no interactions) were found for eating motivations, with higher SES and female participants more likely to agree that pleasure, health and weight control motivated their overall food choices, but lower SES participants more likely to report price motivated their choices. There were no socioeconomic or gender differences in choice of (or effort for) fruit vouchers.

Conclusion: While no social patterning was found in explicit attitudes towards fruit, which may be more vulnerable to social desirability bias, the interaction between SES and gender for implicit attitudes reflects that seen in consumption. However, the extent to which these preferences shape consumption vs. develop from consumption habits remains to be established.

T2:OS2.6

Association between occupational psychosocial factors and waist circumference is modified by diet: A population-based cohort study

Jääskeläinen, Kaila-Kangas, Leino-Arjas, Lindbohm, Nevanperä, Remes, Järvelin, Laitinen

Finnish Institute of Occupational Health

Introduction: Dietary habits play a key role in weight control and diabetes prevention whereas occupational psychosocial stress has been identified as a risk factor for obesity and metabolic syndrome. We examined whether dietary habits modify the association between occupational psychosocial factors and waist circumference.

Methods: Data comprised 31-year-old men ($n = 2222$) and women ($n = 2053$) in the Northern Finland Birth Cohort 1966. Waist circumference was measured and information on other characteristics, including job demands, job control and worksite social support, was collected using questionnaires. Healthy and unhealthy diet indices were constructed according to the current dietary guidelines. Associations were examined using analysis of variance with adjustment for body mass index at 14, education level, leisure-time physical activity, alcohol consumption, smoking, stress-related eating behaviour and parity.

Results: High job demands and high job control were associated with greater waist circumferences among men. No associations were found among women. Among men, there were interactions between unhealthy diet and job demands ($p = 0.043$) and job control ($p = 0.036$). The waist of men with high demands and low consumption of unhealthy foods (red or processed meat, hamburgers and pizzas, fried potatoes, sugar-sweetened soft drinks, white bread) was smaller than that of men with high demands and high consumption of such foods but of similar size to that of men with low demands.

Conclusion: Healthy food choices seem to cancel out the adverse effects of occupational psychosocial stress on waist circumference among young men. In occupational healthcare settings, clinicians should promote healthy eating, especially among men reporting high job demands.

Special oral session session – Obesity in the arab world

1

Nutritional profile of Lebanese NAFLD patients: A case-control study

Nicole Sayegh¹, Hassan Younes², Sandy Abou Mrad¹, Raymond Sayegh³

¹Department of Nutrition, Faculty of Pharmacy, Saint Joseph university of Beirut

²Department of Sciences and Nutrition, Institut Polytechnique La salle Beauvais, 19, rue Pierre Wague, France

³Department of Gastroenterology, School of Medicine, Saint Joseph University, Beirut

Objectives: The aim of this study is to evaluate the nutritional profile of Lebanese non-alcoholic fatty liver disease (NAFLD) patients and compare it with controls.

Methods: From November 2010 to June 2013, 255 NAFLD Lebanese patients; 197 men (mean age: 44 ± 12.4), 58 women (mean age: 40.3 ± 7.9) and 108 controls; 39 men (mean age 42 ± 14.5) and 69 women (mean age 36.7 ± 12.8) were recruited at the outpatient clinic of the department of Gastroenterology of a university hospital. A valid food frequency questionnaire (Harvard, Nurses' Health Study, 2010) and a 24 hours recall were administered. Anthropometric measures, blood pressure and biological markers were also taken in both groups.

Results: Mean body mass index of NAFLD patients (cases) was (31.6 ± 5 kg/m²) as compared to (24.8 ± 4kg/m²) for controls (p < 0.0001). According to IDF classification (International Diabetes Federation, 2005), 67.8% of cases versus 14.6% controls had more than 3 parameters of metabolic syndrome and 48.5% of them versus 18.8% for controls had a homeostasis model assessment (HOMA-IR) ≥3 (p < 0.0001). On multiple logistic regression analysis, HOMA-IR, intake of fructose (g) and absence of physical activity were significantly associated with a increase risk for NAFLD; HOMA-IR (odds ratio 5.17, 95% confidence interval, 1.52–17.59), p = 0.009, fructose (odds ratio 1.03, 95% confidence interval, 1.01–1.06), p = 0.027 and presence of physical activity (odds ratio 0.44, 95% confidence interval, 0.20–0.99), p = 0.047, after adjustment for gender, calorie intake/day, BMI, medical and family medical history.

Conclusion: High HOMA-IR, high fructose intake and lack of physical activity were the main potential risk factors for NAFLD Lebanese patients

2

Demographic, socioeconomic, dietary and physical activity determinants of obesity in a nationally representative sample of the Lebanese adult population

Marie Claire Chamieh¹, Helen Moore², Carolyn Summerbell², Abba Sibai¹, Nahla Hwalla¹

¹American University of Beirut

²Durham University

Introduction: The prevalence and determinants of obesity within countries vary by gender, age, socioeconomic status, and culture. The objective of this study was to investigate the impact of these determinants on obesity in a nationally representative sample of the Lebanese adult population.

Methods: A national cross-sectional survey was conducted in Lebanon in 2008–09. Households were selected based on stratified cluster sampling. One randomly selected adult aged ≥ 20 years was interviewed in each household (n = 2697). Socio-demographic data, anthropometric measurements, 24-hour recall dietary intake and physical activity data were obtained. Obesity prevalence was computed. Associations between obesity

and relevant variables were investigated excluding implausible reporters of energy intake, identified using the revised Goldberg Method.

Results: Obesity prevalence was generally similar in men and women (26.4 % and 25.9%, respectively, P = 0.89). Yet, women were more likely to show obesity classes II and III than men (P < 0.05). In women, obesity showed significant negative associations with education (OR = 0.54; 95% CI: 0.32–0.91), household assets (OR = 0.28; 95% CI: 0.10–0.75), and physical activity (OR = 0.66; 95% CI: 0.44–0.99). Significant positive associations were observed between obesity and energy consumption in both genders. Obese adults reported consuming a higher percentage of their energy intake from fats and oils, and a lower intake from cereals.

Conclusion: Modifiable factors such as increased energy consumption and physical inactivity, as well as socio-demographic elements, are contributing to the high obesity estimates in Lebanese adults.

Hence, evidence-based culture-specific interventions can be constructed to address the obesity problem in the country.

3

Prevalence of body weight and body shape dissatisfaction among secondary school girls in Qatar

Abdelhamid Kerkadi, Abdelmoneim Hassan Sadig

Qatar University

Introduction: The prevalence of overweight and obesity has been rapidly increasing among children and adolescent during the last decades in Qatar which is due to life style changes (physical inactivity, leisure and modernization) and nutrition transition. Several studies have reported that body dissatisfaction increases as degree of obesity rises. Body dissatisfaction has been associated with increased depressive symptoms, stress, reduced self-esteem, increased dieting behavior, and avoidance of physical activity.

The aim of the present study was to assess the prevalence of body weight and body shape dissatisfaction among secondary school girls in Qatar.

Methods: A cross sectional survey in a randomly selected sample of 400 secondary school girls aged between 14–18 years old attending four high schools in Doha was carried out. Weight and height were measured. A self-administered questionnaire was used to assess body image dissatisfaction.

Results: 23.8% and 16.5% of secondary school girls were overweight and obese respectively. Overall results indicated that 29% of students were dissatisfied with their current body shape among them 31.9% and 34.4% were overweight and obese respectively. 23.8% of girls were unhappy with their weight and 50.5% of them tried to lose weight using different methods such as dieting (40%), excessive exercise (22%) and medications (3%). A high significantly correlation was observed between BMI, body shape dissatisfaction, body weight dissatisfaction and general appearance.

Conclusion: Body weight and shape dissatisfaction exists among secondary school girls in Qatar. Prevention strategies focusing on healthy eating and body image are therefore urgently required.

Special oral session – Maternal conditioning

1

Fetal and neonatal body composition in obese pregnant women: Antenatal predictors of neonatal adiposity

Sander Galjaard¹, Lieveke Ameye¹, Goele Jans², Juergen Harreiter³, Roland Devlieger¹, DALI DALI Core Investigators Group⁴

¹Department of Development and Regeneration, Katholieke Universiteit Leuven (KUL); Department of Obstetrics and Gynecology, University Hospitals of Leuven, Belgium

²Department of Development and Regeneration, Katholieke Universiteit Leuven (KUL)

³Department of Obstetrics and Gynecology, Medizinische Universitaet Graz, Austria

⁴European Community's 7th Framework Program

Introduction DALI is an European FP7 study investigating the effect of a lifestyle intervention on the development of gestational diabetes mellitus (GDM) and gestational weight gain (GWG). The aim of this sub-study is to extract predictors for neonatal adiposity in the obese pregnancy.

Methods: We examined 59 pre-gestational obese women longitudinally in their pregnancy for fetal-neonatal growth with novel and routine measurements. The fetal development was assessed by ultrasound examination at 34–38 weeks of gestation with novel body composition techniques. Fat depositions of the trunk were measured: subscapular and abdominal fat thickness (SFT and AFT). Maternal glucose tolerance was monitored per trimester with a 75gr oral glucose tolerance test (IADPSG criteria). Total GWG was registered. Neonatal anthropometry measurements included ponderal index (PI) and skinfold (SF) measurements of the triceps (T-SF), subscapular (S-SF), flank (F-SF) and thigh (T-SF) region within 48h of birth. The prenatal and neonatal outcomes were gestational age corrected.

Results: The antenatal fetal abdominal circumference (fAC) had a positive correlation with the PI at birth ($p = 0.005$). The antenatal SFT was also positively correlated to the neonatal T-SF ($p = 0.006$), S-SF ($p < 0.001$), F-SF ($p = 0.001$) and T-SF ($p < 0.001$). The AFT correlated with the S-SF ($p = 0.008$). 32/59 women could keep their t-GWG within the IOM-2009 guidelines. 11/59 women had or developed GDM with the IADPSG criteria.

Conclusion: In this multicenter study the prenatal measurement of the fAC correlates well with the ponderal index of the neonate in the obese pregnancy. The fetal SFT in the third trimester does highly correlate with neonatal adiposity measurements.

2

Maternal obesity impacts brain insulin sensitivity and glucose uptake in the offspring

Elena Sanguinetti¹, Tiziana Liistro², Marco Mainardi³, Silvia Pardini², Piero Salvadori², Silvia Burchielli⁴, Patricia Iozzo²

¹Institute of Clinical Physiology, National Research Council (CNR), Pisa, Italy; Scuola Superiore di Studi Universitari Sant'Anna, Pisa, Italy

²Institute of Clinical Physiology, National Research Council (CNR), Pisa, Italy

³Institute of Neuroscience, National Research Council (CNR), Pisa, Italy

⁴Fondazione Toscana Gabriele Monasterio (FTGM), Pisa, Italy

Introduction: Maternal obesity affects central and peripheral metabolism in the offspring. An altered brain glucose metabolism may represent an early biomarker of metabolic-cognitive disorders in adulthood. Our aim was to investigate the effect of gravidic obesity on brain insulin sensitivity and glucose metabolism of the offspring.

Methods: Brain glucose uptake during hyperinsulinemic-euglycemic stimulation was determined by 18F-FDG PET in 0 ($n = 18$), 1 ($n = 37$), 6 ($n = 24$) and 12 ($n = 8$) months-old piglets born to obese or lean mothers. Hypothalamic and neocortical insulin receptors- β (IR β) and glucose transporters 4 (GLUT4) were quantified by western blot.

Results: A 30% higher basal glycaemia at birth was detected in the offspring of obese mother ($p = 0.05$ vs controls). In controls, glucose uptake in neocortex, brainstem and cerebellum increased from 0 to 1 and 6 months ($p < 0.001$), with a low rise at 12 months. The offspring of obese mothers showed higher brain values at birth in all regions (+70% vs controls, $p < 0.05$), with a decreasing trend at 1 and 6 months (-35% vs controls, $p < 0.01$), and restoration of normal values at 12 months ($p < 0.01$ vs 6 months; $p = ns$ vs controls). Compared to controls, IR β expression was 4-fold higher at birth, whereas both IR β and GLUT4 were significantly reduced at 6 months ($p < 0.05$) in the offspring of obese mothers. Hypothalamic and neocortical IR β were significantly correlated to GLUT4 levels ($r = 0.495$, $p = 0.003$; $r = 0.599$, $p < 0.001$).

Conclusion: Maternal obesity alters insulin sensitivity and glucose metabolism of brain areas involved in homeostasis and cognition, which might predispose the adult offspring toward metabolic-neurodegenerative diseases.

3

Prepregnancy body mass index and its impact on gestational diabetes

Maria Boyadzhieva¹, Tsvetelina Tankova¹, Iliana Atanasova¹, Sabina Zacharieva¹, Veneta Stoykova²

¹Clinical Center of Endocrinology, Medical University Sofia, Bulgaria

²University Hospital of Obstetrics and Gynecology, Medical University Sofia, Bulgaria

Introduction: Obesity and overweight have in the last decade become a global problem and one of the main risk factor for diabetes type 2 development. Gestational diabetes (GD) is one of the most common complications during pregnancy. The aim of the present study was to evaluate the associations of maternal prepregnancy body mass index (BMI) and the risk for GD development and GD course.

Methods: 1300 pregnant women between 24 and 28 weeks of gestation were recruited in the study. A standard OGTT was performed in all as part of screening program for GD in Clinical Center of Endocrinology in Sofia, Bulgaria. IADPSG criteria were used for GD diagnosis; logistic regression analysis was applied.

Results: We found 29.1% (378) prevalence of GD. Body mass index between 25 and 29.9 kg/m² before pregnancy increases the risk for GD 1.629 ($p < 0.019$), while BMI >30 kg/m² – 4,162 ($p < 0.0001$). Furthermore, prepregnancy BMI between 25 and 29.9 kg/m² increases 1.45 ($p < 0.048$) the need of insulin treatment in addition to diet, while BMI >30 kg/m² increases 2.412 ($p < 0.001$). Body mass index >30 kg/m² is the strongest predictor of glucose intolerance after pregnancy with GD (OR 3.9; $p < 0.001$). In addition, women with prepregnancy obesity developed more often hypertension and preeclampsia during pregnancy.

Conclusion: The lack of established national screening program necessitates the active search for pregnant women at high risk for GD development. Women with prepregnancy overweight and obesity have to perform an OGTT obligatory during pregnancy which could reduce their risks, if having GD.

Longer term child growth and maternal feeding practices outcomes of the NOURISH obesity prevention trial

Lynne Daniels¹, Kimberly Mallan², Jan Nicholson³, Karen Thorpe⁴, Anthea Magarey⁵, et al.

¹Institute Health and Biomedical Innovation and School of Exercise and Nutrition Sciences, Queensland University of Institute Health Biomedical Innovation and School Exercise and Nutrition Sciences, Queensland University of Technology, Queensland, Australia

²Institute Health Biomedical Innovation and School Exercise and Nutrition Sciences, Queensland University of Technology, Queensland, Australia

³Parenting Research Centre, Melbourne, Victoria, Australia; Murdoch Children's Research Institute, Melbourne, Victoria, Australia; School of Early Childhood, Queensland University of Technology, Queensland, Australia

⁴Institute Health Biomedical Innovation and School Psychology and Counselling, Queensland University of Technology, Queensland, Australia

⁵Department Nutrition and Dietetics, Flinders University, Adelaide, South Australia, Australia

Introduction: The NOURISH RCT evaluated anticipatory guidance commencing in infancy to promote 'protective' feeding practices hypothesised to support the development of healthy eating patterns and growth in children. Our aim is to present selected outcomes 18 months post-intervention and at infant age 3.5–4 years.

Methods: 698 first-time mothers (mean age 30.1 years, SD = 5.3) with healthy term infants (51% female) aged 4.3 (SD = 1.0) months were randomly allocated to self-directed access to usual care or to two 6-session group education modules. Outcomes were assessed at 14, 24 and 44 months of age. Child BMI Z-scores (WHO) were analysed using linear mixed models including time (repeated factor), group, and their interaction. Maternal feeding practices were self-reported using validated questionnaires and analysed using MANOVA. Australian and New Zealand Clinical Trials Registry Number 12608000056392.

Results: Retention when children were 3.7 (SD = 0.3) years was 65%. Child BMIZ was not significantly different between groups, main effect $P = .079$ and there was no Time x Group interaction, $P > .10$. There was a significant between group difference in feeding practices, $P < .001$. Mothers in the intervention condition reported significantly less controlling/more responsive feeding practices on 7/10 subscales (all $P < .05$).

Conclusion: The positive impact of the NOURISH intervention on maternal feeding practices at 14 and 24 months was maintained 18 months post intervention. However, these longer term impacts did not translate into statistically significant differences in anthropometric outcomes at child age 3.7 years.

Maternal hyperlipidemia during pregnancy associates with fetal telomere shortening

Maria Angela Guzzardi¹, Tiziana Liistro¹, Lamia Ait-Ali¹, Elena Sanguinetti², Rossella Petrolini¹, Chiara Malito¹, Pietro Di Cecco³, Maria Dolci⁴, Alessandra Kemeny⁵, Patricia Iozzo¹

¹Institute of Clinical Physiology, National Research Council (CNR), Pisa, Italy

²Institute of Clinical Physiology, National Research Council (CNR), Pisa, Italy; Scuola Superiore Sant'Anna, Pisa

³Fondazione Toscana Gabriele Monasterio (FTGM), Pisa, Italy

⁴Endocrinology and Diabetology, ASL-1Massa e Carrara, Massa, Italy

⁵Obstetrics and Gynecology, ASL-1Massa e Carrara, Massa, Italy

Introduction: Telomere length (TL) has been associated with several cardiovascular risk factors, including dyslipidemia and diabetes. Since an altered nutritional environment during fetal life may contribute to the fetal origins of cardio-metabolic diseases, we aimed assessing whether an impaired maternal lipid profile during pregnancy is associated with TL in the newborns. We also investigated if there is an association between birth TL and cardiac parameters.

Methods: Pregnant women ($n = 61$, age range 25–43, BMI range 17–41, gestational diabetes $n = 14$), their partners and children were enrolled. All subjects underwent morphometric and metabolic characterization, and TL measurement by Real-Time PCR. Offspring cardiac dimensions and function were echographically assessed at birth and at 3 and 6 months.

Results: Newborns were stratified according to their TL. Mothers of children in the lowest TL tertile showed a tendency towards higher blood triglycerides, total and LDL-cholesterol levels during pregnancy. In the same group, cord blood (i.e. fetal) TG, LDL, cholesterol and glucose concentrations tended to be higher. Moreover, greater E/A ratio at birth ($p = 0.001$), and increased ($p < 0.05$) left ventricular posterior wall thickness and cardiac mass at 3 and 6 months were observed in this group of offspring. Correlations between cord blood TL and glycemia ($r = -0.389$, $p = 0.073$), and cardiac mass at 6 months of age ($r = -0.478$, $p = 0.018$) were found.

Conclusion: Increased lipidemia during pregnancy may affect fetal metabolic profile and telomere shortening, which are associated to increased cardiac mass in the first 6 months of life. Therefore, maternal hyperlipidemia may contribute to the fetal origins of cardio-metabolic disease.

Effects of maternal gastric bypass surgery on weight status and body esteem in offspring

Willmer¹, Berglind¹, Tynelius¹, Ghaderi², Näslund³, Rasmussen¹

¹Dept of Public Health Sciences, Karolinska Institutet

²Dept of Clinical Neuroscience, Karolinska Institutet

³Dept of Clinical Sciences, Karolinska Institutet

Introduction: The most common method for bariatric surgery in Sweden is currently Roux-en-Y gastric bypass (GBP), with 7900 procedures performed in 2012. GBP leads to major weight loss and improvements in many physical and mental parameters in the majority of patients. However, there is very little research on the effects on the patient's family.

Methods: We recruited 68 female GBP patients with at least one child between 7 and 14. Two home visits were carried out, one three months before surgery and one nine months after surgery. Height and weight were measured for all family members. Mothers completed the Hospital Anxiety and Depression Scale. Children completed the Body Esteem Scale (BES) and the Beck Self-Concept Inventory. Differences between the two time points were estimated using fixed-effects and GEE regression models.

Results: Preliminary analyses showed a significant decrease in the score for the weight-related dimension of the BES (indicating decreased body esteem) amongst girls, but not boys. Younger children (7–10 years), had a significantly decreased risk of overweight after surgery (OR = 0.61 (0.39; 0.96)).

Conclusion: Maternal GBP seems to negatively influence body esteem in girls. This may be explained by the fact that girls are more exposed to societal ideals of female thinness. Younger children were less likely to be overweight after surgery, possibly because younger children are more easily influenced by their parents, eat a larger proportion of their meals at home, and may therefore be more affected by the mother's improved eating habits after surgery.

T5:OS2 – Diet, lifestyle & alternatives

T5:OS2.1

Effects of lifestyle counselling on weight reduction and metabolic syndrome in obese male professional drivers – NCT00893646

*Jatta Puhkala*¹, *Kirsi Mansikkamäki*², *Katriina Kukkonen-Harjula*¹, *Minna Aittasalo*¹, *Kari Tokola*³, *Christer Hublin*⁴, *Paula Kärmenniemi*⁵, *Seppo Ollkonen*⁴, *Markku Partinen*⁵, *Mikael Sallinen*⁶, *Mikael Fogelholm*⁷

¹UKK Institute for Health Promotion Research, Tampere, Finland

²UKK Institute for Health Promotion Research, Tampere, Finland Tampere University of Applied Sciences, Tampere, Finland

³UKK Institute for Health Promotion Research, Tampere, Finland School of Health Sciences, University of Tampere, Tampere, Finland

⁴Finnish Institute of Occupational Health, Helsinki and Lappeenranta, Finland

⁵Vitalmed Sleep Clinic and Research Centre, Helsinki, Finland

⁶Finnish Institute of Occupational Health, Helsinki and Lappeenranta, Finland

⁷Department of Food and Environmental Sciences, University of Helsinki, Helsinki, Finland

Introduction: Long-distance professional drivers are at increased risk of cardiovascular diseases but there have only been few lifestyle interventions to promote their health. The aim was to reduce weight and cardiometabolic risk factors in obese long-distance drivers by counselling on nutrition, physical activity and sleep.

Methods: Male truck and bus drivers were randomized into a lifestyle counselling (LIFE, N = 56) and reference (REF, N = 57) group in Finland in 2009–2010. LIFE participated individually in structured monthly counselling for 12 months aiming to 10% weight loss. After 12 months, REF received 3 months' counselling. Assessments took place at 0, 12 and 24 months. Statistical differences in changes between the groups were analyzed by generalized linear model and generalized estimating equations (GEE).

Results: The mean change in weight at 12 months was –3.4 kg in LIFE (N = 47), and 0.7 kg in REF (N = 48) (net difference –4.0 kg, 95% Confidence Interval (CI) –6.2, –1.9). At 24 months the corresponding values were –3.1 kg in LIFE (N = 37) and –2.5 kg in REF (N = 41) (net difference –0.5 kg, 95% CI –3.8, 2.9). At 12 months, the prevalence of metabolic syndrome (MeS) decreased from 79% to 62% in LIFE and from 63% to 60% in REF (p = 0.34, difference in change between the groups). Likewise, there was no difference in change in MeS prevalence during 24 months (GEE).

Conclusion: Weight reduction and decrease in prevalence of MeS were moderate despite intensive counselling, seemingly due to long and irregular working hours preventing from healthy lifestyle choices.

T5:OS2.2

Longitudinal association between yogurt consumption and weight gain, and the risk of overweight/obesity: The SUN cohort study

*Carmen Sayon-Orea*¹, *Maira Bes-Rastrullo*², *Miguel Ruiz-Canela*², *Alfredo Gea*¹, *Carmen De la Fuente-Arrillaga*², *Miguel A. Martinez-Gonzalez*²

¹Department of Preventive Medicine and Public Health, University of Navarra (Spain)

²Department of Preventive Medicine and Public Health, University of Navarra (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

Introduction: Results from epidemiological studies based on the association between yogurt consumption and the risk of overweight/obesity are scarce and inconsistent. Our objective was to examine longitudinally the association between yogurt consumption (total, whole-fat and low-fat)

and the risk of overweight/obesity, and the in a Mediterranean cohort of university graduates.

Methods: Prospective cohort study of 8,516 men and women initially free of overweight/obesity, with a mean age of 37.1-y (SD: 10.8). Participants were followed up through mailed questionnaires every two years. Yogurt consumption was calculated at baseline. The outcome was incidence of overweight/obesity.

Results: After a median follow-up of 6.6-y, 1860 incident cases of overweight/obesity were identified. High consumption of total and whole-fat yogurt was associated with a lower risk of overweight/obesity [HR = 0.88 (95% CI: 0.78–0.99); and 0.81 (0.71–0.93) respectively]. Same association was also observed in the group of participants who had a high frequency of consumption of total and whole-fat yogurt jointly with a high adherence to the Mediterranean diet [0.75 (0.61–0.91) and 0.64 (0.50–0.83) respectively], the same as in those participants with high frequency of total and low-fat yogurt consumption jointly with a high consumption of fruits [0.79 (0.66–0.94) and 0.78 (0.62–0.97) respectively].

Conclusion: In this Mediterranean cohort high yogurt consumption at baseline was associated with lower risk of overweight/obesity during follow-up, especially in those participants with a high adherence to the Mediterranean diet or high fruit consumption.

T5:OS2.3

Effect of Pistachio Intake on Insulin Resistance and metabolic risk markers – the EPIRDEM Study

*Pablo Hernández-Alonso*¹, *Mònica Baldrich-Mora*¹, *Jordi Salas-Salvadó*², *Pierre Arcelin*³, *Antoni Palau-Galindo*⁴, *Marta Ciutat*⁵, *Jesús Sanmiguel*⁴, *Josep Maria Parés*⁴, *Juanjo Cabré*⁶, *Maria Teresa Acera*⁶, *Mònica Bulló*¹

¹Human Nutrition Unit, Faculty of Medicine and Health Sciences, IISPV, Universitat Rovira i Virgili, Reus, Spain.

²Human Nutrition Unit, Faculty of Medicine and Health Sciences, IISPV, Universitat Rovira i Virgili, Grup Sagessa, Reus, Spain.

³Grup Sagessa, Reus, Spain.

⁴Grup Sagessa, Reus, Spain.

⁵Grup Sagessa, Reus, Spain. Ciutat M

⁶CAP Sant Pere, Institut Català de la Salut, Reus, Spain.

Introduction: Tree nut consumption is likely to beneficially impact health outcomes such as type-2 diabetes or cardiovascular disease. However, limited clinical evidence suggests beneficial effects of pistachios on glucose metabolism at long-term. Our objective was to evaluate the effect of chronic consumption of pistachios on glucose metabolism and insulin resistance in pre-diabetic subjects.

Methods: 49 pre-diabetic subjects participated in a 4-month randomized, crossover clinical trial with 2 weeks of wash-out period. Subjects were randomly assigned to a control diet (CD) or a pistachios diet (PD) (57g daily). Diets were isocaloric and do not differ in the amount of saturated fatty acids and cholesterol content. At baseline and monthly, anthropometry, blood pressure, dietary habits, and physical activity were assessed. Blood samples were collected at baseline and at the beginning and the end of each intervention period for haemostatic, inflammatory, oxidative and related metabolic risk markers measurements.

Results: No significant changes in BMI were observed between intervention groups. Fasting glucose, insulin and HOMA-IR (mean (95% CI); –0.73 (–1.14, –0.32) and 1.05 (0.54, 1.55), PD versus CD, p < 0.001) decreased significantly after the PD compared to the CD. Compared to the participants in the CD, those in the PD showed a non-significant decrease in glycosylated haemoglobin (p = 0.139), and a higher non-significant reduction in serum-LDL cholesterol levels. Other metabolic risk markers such as fibrinogen, GLP-1, oxidized LDL and Platelet Factor-4 significantly decreased after pistachio diet compared to control diet (p < 0.05).

Conclusion: Chronic consumption of pistachios decreases insulin resistance thus leading a potential protective role on type 2 diabetes development.

T5:OS2.4

Treatment of Obesity by Temporary Controllable Intra-gastric Pseudobezoars: Pseudofood for Non-Invasive Gastric Volume Reduction

Marlen Deneva¹, Orly Yadid-Pecht², Michel Fattouche², Robert Bray², Martin Mintchev²

¹Institute of Catalysis, Bulgarian Academy of Sciences, Sofia, Bulgaria

²University of Calgary, Calgary, Alberta, Canada

Introduction: Temporary intra-gastric pseudobezoars are an alternative obesity treatment combining numerous advantages of the traditional approaches. Pseudofood of pseudobezoar type aims at non-invasive, safe, controllable, dynamic and long-term gastric volume reduction from inside the organ. This study aims at investigating the impact of the pseudobezoar therapy on 16 obese volunteers.

Methods: Sixteen volunteers (3M, 13F, mean: age 44.0 ± 12.0 years, BMI 33.3 ± 5.6 kg/m², waist circumference (WC) 103.3 ± 13.8 cm, hip circumference (HC) 114.2 ± 12.2 cm) were separated into 2 groups, A (8F) and B (3M, 5F), and were administered 2 pseudobezoar capsules (Group A) of the pseudofood product (Zalak B, EDF Bulgaria) or placebo (Group B) 15 to 30 min before each meal, 3 times a day for 1 month. After the first month the groups were crossed-over for another month of study, Group A receiving placebo, and Group B – the pseudobezoar product. Body weight (BW), WC, HC, satiety and side effects were monitored.

Results: After the first month Group A produced greater reduction in BW (3.3% vs. 1.9%), and in WC (2.6% vs. 1.8%). After switching, the pseudofood therapy month for Group B resulted in BW and WC reductions of 3.7% and 4.2%, while Group A (switched to placebo) did not regain weight and continued its weight loss with an additional 3.3%. Haber satiety scale for both groups indicated an increased satiety during the actual therapy months. No notable side effects were reported.

Conclusion: Pseudofood of pseudobezoar type is a reliable non-invasive approach to control obesity.

T5:OS2.5

Dance Therapy – its effect on quality of life, and functional capacity

Lara Allet¹, Solange Müller-Pinget², Ilona Punt³, Zoltan Pataky², Alain Golay²

¹University of Applied Sciences of Western Switzerland, Dpt. of Physical Therapy, Geneva, Switzerland

²University Hospitals and University of Geneva, WHO Collaborating Centre, Department of Community Medicine, Geneva, Switzerland

³University of Applied Sciences of Western Switzerland, Dpt. of Physical Therapy, Geneva, Switzerland

Introduction: Dance therapy is a significant constituent of physical rehabilitation in the twenty-first century and addresses individuals' physical, emotional, and cognitive well-being. The aim of this study is to evaluate the efficacy of dance therapy on obese patients' quality of life and functional capacities.

Methods: Obese persons (BMI ≥ 30) who were able to walk 10 meters without a walking aid have been enrolled and randomized to either a control (ambulatory patient education program for obese people) or an intervention group. The intervention consisted in a dance therapy (60 minutes per week during 16 weeks) combined with the same education program as the control group. Individuals' impact of weight on quality of life (IWQOL), their performance during a six minute walking test and the ability to stand up and sit down five times from a chair were assessed before and after treatment.

Results: Thirty-free patients were enrolled in the control group (age 50 ± 8.5; BMI 39.8 ± 5.9) and 34 in the intervention group (age 46 ± 10.1; BMI 38.5 ± 6.6). Five persons dropped out in the control and 7 in the intervention group. We found a significant improvement in IWQOL (p < 0.001) for the intervention group who improved significantly better

than the control group (p = 0.04). No progress and no group differences were identified for the six minute walking test and the chair rise performance.

Conclusion: Dance therapy in addition to a standard education program improves obese individuals' quality of life, but seems not to be adequate enough to improve individuals' functional capacity.

T5:OS2.6

Potential benefits of colonic fermentation of NUTRIOSE®, a wheat dextrin soluble fibre, for weight management and obesity prevention

Catherine Lefranc-Millo¹, Laetitia Guerin-Deremaux², Bertrand Rodriguez¹, Mark Hobden³, Agustin Martin-Morales³, Adele Costabile³, Gemma Walton³, Ian Rowland³, Orla Kennedy³, Glenn Gibson³

¹Roquette Nutritional Sciences, ROQUETTE, Lestrem France

²Biology and Nutrition Department, ROQUETTE, Lestrem, France

³Department of Food and Nutritional Sciences, University of Reading, Reading RG66AP, UK

Introduction: Nutritional modulation of the gut microbial balance is of interest, with recent studies suggesting potential implications for obesity. Short chain fatty acid (SCFA) production resulting from bacterial fermentation has been associated with benefits in weight management. NUTRIOSE® soluble fibre has been demonstrated to positively impact on markers of obesity as well as the ratio of specific gut bacterial genera. In this study, we used a validated *in vitro* three-stage continuous culture human colonic model system to further explore the fermentation profiles of NUTRIOSE®.

Methods: The model including three vessels (V1, V2, and V3, representing the proximal, transverse, distal colon, respectively) was inoculated and run until equilibrium. Steady-state (SS) 1 was achieved after 17 days, after which time NUTRIOSE® (7g) was administered into V1 twice daily, to mimic human ingestion, until SS2 was reached at day 35. The microbial composition and SCFA concentrations of samples collected during SS1 and SS2 were analysed using 16S rRNA-based fluorescence *in situ* hybridization and gas chromatography approaches, respectively.

Results: Total bacteria and butyrate producing *Clostridium* cluster XIVa and *Roseburia* genus were significantly increased following NUTRIOSE® administration. Significant increases in SCFA concentrations were found for butyrate (V1, V2 and V3), acetate (V2 and V3) and propionate (V3).

Conclusion: NUTRIOSE®, at a dose of 14g/d for 18 days, had a butyrogenic effect throughout the colonic system, which may have mechanistic significance for obesity prevention and related metabolic diseases, as previously observed in human nutritional interventions.

POSTER SESSIONS

Thursday, 29 May, 2014

TRACK 1 – Discovery and Integrative Science

T1 – GuidTed Posters

T1:PO.001

The role of Repin1 in Adipose Tissue

Hesselbarth, Kern, Stumvoll, Blueher, Kloeting

Department of Medicine, University of Leipzig

Introduction: Replication initiator 1 (Repin1) is a polydactyl zinc finger protein organized in three clusters, located on human chromosome 7 and on chromosome 6 in mice. The protein of Repin1 is ubiquitous expressed but maximum mRNA levels were detected in liver and adipose tissue. Repin1 maps in a quantitative trait locus (QTL) which is associated with obesity and triglyceride levels. Therefore it has been suggested as a candidate gene for obesity and its related metabolic disorders in congenic and subcongenic rat strains.

Methods: To dissect the role of Repin1 in adipose tissue we generated two different adipose tissue specific Repin1 deficient mice: a conditional (ARep1^{-/-}) and an inducible (iARep1^{-/-}) knockout of Repin1 to investigate the effects of early and late ablation of the gene. Both knockout models have been extensively phenotyped including body weight gain, determination of insulin and glucose tolerance, organ weight, fat cell size and lipid profile.

Results: For both knockout models, conditional and inducible, we obtained (I) reduced body weight in males, (II) decreased relative fat mass and a small fat cell size in males, (III) increased liver weight independently of sex (IV) decreased lipid values in males and (V) increased insulin tolerance independently of sex. (VI) Glucose tolerance was only improved in the inducible knockout model.

Conclusion: In conclusion, those findings indicate that Repin1 plays a key role in adipogenesis and lipid metabolism. Furthermore, alterations of Repin1 expression lead to dyslipidemia and subsequent impairment of glucose homeostasis.

T1:PO.002

Role of COUP-TFII in adipogenesis

Ilse Scroyen, Dries Bauters, Christine Vranckx, Roger Lijnen

KU Leuven

Introduction: Chicken ovalbumin upstream promoter transcription factor II (COUP-TFII) belongs to the steroid/thyroid hormone superfamily and may contribute to the pathogenesis of obesity. It has not been established, however, whether its role is pro- or anti-adipogenic.

Methods: To clarify its functional role in adipogenesis, we investigated the role of COUP-TFII in *in vitro* adipocyte differentiation and in *in vivo* adipogenesis using established mouse models.

Results: During differentiation of murine 3T3-F442A preadipocytes, COUP-TFII gene silencing resulted in enhanced differentiation into mature adipocytes, as monitored by Oil Red O staining and expression of adipogenic markers. This could be explained by an inhibitory effect of COUP-TFII on the Notch-Hey1 signaling pathway. Also *in vivo*, *de novo* fat pad formation in NUDE mice was significantly stimulated following injection of preadipocytes with COUP-TFII gene silencing as compared to controls. This was evidenced by adipocyte hyperplasia and enhanced

expression of adipogenic markers. In a nutritionally induced obesity model in wild-type mice, COUP-TFII expression was negatively correlated with adipose tissue mass. Moreover, expression of COUP-TFII decreased, whereas Hey1 levels were slightly increased in the adipocyte cell fraction of subcutaneous and gonadal adipose tissues of obese mice as compared to mice kept on normal chow.

Conclusion: Our *in vitro* and *in vivo* data support an anti-adipogenic role of COUP-TFII likely by inhibition of Notch signaling.

T1:PO.003

TRAIL (TNF-related apoptosis-inducing ligand) promotes human preadipocyte proliferation via ERK1/2 activation

Jan-Bernd Funcke¹, Verena Zoller¹, Muad Abd El Hay¹, Klaus-Michael Debatin², Martin Wabitsch¹, Pamela Fischer-Posovszky¹

¹Division of Pediatric Endocrinology, Department of Pediatrics and Adolescent Medicine, Ulm Medical Center, Ulm, Germany

²Department of Pediatrics and Adolescent Medicine, Ulm Medical Center, Ulm, Germany

Introduction: Adipose tissue mass is determined by adipocyte volume and number, the latter being balanced by adipocyte formation and death. Death ligands such as TNF- α are known regulators of these processes. We previously demonstrated that the expression of TRAIL receptors is increased in murine and human obese adipose tissue. Here, we studied the effects of TRAIL on the adipose tissue precursor cell pool and therefore investigated its influence on human preadipocyte proliferation.

Methods: Simpson-Golabi-Behmel syndrome (SGBS) preadipocytes and human primary preadipocytes were used as model systems. Cell proliferation was studied by cell counting, 3H-thymidine incorporation and CFSE labeling. Cell signaling was examined by Western blot, EMSA and immunofluorescence microscopy.

Results: TRAIL stimulated the proliferation of human preadipocytes in a time- and dose-dependent manner. Upon treatment with 30 ng/ml TRAIL for 72 h, proliferation of SGBS preadipocytes and human primary preadipocytes was increased by up to 60% and 110%, respectively. Although apoptosis was not induced, a robust activation of caspase-8 and caspase-3 was detected. However, neither chemical inhibition nor genetic ablation of caspases was able to overcome TRAIL-induced proliferation. Investigating the activation of the Akt, MAPK (ERK1/2, p38, JNK) and NF κ B cascades, a delayed and sustained activation of the ERK1/2 cascade was detected. Chemical inhibition of the ERK1/2 cascade completely abolished TRAIL-induced proliferation.

Conclusion: We demonstrate that TRAIL has a significant proliferative effect on human preadipocytes. From our data we conclude that TRAIL might modulate adipose tissue homeostasis by regulating the adipose tissue resident pool of precursor cells.

T1:PO.004

Body fat percentage is a major determinant of total bilirubin levels independently of UGT1A1*28 polymorphism in obese children and adolescents

Luís Belo¹, Henrique Nascimento¹, Michaela Kohlova², Elsa Bronze-Rocha¹, João Fernandes², Elísio Costa¹, Cristina Catarino¹, Luísa Aires³, Helena Mansilha⁴, Petronila Rocha-Pereira⁵, Alexandre Quintanilha⁶, Carla Rêgo⁷, Alice Santos-Silva¹

¹Instituto de Biologia Molecular e Celular (IBMC), Universidade do Porto, 4150-180 Porto, Portugal; Departamento de Ciências Biológicas, Faculdade de Farmácia, Universidade do Porto, 4050-313 Porto, Portugal.

²BILI, Faculdade de Medicina, Universidade de Coimbra, 3000-548 Coimbra, Portugal.

³Research Centre in Physical Activity, Health and Leisure – CIAFEL, Faculdade de Desporto, Universidade do Porto, 4200-450 Porto, Portugal; High Education Institute from Maia – ISMAI; Av. Carlos Oliveira Campos, 4475-690 S. Pedro Avioso, Portugal.

⁴Departamento da Infância e Adolescência/Serviço de Pediatria do Centro Hospitalar do Porto; 4099-001 Porto, Portugal.

⁵Centro de Investigação em Ciências da Saúde, Universidade da Beira Interior, 6200-506 Covilhã, Portugal.

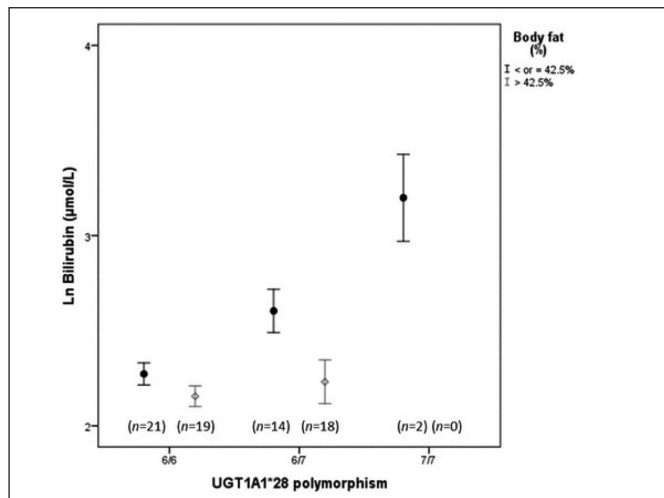
⁶Instituto de Ciências Biomédicas Abel Salazar (ICBAS), Universidade do Porto, 4099-003 Porto, Portugal.

⁷Centro da Criança e do Adolescente. Hospital Cuf Porto. Faculdade de Medicina, Universidade do Porto; 4200-319 Porto, Portugal.

Introduction: The *UGT1A1*28* polymorphism is a major determinant of bilirubin levels and recent evidence suggest that adiposity may also be a determinant of bilirubin. The aim of this work was to study the interaction between *UGT1A1*28* polymorphism and both haematological/biochemical and anthropometric variables on total bilirubin levels in young individuals.

Methods: 350 obese children and adolescents (mean age: 11.6 years) and 79 controls (mean age: 10.5 years). In a subgroup of participants (74 obese and 40 controls) it was performed body composition by dual-energy X-ray absorptiometry (DEXA).

Results: The *UGT1A1* genotype frequencies were 49.9%, 42.7% and 7.5% for 6/6, 6/7 and 7/7 genotypes, respectively. Patients with 7/7 genotype presented the highest total bilirubin levels, followed by 6/7 and 6/6 genotypes. Compared to controls obese patients presented higher haemoglobin, insulin and C-reactive protein levels, but no significant differences in bilirubin levels or in *UGT1A1* genotype distribution. Body fat percentage was negatively correlated with bilirubin only in obese patients ($r = -0.287$, $p = 0.013$). By linear regression analysis, the *UGT1A1*28* polymorphism and body fat percentage were the main factors affecting bilirubin levels within obese patients (standardised Beta: 0.348, -0.291 ; $p = 0.002$ and $p = 0.009$, respectively; Fig.- Observed effect).



Conclusion: In obese children and adolescents, body fat composition and *UGT1A1*28* polymorphism are major and independent determinants of total bilirubin levels.

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T1:PO.005

Functional correlates of sarcopenic obesity

Corinna Geisler, Inga Asbeck, Maike Johannsen, Manfred James Müller, Mario Lichtenwimmer

Institute of Human Nutrition and Foodscience Christian-Albrechts University Kiel

Introduction: Body composition changes with age and obesity. Change in fat mass may mask the loss of muscle mass. This undetected loss characterizes ‘sarcopenic’ obese patients.

Methods: Study population: 151 adults investigated in the German reference center for body composition; age range 19–65 years. Parameters: fat mass; measured with Densitometry/ADP; whole body and regional lean body mass; DXA; handgrip strength was measured with a handgrip dynamometer; Relative skeletal muscle index (RSMI) was calculated as appendicular lean mass (lean mass arms and legs) (kg) divided by height squared (m²). The study population was divided into four groups: normal, obese, sarcopenic and sarcopenic obese.

Results: In the whole group prevalence of obesity, sarcopenia and sarcopenic obesity was 39.1%, 29.8% and 9.9%. There was a positive and significant correlation between the handgrip strength and RSMI and FFM. When compared with normal, obese, sarcopenic and as well as sarcopenic obese handgrip strength showed significant between groups differences with average differences of -34.5% and -36.6% for normal compared to sarcopenic and for obese compared to sarcopenic obese.

Conclusion: The study demonstrates that BMI can't reflect muscle mass and identify sarcopenic obesity. Obese patients had reduced muscle strength. Muscle mass and muscle strength should be investigated in obese patients.

T1:PO.006

Long chain polyunsaturated fatty acids modulate the impact of the GCKR Pro446Leu polymorphism on triglycerides in adolescents: The HELENA study

Julien Rousseaux¹, Alain Duhamel², Jean Dallongeville³, Denes Molnar⁴, Kurt Widhalm⁵, Yannis Manios⁶, Michael Sjostrom⁷, Anthony Kafatos⁸, Christina Breidenassel⁹, Marcela Gonzales-Gross⁹, Magdalena Cuenca¹⁰, Laura Censi¹¹, Marcos Ascension¹², Stefaan De Henauw¹³, Luis Aznar Moreno¹⁴, Aline Meirhaeghe³, Frédéric Gottrand¹⁵

¹Service de Nutrition, University Lille-Nord-de-France, CHRU de Lille, France

²Unité de Biostatistiques, CERIM, EA2694, UDSL, Univ Lille Nord de France, CHU Lille

³Inserm, U744, Institut Pasteur de Lille, Univ Lille Nord de France, UDSL, Lille, France

⁴Department of pediatrics, University of Pécs, Pécs, Hungary

⁵Academic Institute for Clinical Nutrition, Vienna, Austria

⁶Department of Nutrition and Dietetics, Harokopio University, Athens, Greece

⁷Unit for Preventive Nutrition, Department of Biosciences and Nutrition, Karolinska Institute, Huddinge, Sweden

⁸Preventive Medicine & Nutrition Unit, School of Medicine, University of Crete, Heraklion, Greece

⁹Facultad de la Actividad Física y del Deporte-INEF; Universidad Politécnica de Madrid, Madrid

¹⁰Department of Medical Physiology, Faculty of Medicine, Granada University, Granada, Spain

¹¹National Research Institute on Food and Nutrition, Rome, Italy

¹²Immunonutrition Research Group, Department of Metabolism and Nutrition, Institute of Food Science and Technology and Nutrition (ICTAN-CSIC), Madrid, Spain

¹³Department of Public Health, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

¹⁴GENUD (Growth, Exercise, Nutrition and Development) Research Group, Escuela Universitaria de Ciencias de la Salud, Universidad de Zaragoza, Zaragoza, Spain

¹⁵Inserm U995, IFR114, University Lille-Nord-de-France, CHR de Lille

Introduction: Diet is one of the main factors involved in the modulation of triglyceridemia. The glucokinase-regulatory-protein (GCKR) is a key protein that binds to glucokinase, and regulates intracellular glucose disposal.

Our aim was to investigate the influence of n-3 and n-6 polyunsaturated fatty acids (PUFAs) on the association between the GCKR rs1260326 polymorphism and triglycerides concentrations in European adolescents.

Methods: 3,528 adolescents were assessed. 1/3 were randomly selected for blood collection. Anthropometric measurements: height, weight, waist-circumference. BMI and waist-to-height ratio were calculated. Blood dosages were performed: erythrocyte fatty acids, glucose, triglycerides, HDL and LDL-cholesterol. GCKRrs1260326 was genotyped. Subjects were categorized as “high” or “low” according to the median dosage of long-chain PUFAs (LC-PUFAs). Linear regression analyses were performed to study the association between rs1260326 and outcomes of interest.

Results: After stratification on the median of total n-3 fatty acid concentrations, the association between rs1260326 and triglyceride levels was significant for the group of high n-3LC-PUFAs values but not for the group of low n-3LC-PUFAs values. Specific n-3LC-PUFA analysis revealed the same pattern of results for ALA, EPA and DHA levels taken separately. After stratification on the median of n-6 fatty acid concentrations, the association between rs1260326 and triglyceridemia was significant for the low n-6LC-PUFAs values but not for the high n-6 LC-PUFAs values.

Conclusion: Our study provides evidences that long chain n-3PUFAs interact with the GCKR polymorphism to increase triglyceride concentrations in healthy adolescents. This finding suggests that GCKR polymorphism should be taken into account for studies assessing relationships between n-3PUFAs and lipid metabolism.

T1:PO.007

Changes induced by resveratrol in the expression of microRNAs in rat adipose tissue

Ana Gracia, Jonatan Miranda, Alfredo Fernandez, María Puy Portillo

Nutrition and Obesity Group. Dpt. Nutrition and Food Science, Faculty of Pharmacy, University of the Basque Country (UPV/EHU), Vitoria-Gasteiz (Spain). CIBERobn Physiopathology of Obesity and Nutrition, Institute of Health Carlos III (ISCIII) (Spain).

Introduction: The mechanisms of action of resveratrol as an anti-obesity molecule have been studied and reported in the literature; however, the epigenetic mechanisms have not been addressed so far. The aim of the present study was to assess resveratrol-induced changes in microRNA (miRNA) profile in white adipose tissue from rats, and to explore whether these modifications can be related to the reported changes induced by this polyphenol in triacylglycerol metabolism in this tissue.

Methods: Sixteen male Wistar rats were divided into two groups and fed an obesogenic diet supplemented or not (control group; CO) with resveratrol (30 mg/kg/d; RSV), for 6 weeks. Adipose tissue from various anatomical locations were dissected and weighed. A miRNA microarray was carried out in perirenal adipose tissue. Three miRNA (miR-211-3p, miR-1224 and miR-511-3p) were selected for RT-PCR validation.

Results: Resveratrol treatment reduced adipose tissue size. From a total of 273 detected miRNAs, 22 were significantly modified by resveratrol: 16 were up-regulated (i.e. miR-465, miR-206, miR-188) and 6 down-regulated (i.e. miR-511, miR-129, miR-487). Some of the miRNAs which showed

significant changes, miR-328 ($P = 0.02$) and miR-129 ($P = 0.05$), have target genes related with triglycerides metabolism, lipase hormone sensitive (HSL) and peroxisome proliferator-activated receptor gamma (PPARG).

Conclusion: Resveratrol modifies miRNA profile in perirenal white adipose tissue, thus indicating the involvement of epigenetic mechanisms in the effects of this polyphenol. Regarding triacylglycerol metabolism, some of the miRNAs significantly modified by this polyphenol have validated or predicted target genes which, in turn, are targets for resveratrol as an anti-obesity biomolecule.

T1:PO.008

Retinoblastoma protein deficiency increases lipid catabolism capacity in skeletal muscle

Petar Petrov, Andreu Palou, María Luisa Bonet, Joan Ribot

Laboratory of Molecular Biology, Nutrition and Biotechnology-Nutrigenomics, Universitat de les Illes Balears-Ciberobn

Introduction: Mice haploinsufficient for the retinoblastoma protein gene (Rb1+/-) are protected against dietary-induced diabetes (1) and, on a non-obesogenic diet, display in adulthood reduced adiposity, increased insulin sensitivity, reduced plasma lipids and increased energy metabolism in adipose tissues (our unpublished results). We asked if changes in skeletal muscle contribute to this phenotype and if silencing of Rb1 could recapitulate these changes in differentiated myotubes.

Methods: Q-PCR analysis was performed in skeletal muscle samples from 7 month-old Rb1+/- mice and wild-type littermates fed a normal fat diet (n = 8–11/group). Short interference RNAs were transfected in differentiated C2C12 myotubes to silence the Rb1. Transfected myotubes were serum-starved for 14 h prior exposure to insulin or vehicle for 6 h.

Results: Genes in the insulin signaling pathway (Insr, Irs1, Pik3r1, Socs3, Glut4) were similarly expressed in muscle, except for slightly increased Insr mRNA in the Rb1+/- mice. Muscle expression levels of Ucp3 and Pdk4 were higher in the Rb1+/- mice. Rb1-silenced (by 85%) C2C12 myotubes displayed increased Glut4 and Cpt1b mRNA levels, and trends to increased Pdk4 and Pparg1a mRNA levels. This was accompanied by reduced MyoD1 and Fndc5 levels, indicative of a possible loss of differentiation. Silencing of Rb1 did not affect expected Pdk4 and Lpl transcriptional responses to insulin (down-regulation), but blocked the Pparg response (up-regulation).

Conclusion: Rb1 deficiency increases lipid catabolism capacity and may facilitate glucose uptake in muscle cells.

Reference:

1 Mercader J et al.: Am.J.Physiol.Endocrinol.Metab. 2009;297;E184–93.

T1:PO.009

DNA-Methylation pattern of genes involved in triacylglycerol metabolism in rat adipose tissue induced by an obesogenic diet and polyphenol supplementation

Ana Gracia¹, Xabier Elcoroaristizabal², Alfredo Fernández-Quintela¹, Jonatan Miranda¹, Marian Martínez de Pancorbo², Naiara Bediaga², Agnes Rimando³, María Portillo⁴

¹Nutrition and Obesity Group. Department of Nutrition and Food Science, University of the Basque Country (UPV/EHU), Vitoria, Spain. CIBERobn Physiopathology of Obesity and Nutrition, Institute of Health Carlos III, Spain.

²BIOMICs Research Group, University of the Basque Country (UPV/EHU), Vitoria, Spain

³United States Department of Agriculture, Agricultural Research Service. Natural Products Utilization Research Unit, University, MS, USA

⁴Nutrition and Obesity Group. Department of Nutrition and Food Science, University of the Basque Country (UPV/EHU), Vitoria, Spain. CIBERobn Physiopathology of Obesity and Nutrition, Institute of Health Carlos III, Spain

Introduction: The aim of the present work was to assess changes induced by an obesogenic diet in the DNA-methylation profile of genes involved

in triacylglycerol metabolism in white adipose tissue from rats, and to determine whether this methylation pattern can be altered by the administration of two polyphenols, resveratrol and pterostilbene.

Methods: Thirty two rats were divided into four groups (n = 8). Control group (CO) was fed a commercial standard diet. The other three groups received a high-fat, high-sucrose diet: HFS group, RSV group (30 mg resveratrol/kg/day) and PT group (30 mg pterostilbene/kg/day). Gene expression (RT-PCR) and gene methylation (pyrosequencing) assays were performed in perirenal adipose tissue. The DNA-methylation study was conducted in genes involved in triacylglycerol metabolism: fatty acid synthase (*fasn*), adipose triglyceride lipase (*pnpla2*) and peroxisome proliferator-activated receptor gamma (*pparg*).

Results: The perirenal adipose tissue was increased by obesogenic diet and reduced after polyphenols administration. Changes in methylation levels were found only in *fasn*. These changes were significant only in the position -90 bp: obesogenic feeding induced a decrease (-9%) and pterostilbene totally reversed this change. By contrast, resveratrol did not change the methylation percentage in this position when compared with HFS group. mRNA levels of *fasn* were decreased in both RSV and PT groups (-55%, -63% vs HSF group). Changes in gene expression were negatively correlated to changes in methylation levels (P < 0.01).

Conclusion: Although both resveratrol and pterostilbene prevented the up-regulation of *fasn* induced by an obesogenic feeding, only pterostilbene avoided the change observed in its DNA-methylation profile.

T1:PO.010

Anti-inflammatory effects of n-3 PUFA supplementation in obesity. The BIOCLAIMS Study

Goralska¹, Razny¹, Malczewska-Malec¹, Kiec-Wilk², Polus¹, Zdzienicka¹, Gruca¹, Wnek¹, Stancel-Mozwillo¹, Malecki³

¹Chair and Department of Clinical Biochemistry, Jagiellonian University Medical College

²Chair of Metabolic Diseases, Jagiellonian University Medical College

³Chair and Department of Metabolic Diseases, Jagiellonian University Medical College

Introduction Obesity creates a low-grade systemic inflammatory response through lipotoxicity and cytokine dysregulation. The nutritional recommendations should address the mechanisms of inflammation and altered metabolism associated with obesity. The aim was to assess the influence of omega-3 PUFA supplementation on selected inflammatory markers in overweight or obese subjects.

Methods Patients with BMI 25–40 kg/m² included into the double-blind randomized EU BIOCLAIMS trial were put on isocaloric diet supplemented with capsules either with 3×600 mg/day DHA:EPA (5:1) or with placebo for 3 months. Blood concentrations of selected inflammatory markers and antioxidative potential markers before and after supplementation were determined.

Results 80% of subjects (N=104) responded to the supplementation, according to DHA/ EPA changes in plasma. After 3 months of PUFA supplementation, the plasma concentrations of adhesive molecules such as sE-Selectin, s-VCAM-1, s-PECAM-1 were markedly reduced. There was a significant decrease of hsCRP (2,97 mg/dl before suppl. vs 1,97 after suppl., p < 0,01) level exclusively in the n-3 PUFA treated group. Supplementation with PUFA reduced MCP-1 level (334,65 pg/ml before suppl. vs 302,35 after suppl., p < 0,05). DHA/EPA supplementation did not affect the concentrations of adipokines, such as leptin, adiponectin, resistin, visfatin, VEGF, as well as plasma antioxidant potential.

Conclusion The study revealed anti-inflammatory effects of DHA/EPA supplementation pointed by reduction hsCRP, proinflammatory cytokines and adhesive molecules. Concerning role of adipose tissue in chronic inflammation, this action of DHA/EPA could be especially beneficial in overweight and obese subjects.

T1:PO.011

Effect of L-Arginine supplementation on insulin resistance and mineral status in obese patients

Pupek-Musialik¹, Bogdanski¹, Suliburska², Szulinska¹

¹Department of Internal Medicine, Metabolic Disorders, and Hypertension, Poznan University of Medical Sciences, Poznan, Poland

²Department of Human Nutrition and Hygiene, Poznan University of Life Sciences, Poznan, Poland

Introduction: The aim of this study is to evaluate the long-term influence of L-arginine intake on mineral concentration in patients with obesity and to assess the changes in lipid serum levels, fat content, and insulin resistance that result.

Methods: A randomized double-blind placebo-controlled study was conducted. 88 obese patients were randomly assigned to receive either 9 g of L-arginine or placebo daily, for 6 months. At baseline and after 6 months, selected anthropometrical measurements and blood biochemical analyses were performed and mineral levels were assessed. To assess insulin sensitivity, the gold-standard euglycemic clamp methodology was used.

Results: A randomized double-blind placebo-controlled study was conducted. 88 obese patients were randomly assigned to receive either 9 g of L-arginine or placebo daily, for 6 months. At baseline and after 6 months, selected anthropometrical measurements and blood biochemical analyses were performed and mineral levels were assessed. To assess insulin sensitivity, the gold-standard euglycemic clamp methodology was used.

Conclusion: L-Arginine supplementation affects zinc status in obese patients. One beneficial influence is related to the improvements in insulin sensitivity.

T1:PO.012

Dietary inflammatory index and adiposity among high-risk subjects: The PREDIMED study

Maira Bes-Rastrollo¹, Miguel Ruiz-Canela¹, Nittin Shivappa², James R. Hebert², Ana Sanchez-Tainta³, Dolores Corella⁴, Jordi Salas-Salvado⁵, Maria Isabel Covas⁶, Rosa Lamuela-Raventos⁷, Francisco Aros⁸, Enrique Gomez-Gracia⁹, Miquel Fiol¹⁰, Jose Manuel Santos¹¹, Lluís Serra-Majem¹², Xavier Pinto¹³, Jose A. Martinez¹⁴, Emilio Ros¹⁵, Ramon Estruch¹⁶, Miguel A. Martinez-Gonzalez¹

¹Department of Preventive Medicine and Public Health, University of Navarra (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

²Department of Epidemiology and Biostatistics, University of South Carolina (USA)

³Department of Preventive Medicine and Public Health, University of Navarra (Spain)

⁴Department of Preventive Medicine, University of Valencia (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

⁵Human Nutrition Department, University Rovira i Virgili (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

⁶Cardiovascular and Nutrition Research Group, IMIM (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

⁷Department of Nutrition and Food Science, University of Barcelona (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

⁸Department of Cardiology, University Hospital of Alava (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

⁹Department of Preventive Medicine, University of Malaga (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

¹⁰Institute of Health Sciences, University of Balearic Islands (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

¹¹Primary Care Division of Seville, Seville (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

¹²Department of Clinical Sciences, University of Las Palmas de Gran Canaria (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

¹³Lipids and Vascular Risk Unit, Internal Medicine, University Hospital of Bellvitge (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

¹⁴Department of Nutrition, Food Sciences, and Physiology, University of Navarra (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

¹⁵Department of Endocrinology and Nutrition, Hospital Clinic (Spain)
CIBERobn, Instituto de Salud Carlos III (Spain)
¹⁶Department of Internal Medicine, Hospital Clinic (Spain) CIBERobn,
Instituto de Salud Carlos III (Spain)

Introduction: Little is known about the relationship between inflammation, diet, and obesity. Our objective was to assess the relations between diet with the Dietary Inflammatory Index (DII) and to determine the association between the DII and anthropometrics.

Methods: Cross-sectional assessment of all participants in the “PRE-vencción con Dieta MEDiterránea” (PREDIMED) trial. The dietary inflammatory index (DII) was used to assess the inflammatory potential of diet. Socioeconomic, anthropometric, lifestyle characteristics and CVD risk factors were recorded. Diet was assessed through a previously validated 137-item food frequency questionnaire. Trained nurses measured weight, height and waist circumference. Sex-specific multivariate linear regression models were constructed to estimate differences (and 95% confidence intervals) in the anthropometric adiposity measures across quintiles of the DII.

Results: We included 7,369 participants (mean age = 67 y, 58% women) at high-risk of cardiovascular disease. All macronutrient and micronutrient intakes were higher in the quintile with lowest DII score (most anti-inflammatory values) except for intake of animal protein, saturated and monounsaturated fat. Higher consumption of healthy foods and adherence to a Mediterranean diet was also associated with lower DII score. The DII was directly associated with BMI, waist circumference and waist to height ratio after adjusting for potential confounders. Waist circumference and waist to height ratio increased progressively across quintiles compared with the first quintile of DII (p for trend <0.001 in all comparisons in women and men).

Conclusion: The DII was able to account for the role that diet has in the development of obesity through an inflammatory process.

T1:PO.013

Dietary sugars downregulate intestinal sweet taste receptors leading to altered glucose absorption in mice

George Kyriazis¹, Kathleen Smith², Tania Hussain², Richard Pratley¹

¹Florida Hospital and Sanford-Burnham Medical Research Institute

²Sanford-Burnham Medical Research Institute

Introduction: Epidemiological data suggest that consumption of a high-fructose diet is associated with adverse metabolic effects, weight gain and obesity. Although, the pathophysiological mechanisms for these are largely unknown, dietary sugars activate sweet taste receptors (STRs) expressed in a variety of tissues, including the gastrointestinal (GI) tract. We hypothesize that STR may be a mechanistic link between the high consumption of fructose and adverse metabolic outcomes.

Methods: Mice were placed on a high (60%) sucrose diet (HSD) or corn starch (60%) diet (CON) for one feeding cycle (overnight) and STR function was assessed. Mice lacking STR signaling (T1R2 knockout; KO) were used to evaluate the direct role of STRs in response to sugar feeding.

Results: Intestinal expression of t1r2 and t1r3 (STRs) and glut2 (glucose transporter) genes was significantly downregulated in response to short-term HSD compared to CON. Mice on HSD also had lower plasma glucose excursions immediately (5–15 min) after an oral glucose tolerance test that was due to reduced rates of glucose absorption (using ¹³C-6-glucose). Notably, T1R2-KO mice had reduced rates of glucose absorption independent of the dietary intervention.

Conclusion: High dietary sugar consumption, frequently seen in obesity and linked to metabolic diseases, can regulate intestinal STR transcripts leading to alterations in glucose absorption. These data suggest that STRs function to coordinate adaptive responses of the intestine to changes in nutrient availability regulating energy absorption. Understanding the mechanisms of these regulatory pathways may assist in the development of dietary interventions that prevent or delay metabolic dysfunction.

T1:PO.014

Anthropometric indices and selenium status in British adults: The U.K. National Diet and Nutrition Survey

Tigbe¹, Spina¹, Guallar², Rayman³, Kandala¹, Stranges¹

¹University of Warwick

²Johns Hopkins Bloomberg School of Public Health

³University of Surrey

Introduction: Recent studies, mainly in North America suggest a possible associations between high selenium (Se) status and excess adiposity, associated with adverse cardiometabolic outcomes.

Methods: The present study examined cross-sectional associations of anthropometric indices with Se-status biomarkers in a nationally representative sample of 1045 (577 female, 468 male) British Caucasian adults aged 19–64 who participated in the 2000–2001 National Diet and Nutrition Survey.

Results: Median (first, third quartile) values for whole-blood glutathione peroxidase (GPx) activity and plasma and erythrocyte Se concentrations were 120.0(103.0, 142.4) nmolmgHb(–1)min(–1), 1.08(0.98, 1.20) μmol/L, and 1.62(1.38, 1.91) μmol/L, respectively. For males, values were 119.0 (100.0, 141.0) nmolmgHb(–1)min(–1), 1.09 (0.99, 1.22) μmol/L, and 1.54 (1.34, 1.79) μmol/L, respectively; for females 121.0(105.0, 145.0) nmolmgHb(–1) min(–1), 1.07(0.97, 1.18) μmol/L, and 1.71(1.43, 1.99) μmol/L, respectively. Multivariate adjusted mean differences (95% CI) in whole-blood GPx between the highest (>30kg/m(2)) and the lowest (<25 kg/m(2)) categories of body mass index and the highest (96.5–139.2cm) and the lowest (52.2–78.1 cm) quartiles of waist circumference were –7.9(–13.2, –2.7) and –9.7(–16.2, –3.2) nmolmg Hb(–1)min(–1), respectively. Difference (95% CI) in plasma Se between the third (87.5–96.4cm) and the lowest quartiles of WC was –0.04(–0.08, –0.03) μmol/L. Difference (95% CI) in red blood cell Se between the highest (0.91–1.11) and the lowest (0.53–0.76) quartiles of waist-to-hip ratio (WHR) was 0.10 (0.00, 0.20) μmol/L. Similar results were observed in gender and menopausal-status subgroup analyses.

Conclusion: Though the inverse association between plasma Se and waist circumference, and the positive association between red blood Se and WHR will need confirmation, the findings suggest associations between low whole-blood GPx activity and higher measures of general and central adiposity.

T1:PO.015

The role of oxytocin in pathogenesis of obesity

Lucia Gajdosechova¹, Katarina Krskova¹, Maciej Suski², Vladimír Sisovský³, Natasa Hlavacova¹, Stanislav Babic¹, Daniela Jezova¹, Rafal Olszanecki², Stefan Zorad¹

¹Institute of Experimental Endocrinology, Slovak Academy of Sciences, Bratislava, Slovakia

²Chair of Pharmacology, Jagiellonian University Medical College, Krakow, Poland

³Institute of Pathological Anatomy, Faculty of Medicine, Comenius University in Bratislava, University Hospital Bratislava, Bratislava, Slovakia

Introduction: Neuropeptide oxytocin is known for its role in parturition, lactation and prosocial behaviour. Nowadays, the investigation of oxytocin metabolic action is gaining more attention. The aim of our study was to examine variation in plasma oxytocin levels, its synthesis and degradation in obese Zucker rats. Moreover, we studied the effect of oxytocin administration on obese phenotype.

Methods: Male 8 months old lean and obese Zucker rats were used to analyse plasma oxytocin levels by EIA after peptide extraction. Oxytocin gene expression was measured by qPCR. Activity of oxytocinase, an enzyme involved in oxytocin degradation, was determined by fluorometric assay using arylamide derivative as substrate. In addition, obese Zucker rats aged 3 months were treated with oxytocin via osmotic minipumps for 2 weeks. Adipocyte size was evaluated using histochemical method.

Results: Obese Zucker rats aged 8 months displayed marked hypoxytocinaemia. Oxytocinase activity was elevated in adipose tissue and liver plasma membrane fraction of obese animals, but hypothalamic oxytocin expression was unchanged. Oxytocin treatment of 3 months old obese Zucker rats with initially unaltered both plasma oxytocin and oxytocinase resulted in slight anorexia and substantial lower body weight gain over treatment period. In addition, these changes were accompanied by reduction in adipocyte diameter of epididymal adipose tissue in obese Zucker rats. Moreover, oxytocin treatment normalised obesity induced hypercorticosteronemia.

Conclusion: Obesity is accompanied by decreased plasma oxytocin levels due to higher peptide degradation. Oxytocin supplementation reduces obese phenotype. The present work highlights oxytocin as a candidate for therapy of obesity.

T1:PO.016

Relationship between inflammation, nutritional status, insulin resistance and circulating fibroblast growth factor 23 levels in elderly population

Michał Holecki¹, Jerzy Chudek², Aleksander Owczarek³, Magdalena Olszanecka-Glinianowicz⁴, Maria Bożentowicz-Wikarek², Jan Dulawa¹, Małgorzata Mossakowska⁵, Tomasz Zdrojewski⁶, Anna Skalska⁷, Andrzej Więcek⁸

¹Department of Internal Medicine and Metabolic Diseases, Medical University of Silesia, Katowice, Poland

²Pathophysiology Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

³Division of Statistics, Department of Instrumental Analysis, Medical University of Silesia, Katowice, Poland

⁴Health Promotion and Obesity Management Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

⁵International Institute of Molecular and Cell Biology, Warsaw, Poland

⁶Department of Arterial Hypertension and Diabetology, Medical University of Gdansk, Gdansk, Poland

⁷Department of Internal Medicine and Gerontology, Jagiellonian University Medical College, Krakow, Poland

⁸Department of Nephrology, Endocrinology and Metabolic Diseases, Medical University of Silesia, Katowice, Poland

Introduction: Fibroblast growth factor 23 (FGF23) is a hormone involved in calcium-phosphate homeostasis. The data of recently published studies suggest that FGF-23, may also play a role in some metabolic processes beyond mineral metabolism, such as insulin resistance or energy homeostasis. The aim of the study was to attempt the relationships between plasma cFGF-23 (C-terminal) and iFGF-23 (intact) concentrations and nutritional status, insulin resistance and inflammation in elderly population.

Methods: The analysis included 3115 elderly subjects. During three visits, a questionnaire survey, comprehensive geriatric assessment and anthropometric measurements were performed as well as blood and urine samples were collected by trained nurses. Serum phosphorus, calcium, intact parathormone (iPTH), 25(OH)D3, iFGF-23 and cFGF-23, insulin, glucose, albumin (also in urine), creatinine, CRP and interleukin-6 concentrations were assessed. HOMA-IR was calculated according to standard formula.

Results: Both forms of FGF23, iPTH and 25-OH-D3 levels were not related to nutritional status. Insulin resistant subjects were more frequently obese, had greater waist circumference, blood pressure values, as well as CRP, but not IL-6 levels. Additionally, both FGF23 forms, iPTH and 25-OH-D3 levels did not differ significantly between insulin sensitive and insulin resistant subgroups. In multiple regression models circulating iFGF23 and cFGF23 levels variability in elderly population were explained by changes in serum phosphorus, iPTH, eGFR and CRP levels and not by BMI and HOMA-IR values.

Conclusion: Inflammation but not nutritional status *per se* or insulin resistance influence on circulating levels of FGF-23 in elderly population.

T1:PO.017

Ileal infusion of sucrose or casein reduces food intake and alters gastrointestinal hormones

van Avesaat¹, Troost¹, Ripken², Hendriks², Masclee¹

¹Top Institute Food and Nutrition, the Netherlands – Division of Gastroenterology and Hepatology, Department of Internal Medicine, NUTRIM, Maastricht University Medical Center, the Netherlands

²Top Institute Food and Nutrition, the Netherlands – TNO, the Netherlands

Introduction: Activation of the ileal brake, by delivery of undigested lipid directly into the distal small intestine, alters gastrointestinal motility and inhibits food intake. Currently it is not clear whether other macronutrients elicit the same effects. Here, we investigated the effects of ileal infusion of sucrose and casein on food intake and gastrointestinal hormone release.

Methods: Randomized, single-blind, crossover study performed in 13 healthy subjects (intubated with naso-ileal catheter) on six experimental test days in random order. Test days started with consumption of breakfast (t=0). Thirty minutes after breakfast participants received an ileal infusion, containing control (saline), safflower oil (6 g, 51.7 kcal), low-dose sucrose (4.3 g, 17.2 kcal), high-dose sucrose (12.9 g, 51.7 kcal), low-dose casein (5 g, 17.2 kcal) or high-dose casein (15 g, 51.7 kcal) over a period of 90 min. At multiple time points blood samples were drawn for CCK, GLP-1 and PYY analysis. At the end an ad libitum meal was provided and meal intake was recorded

Results: Infusion of safflower oil, high-dose sucrose and high-dose casein resulted in significant reduction in food intake ($P < 0.0001$) and enhanced CCK release ($P < 0.0001$). Infusion of high-dose casein resulted in a significant increase in GLP-1 release ($P < 0.002$) and infusion of high-dose sucrose resulted in an increase in PYY response ($P < 0.0001$).

Conclusion: Ileal infusion of sucrose and casein resulted in reduced food intake and altered gastrointestinal hormone release. This study shows that intestinal feedback mechanisms are induced by all macronutrients, and can be used as a target for the modulation of food intake.

T1:PO.018

Evolution of central leptin sensitivity in diet-induced-obese minipigs

Marie Pigeyre¹, Alexandra Chmielewski¹, Laurence Quintane¹, Thomas Hubert¹, Monique Romon², Vincent Prévot³, François Pattou¹

¹Inserm U859, Université Lille 2

²Service Nutrition, CHRU Lille

³Inserm U837, Equipe 2, Université Lille 2

Introduction: Obese subjects are characterized by a central leptin resistance. However, the mechanisms of this resistance are not completely understood. The aim of our work is to study evolution of central leptin sensitivity in diet-induced-obese minipigs comparatively to normal weight minipigs.

Methods: Twelve 1 y-old male minipigs, weighing 35 ± 5 kg, fed by a standard diet ($n = 6$) or a highfat diet ($n = 6$) during 12 weeks, underwent sampling weekly for leptin assay in plasma and cerebrospinal fluid (CSF), and then were sacrificed after an sub-cutaneous injection of 0.03 mg/kg leptin ($n = 6$) or saline solution ($n = 6$). After extraction of the brain, the leptin hypothalamic signaling pathway was studied by pSTAT3 immunohistochemistry, coupled with β endorphin and HuC/D labeling.

Results: At the end of highfat diet, the mean weight of minipigs was 63.5 ± 4.9 kg. The activation of leptin hypothalamic pathway was attenuated after leptin injection in obese (counting: 212 ± 49.5) versus normal weight minipigs (counting: 475 ± 182) in POMC neurons. Moreover, in minipigs fed by highfat diet, the CSF/plasma leptin ratio gradually decreased during weight gain ($r = -0.74$, $p < 0.0001$), while it remained stable in minipigs fed by standard diet ($r = -0.17$, $p = 0.28$).

Conclusion: Our results confirm the presence of a central leptin resistance in the diet-induced-obese minipig. The next step of our project will be to study evolution of central leptin resistance after weight loss.

T1 – Adipose Tissues

T1:PO.019

Bardoxolone methyl reduces adipocyte size and improves the expression profile of energy expenditure and inflammatory proteins in the white adipose tissue of high fat diet-induced obese mice

Chi Dinh¹, Alexander Szabo², Danielle Camer¹, Yinghua Yu¹, Xu-Feng Huang¹

¹Illawarra Health and Medical Research Institute, Centre for Translational Neuroscience, School of Medicine, University of Wollongong NSW 2522
²Illawarra Health and Medical Research Institute, Centre for Translational Neuroscience, School of Medicine, University of Wollongong NSW 2522
²ANSTO LifeSciences, Australian Nuclear Science and Technology Organisation NSW 2234

Introduction: Obesity is associated with several serious diseases including type 2 diabetes and cancer. This condition leads to changes in white adipose tissue (WAT), including enlarged adipocytes, macrophage recruitment and inflammation. We investigated the effects of bardoxolone methyl (BM) on adipocyte morphology, uncoupling protein 2 (UCP2) and inflammatory proteins in high fat (HF) diet induced obese mice.

Methods: Twenty one C57BL/6 mice were divided into three groups (n = 7), HF/saline, HF/BM and low fat (LF)/saline. BM or saline vehicle was administered at 10mg/kg per day in drinking water for 21 weeks. At week 21, epididymal WAT was collected for immunohistochemistry to determine adipocyte size and distribution. Energy expenditure and inflammatory proteins in WAT were also examined using immunoblotting. Statistical significance between groups was determined using one and two way ANOVA, and the post-hoc Turkey-HSD.

Results: Compared to HF mice, BM mice had more adipocytes (+112.6%, p < 0.0001) with a smaller size (<2000 μm², p < 0.0001). There was significant increase in WAT expression of UCP2 (+29.7%, p < 0.1) and the anti-inflammatory protein IκB-α (+ 67.6%, p < 0.05). Compared to LF mice, HF/BM mice had a significant reduction in WAT levels of stress induced proteins, including Akt (-33.8%, p < 0.05), STAT3 (-20.9%, p < 0.05), JNK (-30.1%, p < 0.05).

Conclusion: A reduction in adipocyte size and increase in UCP2 expression indicates that BM improved metabolic status in WAT. The increased IκB-α and reduced expression of stress induced proteins shows that BM has anti-inflammatory effects. The results of this study indicate that BM has anti-obesity effects and may be useful in the treatment of obesity.

T1:PO.020

EPA, DHA and DHA/ARA exert differential direct beneficial effects on human primary adipocytes

Tania Romacho¹, Isabel Richter¹, Philipp Glosse¹, Manuela Eisen¹, Marieke Schoemaker², Eric van Tol², Juergen Eckel¹

¹Paul-Langerhans-Group, Integrative Physiology, German Diabetes Center, Düsseldorf, Germany.

²Mead Johnson Nutrition, Nijmegen, The Netherlands.

Introduction: Obesity prevalence is dramatically increasing in children, requiring novel strategies. Early dietary supplementation with the ω-3 long-chain polyunsaturated fatty acids (LC-PUFAs) eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) reduces adipose tissue inflammation in mice later in life. How these nutritional factors can directly modulate adipokine secretion and inflammation in human primary adipocytes is not fully understood. We aimed to determine the impact of EPA, DHA and DHA/ARA (1:2) in the ratio present in breast and formula milk on adipokine secretion and their potential anti-inflammatory actions.

Methods: Human primary adipocytes were isolated from subcutaneous adipose tissue. After differentiation, characterization by immunofluorescence was performed. Adiponectin and leptin secretion were assessed by ELISA. Adiponectin and NF-κB activation were measured by Western blot.

Results: 24 h exposure to EPA, DHA (50 μM and 100 μM, respectively) and DHA/ARA (50/100 μM) significantly upregulated adiponectin secretion without affecting leptin secretion. This upregulation of adiponectin secretion was not due to de novo synthesis, since intracellular adiponectin levels were not increased by the LC-PUFAs. Both DHA (100 μM) and DHA/ARA significantly reduced the NF-κB activation (48.2% and 53.8% respectively), induced by TNF-α (5 ng/ml) whereas EPA or ARA alone did not impact NF-κB activation.

Conclusion: DHA, EPA, and DHA/ARA arise as promising early nutritional factors promoting an anti-inflammatory phenotype in adipocytes. Moreover, DHA and DHA/ARA may be efficient in early nutritional programming by exerting a protective action against diseases characterized by low-grade chronic inflammation such as obesity or type 2 diabetes.

Introduction: “Brite” (brown-in-white) cells are brown-like adipocytes that appear in white adipose tissue (WAT) in response to appropriated stimuli (browning process). These cells possess the functional machinery for thermogenesis and hence may contribute to body weight maintenance. We have reported that supplementation with a combination of Resveratrol (RSV) and Quercetin (Q) produces a synergic decrease in adiposity in rats. Our aim was to determine whether the body-fat loss produced by this combination could be related to WAT-browning.

T1:PO.021

A combination of Resveratrol and Quercetin stimulates the development of brite adipocytes in white adipose tissue from rats

Noemí Arias¹, Catalina Picó², Paula Oliver², María Teresa Macarulla¹, Jonatan Miranda¹, Andreu Palou², María del Puy Portillo¹

¹Nutrition and Obesity Group, Department of Nutrition and Food Science, University of the Basque Country (UPV/EHU) and CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), Vitoria, Spain. Phone: +34945013863.

²Laboratory of Molecular Biology, Nutrition and Biotechnology, University of the Balearic Islands (UIB) and CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), Palma de Mallorca, Spain

Methods: Forty male Wistar rats were divided into four groups and fed an obesogenic diet during 6 weeks: controls (C) and treated with Resveratrol (RSV; 15 mg/kg/d), Quercetin (Q; 30 mg/kg/d), and both molecules (RSV+Q). WAT from epididymal, perirenal, mesenteric and subcutaneous locations were dissected, weighed and histologically analysed. Adipocyte size and the expression (RT-PCR) of brite and brown adipocyte markers (Cidea, Ucp1 and Cpt1b) were measured in the perirenal depot.

Results: Histological analysis showed abundant presence of multilocular brite adipocytes in the perirenal depot of the RSV+Q group, and a slight presence in the RSV group. In both groups, the unilocular adipocyte size was decreased. Brite adipocytes were not found in any of the other studied depots. An increase in mRNA levels of Cidea was observed only in the RSV+Q group, without changes in Ucp1 or Cpt1b mRNA levels.

Conclusion: A combination of RSV+Q induces the appearance of brite adipocytes in the perirenal depot. This browning induction could contribute to explain the adiposity-lowering effect of the combination of these polyphenols.

T1:PO.022

Cultured 3T3L1 adipocytes dispose of excess medium glucose as lactate under abundant oxygen availability

David Sabater, Sofia Arriarán, María del Mar Romero, Agnelli Silvia, María del Mar Grasa, Xavier Remesar, José-Antonio Fernández-López, Marià Alemany

Dep. Nutrition and Food Sciences. Fac. Biology. University of Barcelona. Barcelona, Spain.

Introduction: White adipose tissue (WAT) produces lactate from glucose, especially in obesity, with low in vivo oxygen consumption. Cultured adipocytes also produce lactate, acidifying the medium. We analyzed whether excess glycolytic lactate production is related to hypoxia or to a Warburg effect using mature 3T3L1 cells in cultures devoid of fibroblasts.

Methods: Standard 3T3L1 cells were cultured in Transwells under varying glucose concentrations. Cells number and size were measured with a handheld cell counter. Gene expression for glucose-lactate-lipid relationships were analyzed, as well as pO₂ and changes in medium content of glucose and lactate.

Results: Lactate production by 3T3L1 cells at the expense of glucose was observed in mature adipocytes, but not in fibroblasts; most of the glucose was glycolized to lactate; with medium glucose up to 10 mM, in 2 days all medium glucose had disappeared, largely substituted by lactate, which production rate plateaued at about 400 akat/cell. Only a fraction of glucose was used for lipogenesis. The cells were under normoxia throughout, with unaltered pO₂.

Conclusion: Cultured adipocyte metabolism was largely anaerobic, ATP was obtained mainly from glycolysis to lactate. There was no Warburg effect since cell proliferation was absent. We hypothesize that adipocytes defend from excess glucose producing lactate, to limit lipogenesis, but in this process they also help lower hyperglycemia.

T1:PO.023

Brown and beige adipose tissue marker gene expression in human abdominal adipose tissue is fat depot-specific and related to obesity, insulin sensitivity and hyperglycemia

Lakowa¹, Flehmig², Lorenz¹, Lohmann³, Schön⁴, Dietrich⁵, Klötting⁶, Stumvoll⁷, Blüher¹

¹Universität Leipzig, Klinik und Poliklinik für Endokrinologie und Nephrologie – Leipzig, Deutschland

²Universität Leipzig, Department für Innere Medizin – Leipzig, Deutschland

³Städtisches Krankenhaus Dresden-Neustadt, Innere Medizin – Dresden, Deutschland

⁴Städtisches Klinikum Karlsruhe, Klinik für Allgemein- und Viszeralchirurgie – Karlsruhe, Deutschland

⁵Uniklinik Leipzig, Klinik und Poliklinik für Viszeral-, Transplantations-, Thorax- und Gefäßchirurgie, Sektion Bariatrische Chirurgie – Leipzig, Deutschland

⁶Universitätsmedizin Leipzig, IFB AdipositasErkrankungen – Leipzig, Deutschland

⁷Uniklinik Leipzig, Klinik und Poliklinik für Endokrinologie und Nephrologie – Leipzig, Deutschland

Introduction: Brown adipose tissue (BAT) plays an important role in the regulation of energy metabolism. In adult humans evidence of BAT is associated with lower BMI, younger age, and preserved normal glucose metabolism. It is not yet known whether abdominal fat depots express markers of brown (*UCP1*, *CIDEA*, *PRDM16*) or beige adipocytes (*CD137*, *TMEM26* and *TBX1*) and how the mRNA expression of these genes is associated with anthropometric and biochemical parameters.

Methods: *UCP1*, *CIDEA*, *PRDM16*, *CD137*, *TMEM26* and *TBX1* mRNA expression was measured in 488 paired subcutaneous and visceral abdominal AT samples. For gene expression analysis, a quantitative RT-PCR was performed. Mean age of the AT donors (326 women, 162 men) was 51 ± 14 (SD) years with a mean BMI of 43.5 ± 13.0 kg/m².

Results: All examined BAT and beige AT markers were expressed in visceral and subcutaneous AT in adults. In subcutaneous AT, *UCP1*, *CI-*

DEA, *CD137*, *TMEM26* and *TBX1* were significantly lower expressed (all: $p < 0.01$) than in visceral AT. Compared to normal weight individuals, *UCP1*, *CIDEA* and *TMEM26* mRNA expression was significantly higher (for all: $p < 0.01$) in individuals with a BMI > 30 kg/m². In addition, *CIDEA* ($r = -0.160$; $p < 0.01$), *TMEM26* ($r = -0.163$; $p < 0.05$) and *TBX1* ($r = -0.249$; $p < 0.001$) expression negatively correlates with parameters of insulin sensitivity (HbA1c).

Conclusion: Marker genes of BAT and beige adipocytes are expressed in human white adipose tissue. mRNA expression of BAT and beige AT genes is associated with obesity, visceral fat distribution as well as with parameters of insulin resistance and glucose homeostasis.

T1:PO.024

Osteopontin deficiency prevents the development of obesity and fatty liver via impaired adipose tissue matrix remodelling and reduced inflammation and fibrosis in adipose tissue and liver in mice

Andoni Lancha¹, Amaia Rodríguez¹, Victoria Catalán¹, Sara Becerril¹, Neira Sáinz¹, Beatriz Ramírez¹, María A. Burrell², Gema Frühbeck³, Javier Gómez-Ambrosi¹

¹Metabolic Research Laboratory, Clínica Universidad de Navarra, Pamplona, Spain. CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, Pamplona, Spain.

²CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, Pamplona, Spain. Department of Histology and Pathology, University of Navarra, Pamplona, Spain.

³Metabolic Research Laboratory, Clínica Universidad de Navarra, Pamplona, Spain. CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, Pamplona, Spain. Department of Endocrinology & Nutrition, Clínica Universidad de Navarra, Pamplona, Spain

Introduction: Osteopontin (OPN) is a multifunctional extracellular matrix (ECM) protein involved in multiple physiological processes.

Methods: The effect of the absence of OPN in the development of obesity induced by a high-fat diet (HFD) using OPN-KO mice was analysed.

Results: OPN expression was upregulated in white adipose tissue (WAT) and liver in wild type (WT) mice with HFD. OPN-KO mice had higher insulin sensitivity, lower body weight and fat mass with reduced WAT ECM remodelling and reduced adipocyte size than WT mice under a HFD. Reduced MMP2 and MMP9 activity was involved in the decreased ECM remodelling. Crown-like structure number in epididymal WAT (EWAT) as well as F4/80-positive cells and *Emr1* expression in EWAT and liver increased with HFD, while OPN-deficiency blunted the increase. Moreover, our data show, for the first time, that OPN-KO mice display reduced fibrosis in EWAT and liver under a HFD. Gene expression of collagens *Col1a1*, *Col6a1* and *Col6a3* in EWAT and liver, as well as the profibrotic cytokine *Tgfb1* in EWAT were increased with HFD, while OPN-deficiency prevented this increase. Moreover, lack of OPN blunted the HFD-induced increase in oxidative stress in EWAT. OPN deficiency prevented hepatic steatosis via reduction in the expression of molecules involved in the onset of fat accumulation such as *Pparg*, *Srebf1*, *Fasn*, *Mogat1*, *Dgat2* and *Cidec*.

Conclusion: The present data evidence novel mechanisms of OPN in the development of obesity, pointing out the inhibition of OPN as a promising target for the treatment of obesity and fatty liver.

T1:PO.025

The age-dependent changes in metabolic activity of rat adipocytes

Kinga Gwóźdź, Agnieszka Stefańska, Łukasz Szczeszek, Tomasz Szkudelski, Katarzyna Szkudelska, Leszek Nogowski
Poznań University of Life Sciences

Introduction: The aging is manifested by changes of essential physiological processes in many tissues including fat tissue and is often accompa-

nied by increased obesity. These changes are to a large extent related to metabolic processes.

Methods: The aim of our experiments was to study the age-dependent metabolic activity of fat cells isolated from male Wistar rats weighing about 200 (six weeks old) and 400g (12 weeks old). Lipolysis was induced by epinephrine, dibutyryl-cAMP, amrinone (inhibitor of phosphodiesterase 3B) or DPCPX (adenosine A1 receptor antagonist), whereas antilipolytic effects were studied in the presence of insulin or H-89 (PKA inhibitor). Moreover, insulin-stimulated glucose conversion to lipids (lipogenesis) and glucose oxidation were compared. Additionally, blood insulin, thyroid hormones, glucose, triglycerides, free fatty acids, lactate were determined in both groups of animals.

Results: In the presence of amrinone and DPCPX increased lipolysis was observed in cells of young rats in comparison to older ones. The antilipolytic activity of insulin was shown to be reduced with age. There was no significant change observed in the intensity of lipolysis, when PKA inhibitor (H-89) was used as a antilipolytic agent. Lipogenesis was decreased in older animals as well as glucose oxidation. Blood insulin was increased, whereas thyroid hormones, glucose and fatty acids were reduced with age. The aging was associated with slight elevation of blood lactate and triglycerides.

Conclusion: The complex study was performed describing deteriorations of fat cells metabolic activity in male rats during aging emphasizing their significance in metabolic status of the whole organism.

T1:PO.026

Dysregulated extracellular matrix gene expression levels in adipose tissue of patients with colon cancer

Victoria Catalán¹, Javier Gómez-Ambrosi¹, Amaia Rodríguez¹, Beatriz Ramírez¹, Camilo Silva², Fernando Rotellar³, José Luis Hernández-Lizoaín⁴, Jorge Baixauli⁴, Victor Valentí⁴, Javier Salvador⁴, Gema Frühbeck⁵

¹Metabolic Research Laboratory, Clínica Universidad de Navarra, Pamplona, Spain CIBER Fisiopatología de la Obesidad y la Nutrición, ISCIII, Spain

²Department of Endocrinology, Clínica Universidad de Navarra, Pamplona, Spain CIBER Fisiopatología de la Obesidad y la Nutrición, ISCIII, Spain

³Department of Surgery, Clínica Universidad de Navarra, Pamplona, Spain CIBER Fisiopatología de la Obesidad y la Nutrición, ISCIII, Spain

⁴Department of Surgery, Clínica Universidad de Navarra, Pamplona, Spain

⁵Metabolic Research Laboratory, Clínica Universidad de Navarra, Pamplona, Spain Department of Endocrinology, Clínica Universidad de Navarra, Pamplona, Spain CIBER Fisiopatología de la Obesidad y la Nutrición, ISCIII, Spain

Introduction: Association between excess adiposity and cancer has been well established for several tumour types. Dysregulated adipokine expression in obesity maintains a microenvironment that is favourable for tumorigenesis. The aim of the present study was to evaluate the expression levels of key genes involved in extracellular matrix remodelling in visceral adipose tissue from volunteers with and without colon cancer (CC).

Methods: Twenty-five subjects were included in the study (15 controls and 10 patients with CC). Anthropometric measurements as well as circulating metabolites were determined. Real-time PCR analyses were performed to quantify gene expression levels of lipocalin-2 (LCN2), osteopontin (SPP1), chitinase-3-like protein 1 (YKL40), vascular endothelial growth factor (VEGFA) and matrix metalloproteinase (MMP)-2 and 9 in VAT.

Results: No differences in body mass index as well as glucose and leptin concentrations were observed between groups. Patients with CC exhibited higher ($P < 0.05$) circulating levels of interleukin-6 and tumour necrosis factor- α compared with patients without CC. Increased ($P < 0.05$) gene expression levels of LCN2, SPP1, YKL40, VEGFA and MMP2 were found in VAT of patients with CC ($P < 0.05$). No differences were detected for mRNA levels of MMP9. Biologically relevant and signif-

icant ($P < 0.05$) correlations emerged between key extracellular matrix proteins.

Conclusion: Upregulation of visceral adipose tissue extracellular matrix genes involved in remodelling provides a molecular and cellular environment that facilitates the growth and progression of obesity-associated tumours.

T1:PO.027

Evaluation of glucose transporters (GLUT1 & GLUT4) and UCP1 expression in brown adipose tissue in short term-fasted rAAV-leptin treated mice

Naohiko Ueno¹, Akihiro Asakawa², Akio Inui³

¹Ueno Internal Medicine and Diabetes Clinic

²Department of Psychosomatic Internal Medicine, Kagoshima University Graduate School of Medical and Dental Sciences Kagoshima, Japan.

³Kagoshima University Graduate School of Medical and Dental Sciences Kagoshima, Japan.

Introduction: rAAV-leptin treatment drastically reduces body fat and ameliorates glucose metabolism even in normal mice, possibly enhancing the function of brown adipose tissue (BAT). This shows that the target organ of rAAV-leptin treatment may be brown adipose tissue. We investigated glucose transporters (GLUT1 & GLUT4) and UCP1 mRNA in BAT in rAAV-leptin treated mice.

Methods: rAAV-GFP and rAAV-leptin treated mice were fasted for 3 hours. Percent body weight and blood glucose levels were measured before and after fasting. Plasma glucagon levels were measured after fasting. Glucose-6-phosphatase, PEPCK and glucokinase in the liver, GLUT1 and GLUT4 mRNA in the muscle, and UCP1, GLUT1 and GLUT4 mRNA in BAT were measured using real-time PCR.

Results: Even after three hours fasting, %BW and blood glucose levels were decreased and plasma glucagon levels were increased in rAAV-leptin treated mice. Although elevated G6P mRNA with reduction of glucokinase mRNA in the liver showed the pattern of fasted condition, GLUT1 and GLUT4 mRNA were both highly upregulated with elevation of UCP1 mRNA in BAT. There was no change in the muscle.

Conclusion: Three hours fasting in rAAV-leptin treated mice caused the condition of fasting, although there was high elevation in GLUT1 and GLUT4 expression with increased UCP1 mRNA in BAT. This suggests that increased energy expenditure may require glucose utilization in BAT, leading to elevated GLUT1 and GLUT4 expression. BAT may be, at least in part, the target organ for the improvement of glucose metabolism by rAAV-leptin treatment.

T1:PO.028

Regulation of the conversion of white to brown adipocytes by arachidonic acid metabolic pathway

Rayane Ghandour, et al.

IBV, CNRS UMR7277, INSERM U1091, Univ. de Nice Sophia-Antipolis, NICE

Introduction: The recent discovery of functional brown adipocytes in adult humans has led to the consideration of their use to increase energy expenditure in the treatment of obesity.

We decided to study the effect of an excess of poly unsaturated fatty acids $\omega 6$ on brown adipocytes formation.

Methods: Our team developed a unique cell model for studying the late steps of human brown adipogenic differentiation, the hMADS cells (human-Multipotent Adipose-Derived-Stem). We studied the effect of arachidonic acid (ARA) or its metabolites, prostaglandins (PGs) of series 2 treatments of hMADS cells, on the differentiation process.

Results: Our data show different effects of the prostaglandins studied. Thus, PGF2 α and PGE2 inhibit the conversion of white adipocytes into brown adipocytes through a pathway involving intracellular calcium, MAPK and PPAR γ . Meanwhile, PGE 2 is also able to induce this conversion via a cAMP-dependent pathway. This dual capacity might be due to the diversity of EP membrane receptors and their different signaling pathways

Finally prostacyclin (PGI₂) induces this conversion through a pathway involving PPARs and IP receptor.

Conclusion: These results show that the effect of ARA on the conversion of white adipocytes into brown adipocytes depends on three factors: i) the nature of prostaglandins synthesized ii) the secreted amount and iii) the presence of different receptors on the adipocyte's membrane.

Our results suggest that in addition to promoting the formation of white adipocytes, excess of polyunsaturated fatty acids in diets may increase their deleterious effect, altering the process of "browning" in the white adipose tissue.

T1:PO.029

Establishment of Lipofection for Studying miRNA Function in Human Adipocytes

Enlund¹, Fischer², Handrick², Otte², Debatin³, Wabitsch¹, Fischer-Posovszky¹

¹Division of Pediatric Endocrinology and Diabetes, Department of Pediatrics and Adolescent Medicine, Ulm University Medical Center, Ulm, Germany

²Institute of Applied Biotechnology, University of Applied Sciences Biberach, Biberach, Germany

³Department of Pediatrics and Adolescent Medicine, Ulm University Medical Center, Ulm, Germany

Introduction: miRNA dysregulation has recently been linked to human obesity and its related complications such as type 2 diabetes. In order to study miRNA function in human adipocytes, we aimed for the modulation of mature miRNA concentration in these cells. Adipocytes, however, tend to be resistant to transfection and there is often a need to resort to viral transduction or electroporation. Our objective therefore was to identify an efficient, non-viral transfection reagent capable of delivering small RNAs into these cells.

Methods: We compared the efficiencies of three transfection agents, Lipofectamine™ 2000, ScreenFect® A and BPEI 1.2k in delivering fluorescently labelled siRNA into human Simpson-Golabi-Behmel syndrome (SGBS) preadipocytes and adipocytes using fluorescence microscopy and flow cytometry. Downregulation of a specific target gene in response to miRNA mimic transfection was assayed in SGBS preadipocytes via RT-qPCR and Western Blot. The downregulation on mRNA level was also studied in mature SGBS adipocytes and in *ex vivo* differentiated primary human adipocytes.

Results: All three transfection agents were able to internalize the oligos but only lipofection resulted in efficient downregulation of the target gene. Lipofectamine™ 2000 outperformed ScreenFect® A in preadipocytes where Lipofectamine™ 2000 transfection resulted in 60% downregulation of the target gene. In adipocytes the two reagents gave comparable results with ca. 50% target gene downregulation. Transfection with Lipofectamine™ 2000 did not affect the preadipocytes capacity for adipogenic differentiation while ScreenFect® A had a minor inhibitory effect.

Conclusion: Lipofection is a feasible method for the study of miRNA function in adipocytes.

T1:PO. 030

Low doses of quercetin inhibit adipocyte differentiation in 3T3-L1 pre-adipocytes

Itziar Eseberri, Jonatan Miranda, Arrate Lasa, Itziar Churruga, María Puy Portillo

Nutrition and Obesity Group, Department of Nutrition and Food Science, University of the Basque Country, (UPV/EHU). Vitoria, Spain. CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Instituto de Salud Carlos III, Spain.

Introduction: Quercetin is a flavonoid present in onions, broccoli, tomatoes, apples and berries and its intake is one of the most consumed polyphenol. A wide range of biological effects, such as prevention of ox-

idation, inflammation and cancer have been attributed to this compound and it has also been reported to improve diabetic status in animal models. However, very scarce data exist concerning its delipidating effect and the underlying mechanisms of action. The aim of the present study was to analyze the effect of quercetin on triacylglycerol accumulation and on the expression of adipogenic genes in maturing pre-adipocytes.

Methods: 3T3-L1 pre-adipocytes were cultured in DMEM+FBS media. Two days after confluence, differentiation was induced. On day 0, 2, 4 and 6 of differentiation maturing pre-adipocytes were treated with 1,2,5 and 10 μM of quercetin. On day 8, medium was removed and cells were harvested. Triacylglycerol content was measured spectrophotometrically. The expression of adipogenic genes (CEBPα and β, PPARγ, SREBP 1C and LPL) was analyzed at 1 and 10 μM doses by Real Time RT-PCR. All sample mRNA levels were normalized to the values of β-actin. The statistical study was performed by using Student's *t* test.

Results: Quercetin reduced triacylglycerol content at all doses. The lowest dose (1 μM) reduced CEBPβ and PPARγ expression, whereas the highest dose (10 μM) reduced SREBP1c, PPARγ and LPL expression.

Conclusion: It can be concluded that low doses of quercetin are able to inhibit adipogenesis. Depending on the dose different pathways of the adipogenic process are affected.

T1:PO.031

ATGL and HSL deficiency contributes to insulin resistance in human primary adipocytes

Johan Jocken, Gijs Goossens, Yvonne Essers, Nicole Hoebbers, Ellen Blaak

Department of Human Biology, NUTRIM School for Nutrition, Toxicology, and Metabolism, Maastricht University Medical Centre, Maastricht, The Netherlands

Introduction: The mobilization of fat stored in adipose tissue is mediated by adipose triglyceride lipase (ATGL) and hormone-sensitive lipase (HSL). We hypothesized that reduced lipase expression provides less lipid ligands for peroxisome proliferator-activated receptor (PPAR) activation, disrupting mitochondrial oxidation, resulting in excessive lipid accumulation and the development of adipocyte insulin resistance.

Methods: First we measured lipase expression in subcutaneous adipose tissue biopsies of lean (n = 8), and age-matched obese subjects (n = 10). Next we investigated the impact of altered lipase expression on glucose uptake, lipid content, mitochondrial substrate oxidation and respiration in human primary adipocytes.

Results: Adipose tissue ATGL and HSL mRNA expression was negatively associated with whole-body insulin resistance (r = -0.34 and -0.41, P < 0.05). We next showed that siRNA-mediated knock-down of HSL and double knock-down (both ATGL and HSL), decreased 3H-glucose uptake. Insulin-mediated 3H-glucose uptake was blunted following single and double lipase knock-down (-20%, P < 0.001). 14C glucose oxidation tended to decrease following double knock-down (P=0.073). ATGL knock-down decreased mRNA levels of the PPAR target CPT1a, disrupting 14C-palmitate beta-oxidation, followed by 14C incorporation in the lipid pool. On the other hand, HSL knock-down decreased PPARα but increased the rate-limiting enzyme in beta-oxidation LCAD, dissociating mitochondrial beta-oxidation and respiration, resulting in accumulation of incomplete oxidation products (1.14 ± 0.03 vs 1.00 ± 0.01, P < 0.001).

Conclusion: Altogether, our data indicate that ATGL and HSL knock-down results in insulin resistance in human adipocytes, which may involve altered PPAR signalling. Targeting adipocyte lipases may be an important strategy to improve insulin sensitivity in obesity and type 2 diabetes.

T1:PO.032

Resveratrol does not increase body fat loss induced by energy restriction

Goiuri Alberdi, María Teresa Macarulla, Víctor Manuel Rodríguez, María del Puy Portillo

Nutrition and Obesity Group, Department of Nutrition and Food Sciences and Research Institute Lucio Lascaray, University of the Basque Country (UPV/EHU), CIBERobn Physiopathology of Obesity and Nutrition, Institute of Health Carlos III (ISCIII)

Introduction: Resveratrol (RSV) is a polyphenol known to have an anti-obesogenic effect because it mimics energy restriction. However, very scarce evidence exists concerning the combined effects of RSV and energy restriction on body fat reduction. Therefore, the aim of the present study was to determine whether RSV increases body fat reduction induced by energy restriction.

Methods: For the experiment, 27 male Wistar rats were fed a high-fat high-sucrose diet for 6 weeks to obtain a diet induced obesity model. Nine of them were used as obese control group, and the remaining 18 ones were submitted to a mild energy restriction (25%) without or with RSV administration (30 mg/kg body weight/d) for 2 weeks. Final body weight, subcutaneous and intra-abdominal white adipose tissues weights were assessed, and Adipose Index was calculated. In addition, heparin-releasable lipoprotein lipase (HR-LPL), fatty acid synthase (FAS) and acetyl-CoA carboxylase (ACC) enzyme activities, and their respective mRNA levels, were measured in white adipose tissue.

Results: Final body weight, white adipose tissue weights, and Adipose Index were reduced in both restricted groups as compared with the control obese group, but no differences were found between them. LPL, FAS and ACC activities and their genetic expressions were also similar in both restricted groups.

Conclusion: These results suggest a lack of any adjuvant effect of RSV on energy restriction for obesity treatment purposes.

T1:PO.033

Epicardial adipose tissue and cardiometabolic parameters in obese women

Mirjana Sumarac-Dumanovic¹, Jelena Milin-Lazovic², Danica Stamenkovic-Pejkovic³, Danka Jeremic³, Goran Cvijovic¹, Ana Gligic³, Snezana Polovina³, Dragan Micic¹

¹Faculty of Medicine, University of Belgrade, Center of Obesity, Clinical Center of Serbia

²Faculty of Medicine, University of Belgrade

³Center of Obesity, Clinical Center of Serbia

Introduction: Epicardial fat pad (EFP) is a visceral fat type, which functions as metabolically active endocrine organ. Besides being a marker of cardiovascular risk, due to its anatomical and functional closeness (paracrine interactions) with the myocardium, EFP can play an important role in the structural changes of the left ventricle, which are associated with obesity. The aim of the study was to examine the relationship among epicardial fat pad thickness (EFPT), left ventricular mass, insulin sensitivity and trunk obesity parameters in obese women.

Methods: In 36 overweight and obese women (BMI = 34.13 ± 4.84 kg/m², age = 37.89 ± 30.10 g), without hypertension and diabetes echocardiogram with determination EFPT and measurement of regional (trunk) of adipose tissue using osteodensitometry were done. Fasting plasma glucose nad insulin were measured and HOMA index calculated. Based on the mean values of EFPT (6 mm), respondents were divided into two groups (group 1: EFPT ≤ 6mm, group 2: EFPT > 6mm). Significant difference was found by using t test.

Results: In Group 2 (EFPT > 6 mm) registered statistically significantly higher BMI (32.36 ± 3.43 vs. 36.51 ± 5.41, p < 0.05), HOMA-IR (3.76 ± 1.60 vs. 5.32 ± 2.08, p < 0.05) and left ventricular mass (176.54 ± 44.28 vs. 209.64 ± 43.07, p < 0.05). Statistically significant correlation exists between EFPT and BMI (r = 0.583, p < 0.001), trunk

fat tissue (r = 0.409, p < 0.05), HOMA-IR (r = 0.414, p < 0.05) and left ventricular mass (r = 0.506, p < 0.001).

Conclusion: Our study showed positive correlation between epicardial fat thickness, left ventricular mass and insulin resistance suggesting potential role of EFPT in obesity-related myocardial structural changes.

T1:PO.034

Apolipoprotein CIII overexpression exacerbates high fat diet-induced adiposity by modulating lipid storage, lipogenesis and lipolysis rates

Helena Raposo, Larissa Sato, Adriene Paiva, Helena Oliveira

Dept Structural and Functional Biology, State University of Campinas, Campinas, SP, Brazil

Introduction: Excess of apolipoprotein (apo) CIII causes severe hypertriglyceridemia and predispose to diet induced atherosclerosis. We have previously shown that apo CIII overexpression also promotes diet-induced obesity. In this work, we examined the major mechanisms involved in the increased adiposity response to a high fat (HF) diet in mice overexpressing the apo CIII.

Methods: We measured the adipose tissue's capacity to store exogenous lipids, *de novo* lipogenesis and lipolysis rates in mice after two months on a high fat (HF) diet.

Results: In mice fed a HF diet from 2 to 4 months of age, there was a 3-fold increase in the exogenous lipid retention capacity of apo CIII mice adipose tissue compared to non-transgenic (NTg) mice. However, lipogenesis in apo CIII mice was reduced by 20–50%; therefore, the overall adipose tissue depot masses did not differ between the two groups of mice, although leptin levels were higher in apo CIII mice. When the HF diet was provided to older mice, from 4 to 6 months of age, both adipose masses and leptin levels were increased. While exogenous lipid retention capacity and lipogenesis were similar in both groups, the lipolysis rates measured in isolated adipocytes and *in vivo* were significantly reduced in apo CIII mice.

Conclusion: Altogether, these data indicate that apo CIII overexpression promotes age-dependent effects on adipose tissue lipid metabolism, namely, stimulation of exogenous lipid storage at early ages and repression of lipolysis at late ages.

T1:PO.035

Preparation and characterization of adipocyte model for studying of persistent organic pollutants exposure

Dana Mullerova, Vlastimil Kulda, Miroslava Cedikova, Jana Dvorakova, Michaela Kripnerova, Pavel Sedlacek, Vaclav Babuska, Martin Pesta, Milena Kralickova

Charles University, Medical Faculty in Pilsen, Czech Rep.

Introduction: Introduction: In humans, organochloric persistent organic pollutants (POPs) are associated in epidemiological studies with higher risk of diabetes mellitus type II. These lipophilic pollutants are stored primarily in adipose tissue. To examine the effect of POPs to adipocyte metabolism, we use *in vitro* model of adipocytes derived from mesenchymal stem cells.

Objective: To study of effect of POPs it is necessary to characterize process of differentiation of adipocytes.

Methods: We prepared a model of adipocyte from human mesenchymal stem cells derived from adipose tissue (hMSC), (StemPro[®] Gibco, R7788–110; StemPro[®] Adipogenesis Differentiation Kit; Gibco A10070–01). The ongoing process of differentiation will be described by mapping of expressions of selected genes. The expression of genes is analysed by real-time PCR using LNA probe.

Results: Process of differentiation was analysed by quantitative assessment of expression of the followed genes OCT4, CD 34, GATA4, PPAR gamma, CEBP alpha, CEBPB beta, SRBP1c, LMN alpha, LMN

beta. During 28 days from the point when differentiation was initiated, the samples were taken every 3 days. The pattern of expression will be presented.

Conclusion: Although there is suggestion from epidemiological human studies, that POPs could be obesogens and metabolic disruptors, the exact pathophysiology on cellular level has not been already known and next research in this area is desirable.

T1:PO.036

About one third of the rat fat reserves is dispersed out of the major adipose tissue sites; cafeteria diet increases its levels in the same proportion that main adipose stores

Maria del Mar Romero, Stephanie Roy, Karl Pouillot, Montserrat Esteve, Maria del Mar Grasa, José-

Antonio Fernández-López, Marià Alemany, Xavier Remesar

Dept. Nutrition and Food Sciences. University of Barcelona. Barcelona, Spain

Introduction: Adipose tissue (AT) is found in large macroscopic masses but also interspersed in other organs and body spaces. Lipid storage is also partly shared by other tissues. We analyzed the size of these lipid pools and its modulation by a cafeteria diet in rats.

Methods: Adult female and male rats were fed for 28d with control or of cafeteria diet. Lipid content was measured in brain, liver, gastrocnemius muscle, white AT (subcutaneous, perigonadal, retroperitoneal, mesenteric), brown AT (interscapular, perirenal) and the combined rest of organs and tissues (without gut contents). Food (energy and lipid) intakes were measured daily.

Results: Total body lipid: muscle 8%, liver 1–1.4%, four white AT sites 28–63%; the rest of the body (including muscle) 38–44%. There was a good correlation between AT lipid and body lipid (as expected), but lipid in “other organs” was highly correlated too with body lipid; brain lipid was not.

Conclusion: Body fat storage was fairly uniform for the main AT sites, but also liver, muscle, as well as in other tissues (with the exception of unchanged brain lipid content), and was related to energy intake. All storage sites increased their lipid content in parallel against a hyperlipidic diet challenge. We postulate that lipid stores are handled and regulated coordinately, with a more centralized and overall mechanisms than usually assumed

T1:PO.037

Resveratrol and Quercetin: A good combination to prevent fat accumulation in white adipose tissue

Noemí Arias, María Teresa Macarulla, Leixuri Aguirre, Jonatan Miranda, María del Puy Portillo

Nutrition and Obesity Group. Dpt. Nutrition and Food Science, Faculty of Pharmacy. University of the Basque Country (UPV/EHU). Vitoria-Gasteiz (Spain). CIBERobn Physiopathology of Obesity and Nutrition, Institute of Health Carlos III (ISCIII), Spain

Introduction: Resveratrol (RSV) and Quercetin (Q) are two polyphenols that have demonstrated to have anti-obesity properties. Then, additive or synergic effects could be expected when both are administered together. The aim of this work was to analyse the effects of a combination of RSV and Q on body fat accumulation.

Methods: Forty male Wistar rats were divided into four groups fed on an obesogenic diet during 6 weeks: control (C) and treated with resveratrol (RSV; 15 mg/kg body weight/d), quercetin (Q; 30 mg/kg body weight /d), or both molecules (RSV+Q). Enzymatic activities of Fatty Acid Synthase (FAS), Acetyl-CoA Carboxylase (ACC) and Heparin-Releasable Lipoprotein Lipase (HR-LPL) were assessed by spectrophotometry, western blot and fluorimetry, respectively, in perirenal adipose tissue. In the case of ACC, the ratio between phosphorylated ACC (inactivated form of ACC) and total ACC was measured.

Results:

	C	RSV	Q	RSV+Q
Perirenal adipose tissue weight (g)	13.5 ± 1.0 ^a	11.6 ± 0.3 ^{ab}	13.0 ± 0.8 ^a	9.8 ± 0.9 ^b
Phosphorylated ACC/total ACC (AU)	0.11 ± 0.02 ^b	0.36 ± 0.15 ^{ab}	0.25 ± 0.06 ^{ab}	0.55 ± 0.15 ^a
FAS (nmol/min/mg protein)	4.60 ± 0.42	4.77 ± 0.75	3.82 ± 0.51	3.69 ± 0.60
HR-LPL (nmol/min/mg protein)	8.40 ± 0.66 ^a	5.23 ± 0.56 ^b	6.56 ± 0.40 ^{ab}	5.06 ± 0.61 ^b

^{a,b}Values in the same row with different superscript letters were significantly different $P < 0.05$. AU: arbitrary units.

Conclusion: A combination of RSV and Q is more efficient in the reduction of observed fat accumulation than the administration of both polyphenols separately. This can be due to the fact that, in contrast to that observed in RSV and Q groups, the administration of RSV+Q led to a decrease in *de novo* lipogenesis and fatty acid uptake from circulating triacylglycerols.

T1:PO.038

Energy and macronutrients content of oral hospital diet prescribed to chronic renal failure patients on conservative treatment

Janiara David Silva¹, Karine Louvera Silva¹, Sueli Baggio², Marcelo Morgano², Aline Nemer³, Késia Diego Quintaes⁴

¹Nutrition School, Federal University of Ouro Preto (UFOP)

²Institute of Food Technology (ITAL)

³Department of Nutrition, Federal Nutrition of Juiz de Fora (UFJF) and Nutrition School, Federal University of Ouro Preto (UFOP)

⁴Nutrition School, Federal University of Ouro Preto

Introduction: The contributions of diet and treatment planning in the treatment of Chronic Kidney Disease (CKD) has been recognized as having a significant clinical impact if introduced early. This study aimed to determine the levels of carbohydrates, proteins, lipids, energy and energy density (ED) in an oral hospital diet prescribed to CKD patients, and to evaluate the adequacy of this diet with respect to dietary recommendations.

Methods: Diets were collected in a Brazilian public hospital on two non-consecutive days of six different weeks. The carbohydrate, protein, and lipid (total, saturated, monounsaturated, polyunsaturated, linoleic, linolenic and trans fatty acids) contents were determined in a laboratory. The amount of energy and the ED of the diets were calculated using the correction factor Atware and by dividing the total energy of the diet by weight, respectively.

Results: About 14.3% of the diets produced for patients with CKD were analyzed. The average density of the diets was low (0.7 kcal/g). In terms of nutritional adequacy, the average lipid content (15%) and linolenic fatty acid content (0.4%) were below the recommendation, as was energy (23.4 kcal / kg / day). The levels of trans and saturated fat were adequate. The average carbohydrate content (63.5%) and protein content (1.0 g/kg/day) exceeded the recommendations levels.

Conclusion: The oral hospital diet prepared for patients with CKD was considered unbalanced, and an unfavorable clinical treatment for these patients.

T1:PO.039

Preparation and characterization of adipocyte model for studying of persistent organic pollutants exposure

Dana Mullerova, Vlastimil Kulda, Jana Dvorakova, Miroslava Cedikova, Michaela Kripnerova, Vaclav Babuska, Pavel Sedlacek, Martin Pesta, Milena Kralickova

Charles University, Medical Faculty in Pilsen Czech Republic

Introduction: In humans, organochloric persistent organic pollutants (POPs) are associated in epidemiological studies with higher risk of diabetes mellitus type II. These lipophilic pollutants are stored primarily in adipose tissue. To examine the effect of POPs to adipocyte metabolism, we use in vitro model of adipocytes derived from mesenchymal stem cells.

Objective: To study of effect of POPs it is necessary to characterize process of differentiation of adipocytes.

Methods: We prepared a model of adipocyte from human mesenchymal stem cells derived from adipose tissue (hMSC), (StemPro® Gibco, R7788–110; StemPro® Adipogenesis Differentiation Kit; Gibco A10070–01). The ongoing process of differentiation will be described by mapping of expressions of selected genes. The expression of genes is analysed by real-time PCR using LNA probe.

Results: Process of differentiation was analysed by quantitative assessment of expression of the followed genes OCT4, CD 34, GATA4, PPAR gamma, CEBP alpha, CEBPB beta, SRBP1c, LMN alpha, LMN beta. During 28 days from the point when differentiation was initiated, the samples were taken every 3 days. The pattern of expression will be presented.

Conclusion: Although there is suggestion from epidemiological human studies, that POPs could be obesogens and metabolic disruptors, the exact pathophysiology on cellular level has not been already known and next research in this area is desirable.

Conflict of interest: None

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T1 – Body composition and obesity phenotypes

T1:PO.040

Prevalence of sarcopenia in middle-age obese outpatients

Rosa Sammarco, Maurizio Marra, Concetta Montagnese, Eliana De Rosa, Michele Onufrio, Valeria Amato, Lidia Santarpia, Carmela De Caprio, Franco Contaldo, Fabrizio Pasanisi

Dept of Clinical Medicine and Surgery, University “Federico II”, Naples, Italy

Introduction: Sarcopenic obesity is a condition where fat mass excess and muscle mass depletion coexist and it is mainly described in the elderly. Our study aims to evaluate the prevalence of sarcopenia in obese outpatients, using BIA and two skeletal muscle mass indexes as screening tools.

Methods: Skeletal muscle mass (SM) was estimated by Janssen’s BIA equation in 100 (50F, 50M) obese (BMI ≥ 30 kg/m²) adults (45–65yrs). Prevalence of sarcopenia was evaluated by sex-specific cut-off points of SMI = SM/height² [1] and SMI% = SM/body mass $\times 100$ [2].

Results: Based on SMI, 2% of men and women were moderately sarcopenic; none resulted severely sarcopenic. Based on SMI%, 100% of men and women met the definition of sarcopenia; prevalence of moderate sarcopenia was 44% in men and 20% in women; whereas prevalence of severe sarcopenia was 56% in men and 80% in women.

Conclusion: Sarcopenia rates vary widely, based on different definitions. Despite SMI is the only predictive index of disability, it could underesti-

mate sarcopenia in obesity, since the muscle mass, though normal, could be inadequate for total body mass. SMI% could better define sarcopenia in obese patients, as it takes total body mass into account. Based on SMI%, 100% of our patients could be considered in a “presarcopenia” stage. The definition of sarcopenia needs to be improved with data on muscle function.

T1:PO.041

Relationship of Intermuscular Adipose Tissue with Epicardial Fat measured by MRI in sedentary lean, overweight and obese subjects

Valeria Guglielmi¹, Luciano Maresca², Mauro Di Roma², Chiara Lanzillo³, Monica D’Adamo¹, Alfonso Bellia⁴, Davide Lauro⁴, Massimo Federici⁴, Paolo Preziosi², Paolo Sbraccia¹

¹Obesity Center (EASO accredited COM), Department of Systems Medicine, University of Rome “Tor Vergata”

²Diagnostic Imaging Department, Policlinico Casilino, Rome, Italy

³Cardiology Department, Policlinico Casilino, Rome, Italy

⁴Department of Systems Medicine, University of Rome “Tor Vergata”

Introduction: The regional distribution of adipose tissue plays an important role in the development of metabolic and cardiovascular diseases. Aim of our study was to investigate the relations of intermuscular adipose tissue (IMAT), with epicardial (EAT), intraabdominal (IAAT) and subcutaneous (SAT) compartments measured by MRI and metabolic parameters in lean, overweight and obese subjects.

Methods: We enrolled 32 non-diabetic patients with wide ranges of age and BMI, undergoing cardiac MRI.

EAT volume was quantified, and by two single slice detections at L3-L4 and L4-L5 level, SAT, IAAT and rectus spinae IMAT areas were measured. Plasma fasting glucose, HDL-cholesterol and triglycerides were assayed.

Results: IMAT was greater in women (W: n = 14) than in men (M: n = 18) matched for age, BMI and waist circumference (W: IMAT 925.4 \pm 131.3 mm²; M: IMAT 510.1 \pm 79.47 mm²; p < 0.01).

A multivariate analysis showed that also ageing, but not BMI or waist circumference, is an important determinant of IMAT ($\beta=0.51$, p < 0.01). Notably, IMAT was found significantly correlated with EAT independent of age in male patients ($\beta=0.46$; p < 0.05), and with systo- ($\beta=0.54$; p < 0.05) diastolic blood pressure ($\beta=0.46$; p < 0.05) independent of IAAT in all subjects and in men. Although, patients with Metabolic Syndrome (MS) did not differ in IMAT amount compared to subjects without MS.

Conclusion: In summary, we report that age and female gender, but not obesity, are pivotal factors in determining IMAT amount in sedentary subjects. Notably, IMAT was found significantly correlated with EAT independent of age, in male patients, and with systo- diastolic BP independent of IAAT.

T1:PO.042

Effect of isocaloric diets with an unbalanced macronutrient proportion on different parameters related to adiposity and energy homeostasis in rats

Ruben Diaz-Rua¹, Estefania Garcia-Ruiz¹, Antoni Caimari², Andreu Palou¹, Paula Oliver¹

¹Laboratory of Molecular Biology, Nutrition and Biotechnology, Universitat de les Illes Balears and CIBER de Fisiopatología de la Obesidad y Nutrición (CIBERObn), Palma de Mallorca, Spain

²Centre Tecnològic de Nutrició i Salut (CTNS), TECNIO, CEICS, Reus, Spain

Introduction: Diet macronutrient composition has a deep impact on energy metabolism and body weight control. However there are still discrepancies regarding metabolic and health consequences, especially in the long term, of diets with unbalanced macronutrient proportion

Methods: We analyzed the effects of sustained intake (4 months) of two unbalanced diets, high fat (HF) and high protein (HP) – administered in isocaloric conditions (pair-feeding) to adult rats – on weight gain and on metabolic and molecular parameters related to adiposity and metabolic syndrome

Results: The intake of an isocaloric HF diet did not affect body weight but increased adiposity and liver-fat deposition, and induced insulin resistance. Gene expression changes observed in key energy homeostatic-related organs as liver and adipose tissue (increased expression of lipolytic and decreased expression of lipogenic genes) could try to compensate for increased adiposity. The intake of a HP diet decreased caloric intake, body weight and size of subcutaneous adipocytes, and circulating cholesterol. We also observed higher insulin levels apparently not related to insulin resistance or alterations in glycaemia. Changes in the expression of key energy-homeostatic genes reflected an adaptation to lower diet carbohydrate content and to the use of aminoacids as energy source. Kidney size was increased in HP-fed animals but serum creatinine was not affected

Conclusion: Long-term increase in diet fat proportion can produce alterations related to metabolic syndrome even in the absence of increased body weight, whereas an increase in diet protein content reduces body weight and is not related to any apparent problem in healthy animals

T1:PO.043

Preliminary evaluation of sarcopenia in obese patients from Southern Italy

Eliana De Rosa, Santarpia Lidia, Marra Maurizio, Sammarco Rosa, Valeria Amato, Michele Onufrio, Giovanni De Simone, Franco Contaldo, Fabrizio Pasanisi

Department of Clinical Medicine and Surgery, Federico II University of Naples

Introduction: Sarcopenic Obesity (SO) has not yet a widely accepted definition. The present study aims: 1) to evaluate the prevalence of sarcopenia in a group of severely obese adults from Southern Italy by using two different indexes: percentage of skeletal muscle mass (SMP) and skeletal muscle mass normalized for height (SMI); 2) to determine SMP and SMI cut-off points in a reference population with a Body Mass Index (BMI) distribution representative of Southern Italy population.

Methods: In 131 consecutive obese adult outpatients, 51 men (M) and 80 women (F) (45 – 67 years, 44.6 ± 7.7 kg/m²), skeletal muscle mass (SM) was assessed by bioimpedance analysis (BIA). SMP and SMI cut-off points to identify moderate and severe sarcopenia were calculated in a reference group of 500 young adults (100 M and 400 F, 18 – 40 years, 25.2 ± 5.6 kg/m²) and applied to assess the prevalence of sarcopenia in the 131 obese patients.

Results: According to our SMP cut-off points, 23/51 (45.1%) M and 19/80 (23.8%) F were moderately sarcopenic, 28/51 (54.9%) M and 61/80 (76.3%) F met the definition of severe sarcopenia. Based on our SMI cut-off points, only 2/51 (3.9%) M were moderately sarcopenic.

Conclusion: Our study confirms that the sarcopenia rate varies widely according to the criteria applied and proposes a quick and inexpensive screening test to identify a SO at-risk population.

T1:PO.044

Impact of body composition during weight change on resting energy expenditure and HOMA index in overweight non smoking adults

Maryam Pourhassan¹, Anja Bosy-Westphal¹, Britta Schautz¹, Wiebke Braun¹, Glüer², Manfred James Müller¹

¹Institute of Human Nutrition and Food Science, Christian Albrechts University, Kiel, Germany

²Klinik für Diagnostische Radiologie, Sektion Biomedizinische Bildgebung, MOIN CC, Universitätsklinikum (University Medical Center) Schleswig Holstein (UKSH), Kiel, Germany

Introduction: The impact of changes in individual body components on metabolism is unclear. Our objective was to investigate changes in de-

tailed body composition to assess their impacts on resting energy expenditure (REE) and insulin resistance.

Methods: 83 healthy subjects (BMI: 20.2–46.8 kg/m²) were investigated at two occasions with weight changes between –11.2 kg to +6.5 kg (follow-up periods between 23.5- 43.5 months). Detailed body composition was measured by the 4 component model and whole body MRI. REE, plasma thyroid hormone concentrations and insulin resistance were measured by standard methods.

Results: Weight loss was associated with decreases in FM (fat mass) and FFM (fat-free mass) by 72.0 and 28.0%, respectively. 87.9% of weight gain was due to FM. With weight loss, the sizes of skeletal muscle, kidneys, heart and all fat depots decreased. With weight gain, skeletal muscle, liver, kidney masses and several adipose tissue depots increased except for visceral adipose tissue (VAT). After adjustments for FM and FFM, REE decreased with weight loss (by 0.22 MJ/d), and increased with weight gain (by 0.11 MJ/d). In a multiple stepwise regression analysis, changes in skeletal muscle, plasma T3 and kidney masses explained 34.9%, 5.3% and 4.5% of the variance in changes in REE. Reduction in subcutaneous adipose tissue (SAT) rather than VAT was associated with the improvement of insulin sensitivity with weight loss. Weight gain had no effect on insulin resistance.

Conclusion: Beyond a 2-compartment model, detailed changes in organ and tissue masses further add to explain changes in REE and insulin resistance.

T1:PO.045

Computed tomography during very-high-fat and isocaloric low-fat diet interventions in overweight men – results from a randomized trial

Øyvind Eng¹, Vivian L. Veum², Johnny Laupsa-Borge³, Terje Larsen⁴, Espen Rostrup⁵, Oddrun Gudbrandsen⁶, Simon N. Dankel², Jan Erik Nordrehaug⁷, Ottar Nygård⁸, Jørn V. Sagen², Gunnar Mellgren²

¹Hormone Laboratory, Haukeland University Hospital

²Hormone Laboratory, Haukeland University Hospital; Department of Clinical Science, University of Bergen; KG Jebsen Center for Diabetes Research, University of Bergen

³Hormone Laboratory, Haukeland University Hospital; Department of Clinical Science, University of Bergen;

⁴Department of Heart Disease, Haukeland University Hospital

⁵Department of Clinical Science, University of Bergen; Department of Heart Disease, Haukeland University Hospital

⁶Department of Clinical Science, University of Bergen; KG Jebsen Center for Diabetes Research, University of Bergen

⁷Department of Clinical Science, University of Bergen

⁸Department of Clinical Science, University of Bergen; KG Jebsen Center for Diabetes Research, University of Bergen; Department of Heart Disease, Haukeland University Hospital

Introduction: Increased fat accumulation in liver, pericardium and visceral tissues is associated with coronary and metabolic diseases. Conventional low fat and high carbohydrate diet (LFHC) is known to decrease fat accumulation in these tissues. The purpose of this study was to compare the effects on fat accumulation after very-high fat and low carbohydrate (VHFLC) and LFHC diets.

Methods: We recruited 36 men (BMI>29 or TBF≥25%) randomly divided into VHFLC (70% fat) or LFHC. The diets were isocaloric (2090kcal/day) with equal percentage of proteins. All participants underwent CT-scanning at baseline and after 12 weeks of diet intervention.

Results: Both groups showed a significant fat reduction in visceral (VHFLC, $p < 0,023$; LFHC, $p < 0,036$), subcutaneous (VHFLC, $p < 0,046$; LFHC, $p < 0,042$), and pericardial (VHFLC, $p < 0,001$; LFHC, $p < 0,011$) adipose tissues, as well as in hepatic volumes (VHFLC, $p < 0,011$; LFHC, $p < 0,038$), from baseline to 12 weeks follow-up. The VHFLC diet gave significant reduction in hepatic fat accumulation (VHFLC, $p < 0,027$). However, no significant differences were found between groups after 12 weeks.

Conclusion: CT-scans of overweight men after 12 weeks on a moderately calorie restrictive VHFLC diet show significant fat reduction in hepatic, pericardial, visceral, and subcutaneous adipose tissues. Compared to an isocaloric LFHC diet we report no significant differences in the fat reduction in these tissues between the two groups.

T1:PO.046

Vertebral bone marrow fat is increased in obese women: Relationship with epicardial fat

Ermetici Federica¹, Briganti Silvia¹, Alessandra Delnevo², Paola Cannao³, Francesco Secchi², Gianni Di Leo², Elena Dozio⁴, Massimiliano Corsi Romanelli⁵, Francesco Sardanelli⁶, Morricone Lelio⁷, Alexis Elias⁷

¹Diabetology and Metabolic Disease Unit, IRCCS Policlinico San Donato, San Donato Milanese, Italy

²Unit of Radiology, IRCCS Policlinico San Donato, San Donato Milanese, Milan, Italy

³Postgraduation School in Radiodiagnosics, University of Milan, Milan, Italy

⁴Department of Biomedical Sciences for Health, University of Milan, Milan, Italy

⁵Department of Biomedical Sciences for Health, University of Milan, Milan, Italy, Operative Unit of Laboratory Medicine-1, Chair of Clinical Pathology, IRCCS Policlinico San Donato, San Donato Milanese, Italy

⁶Unit of Radiology, IRCCS Policlinico San Donato, San Donato Milanese, Milan, Italy, Department of Biomedical Sciences for Health, University of Milan, Milan, Italy

⁷Diabetology and Metabolic Disease Unit, IRCCS Policlinico San Donato, San Donato Milanese, Italy,

Introduction: This study was aimed to evaluate bone marrow adiposity, a risk factor for osteoporosis and fragility fracture, in obese women in relation to different compartments of adipose tissue.

Methods: 20 healthy premenopausal women (age 32 ± 8 years, BMI 28 ± 6 kg/m², mean \pm SD) underwent body composition evaluation with body impedance assessment, marrow adipose tissue (MAT) and marrow fat unsaturation measurement (L4 level) with proton magnetic resonance spectroscopy (1H-MRS), visceral and subcutaneous adipose tissue (L4 level) and epicardial adipose tissue measurement with magnetic resonance imaging, lumbar spine and femoral bone mineral density (BMD) measurement with DXA.

Results: Overweight/obese women ($n = 10$, BMI 32 ± 5 kg/m²) had higher MAT content than normal weight women ($n = 10$, BMI 22 ± 1 kg/m²) (40 ± 9 vs $27 \pm 17\%$, $p < 0.05$). MAT correlated with EAT ($r = 0.473$, $p < 0.05$), age ($r = 0.391$, $p < 0.05$), BMI ($r = 0.410$, $p < 0.05$), fat mass ($r = 0.440$, $p < 0.05$), duration of obesity ($r = 0.400$, $p = 0.05$) and marrow fat unsaturation ($r = -0.652$, $p < 0.001$). In a multiple stepwise regression analysis including MAT as dependent variable and age, BMI, fat mass, duration of obesity, EAT as independent variables, EAT was the most significant determinant of MAT ($\beta = 0.023 \pm 0.009$, $p < 0.05$). Based on medians, women with higher EAT ($n = 8$) had higher MAT than women with lower EAT ($n = 12$) (41 ± 0.1 vs $28 \pm 0.2\%$, $p < 0.05$). Marrow-fat unsaturation positively correlated with lumbar spine BMD ($r = 0.480$, $p < 0.05$).

Conclusion: Bone marrow adiposity is increased and richer in saturated fatty acids in obese premenopausal women and it is related to fat mass and EAT. This seems to confirm an increased risk for osteoporosis in obesity, possibly related to visceral adipose tissue compartments.

T1:PO.047

Rate of weight loss and loss of fat free mass in overweight and obese subjects

Roel Vink, Roumans, Arkenbosch, Mariman, van Baak
NUTRIM, Department of Human Biology, Maastricht University

Introduction: Diet-induced weight loss is accompanied by a loss of fat free mass (FFM). Indirect evidence suggests a positive correlation between rate of weight loss (rapid or slow) and loss of FFM, although direct

proof is lacking. Therefore, our objective was to investigate the effect of rate of weight loss on FFM loss in overweight and obese subjects.

Methods: Weight and body composition were determined before and after either a 5-week very-low-caloric diet (VLCD: 500 kcal/d) ($n = 25$) or a 12-week low-caloric diet (LCD: 1250 kcal/d) ($n = 22$) and after a subsequent 4-week weight-stable period. Body composition was measured using air-displacement plethysmography (BodPod).

Results: Diet-induced weight loss was similar at the end of the diet in both groups (VLCD: 8.8 ± 0.4 kg and LCD: 8.6 ± 0.6 kg) and at the end of the weight-stable period (VLCD: 9.4 ± 0.5 kg and LCD: 8.8 ± 0.6 kg) (both $P > 0.1$). FFM loss at the end of the diet was higher in the VLCD-group compared to the LCD-group expressed both as absolute values (1.6 ± 0.2 kg and 0.6 ± 0.2 kg respectively, $P = 0.002$) or as percent of weight loss ($18.0 \pm 2.1\%$ and $7.7 \pm 2.6\%$, $P = 0.003$). A trend remained at the end of the weight-stable period (VLCD: 0.8 ± 0.2 kg and LCD: 0.3 ± 0.2 kg, $P = 0.081$) and ($9.4 \pm 2.4\%$ and $2.9 \pm 2.3\%$, $P = 0.058$).

Conclusion: Loss of FFM was higher after rapid than slow diet-induced weight loss with similar total weight loss. Measuring body composition under conditions of negative energy balance overestimates loss of FFM compared with weight stable conditions.

T1:PO.048

Waist-to-hip or waist-to-height ratio which better discriminate insulin resistance and hypertriglyceridemia? A morbid obesity sample analysis

Eva Lau¹, Joana Oliveira¹, Filipe Cunha¹, Cláudia Nogueira¹, Sandra Belo¹, Ana Saavedra¹, Maria Costa¹, Ana Santos², Paula Freitas³, Ana Varela³, Joana Queiróz⁴, Flora Correia³, AMTCO Group⁵, Davide Carvalho⁶

¹Department of Endocrinology, Diabetes and Metabolism, Hospital de São João EPE, Faculty of Medicine, University of Porto, Porto, Portugal

²Department of Clinical Epidemiology, Predictive Medicine and Public Health, Porto, Portugal Multidisciplinary Assessment of Surgical Treatment of Morbid Obesity, High Differentiation Centre for Surgical Treatment of Obesity, Hospital de São João EPE, Por

³Department of Endocrinology, Diabetes and Metabolism, Hospital de São João EPE, Faculty of Medicine, University of Porto, Porto, Portugal Multidisciplinary Assessment of Surgical Treatment of Morbid Obesity, High Differentiation Centre for Surgical Tre

⁴Department of Endocrinology, Diabetes and Metabolism, Hospital de São João EPE, Porto, Portugal Multidisciplinary Assessment of Surgical Treatment of Morbid Obesity, High Differentiation Centre for Surgical Treatment of Obesity, Hospital de São João EP

⁵Multidisciplinary Assessment of Surgical Treatment of Morbid Obesity, High Differentiation Centre for Surgical Treatment of Obesity, Hospital de São João EPE, Porto, Portugal

⁶Department of Endocrinology, Diabetes and Metabolism, Hospital de São João EPE, Faculty of Medicine, Porto, Portugal

Introduction: The waist-to-hip ratio (W/Hi), and waist-to-height ratio (W/Hei) are visceral fat markers associated with an increase risk of metabolic complications, including insulin resistance (IR) and hypertriglyceridemia. Aim: To define a cutoff value for W/Hi and W/Hei able to discriminate insulin resistance and hypertriglyceridemia.

Methods: Cross-sectional study of a population of 462 obese adults evaluated at the first attendance of Multidisciplinary Assessment of Surgical Treatment of Obesity. Anthropometric and metabolic parameters were analysed. IR was defined if HOMA-IR > 2.2 and hypertriglyceridemia if triglycerides ≥ 150 mg/dL. Logistic regression and ROC curves were held to obtain cutoff values.

Results: 407 (88.1%) were female, 55(11.9%) males, with a mean age of 42.7(10.6) years and a mean BMI of 44.7(5.2) kg/m² for women and 44.4(4.8) for men. To discriminate IR: the area under the curve (AUC) for ratio W/Hi was 0.618 (95% CI 0.53 to 0.71), with a cutoff value of 0.87 (Sensitivity (Sens) 0.77/Specificity (Spec) 0.44); the AUC for W/Hei was 0.551 (95% CI 0.46 to 0.64), with a cutoff value of 0.68 (Sens 0.87/Spec 0.26). For discrimination of hypertriglyceridemia: AUC for W/Hi was 0.62 (95% CI 0.54 to 0.70), with a cutoff of 0.96 (Sens 0.42/Spec

0.80); the AUC for W/Hei was 0.55 (95% CI 0.47 to 0.62), with a cutoff of 0.74 (Sens 0.66/Spec 0.44).

Conclusion: W/Hi ratio seems to have some discriminatory capacity for IR and hypertriglyceridemia, with cutoff values of 0.87 and 0.96, respectively. Although W/Hei has not shown the same discriminatory capacity, a value of 0.68 for W/Hei seems to have excellent sensitivity to determine IR.

T1:PO.049

Sex differences in self-perceived fatigue and handgrip performance and its relation with body composition in obese children

Stijn Vantieghe¹, Steven Provyn¹, Jonathan Tresignie², Ivan Bautmans³

¹Experimental Anatomy

²Experimental Anatomy

³Gerontology

Introduction: Maximal strength is an important factor to perform daily activities, especially in obese persons whose muscles must carry heavier loads, which can induce higher levels of fatigue. Weight excess consists mainly of fat mass but also lean mass which can influence the muscle performance positively in non-weight bearing activities. Studies correlating grip strength with segmental and total body composition (estimated using DXA) in obese children are scarce. This study explores the self-perceived fatigue, body composition and muscle performance in obese adolescents

Methods: 117 obese children (70 girls and 47 boys) were examined for body composition (DXA), muscle performance (maximal grip strength, fatigue resistance and grip work) and self-perceived fatigue (Multidimensional Fatigue Inventory, MFI-20).

Results: Girls showed no difference in absolute muscle performance compared with boys, even correction for lean arm mass. No significant difference was found between the 2 sexes for absolute fat mass, but girls showed significant lower lean mass and higher fat percentage than boys. Grip strength shows good correlations with lean and BMC in as well appendicular segments as total body composition and a negative correlation is found for fat% in both sexes. In boys fatigue parameters show correlation with body composition, not in girls.

Conclusion: Based on our results we can state that self-perceived fatigue and handgrip performance has an influence on segmental and total body composition. Further studies are necessary to evaluate whether self-perceived fatigue is affected by weight loss and/or physical exercise interventions.

T1:PO.050

Visceral measurement through computerized tomography was a significant metabolic determinant in Korean overweight subjects

Kyurae Lee¹, Hyunhee Choi², Wonyong Kim³

¹Bariatric Clinic, Family Medicine, Wallace Memorial Baptist Hospital

²Family Medicine, Wallace Memorial Baptist Hospital

³Family Medicine, Hong Ik General Hospital

Introduction: While body mass index was considered as the standard diagnostic marker for fatness, the different diagnostic methods such as body impedance analysis, bone mineral density, visceral fat measurement through computerized tomography, were investigated for precise measurement for obesity. In addition, each of them has its own unique advantage according to its specification. The diagnostic methods were included BMI, BMD (body mineral density) fat by DEXA, BIA (body impedance analysis) and abdomen fat CT. Therefore we studied the relationship between the above described tools and metabolic variables of 107 overweight subjects (93 women, 14 men).

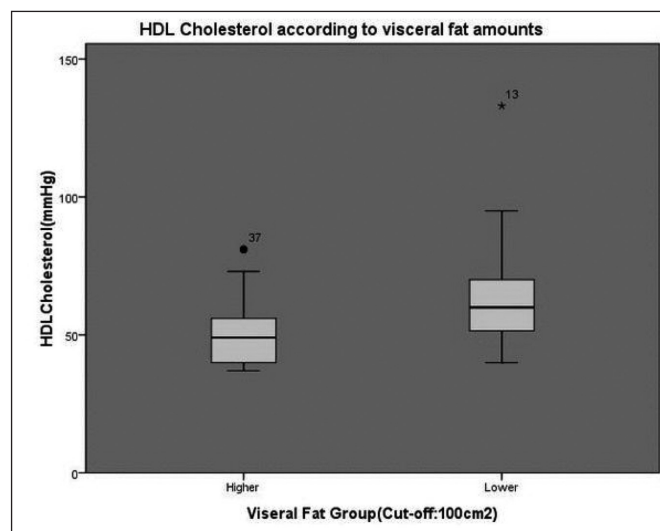
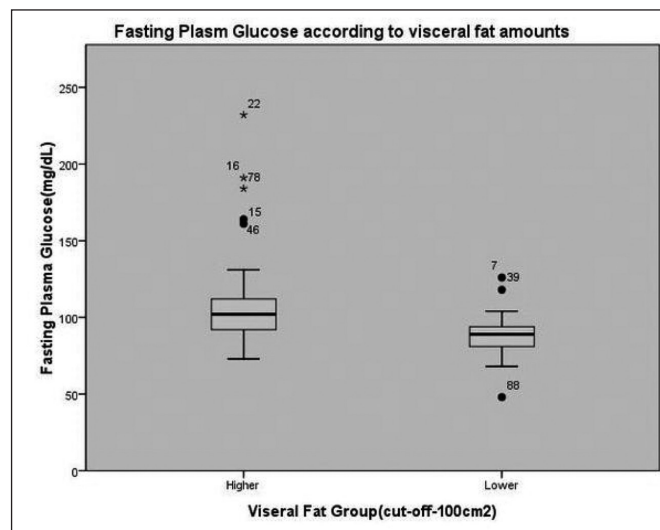
Methods: We scaled their anthropometrical and fitness parameters such as height, weight, BIA, BMD fat and visceral fat CT; collected overnight blood of one hundred seven subjects (40.78 +/- 1.14 ages, 26.45 +/- 0.44

kg/m²) visited the bariatric clinic of family department of Wallace Memorial Baptist Hospital. The metabolic variables including insulin, free fatty acid, fasting plasma glucose, triglyceride, HDL cholesterol and total cholesterol were measured.

The SPSS package for windows version 17 was applied in order to assess the association between the metabolic markers and fatness through Spearman correlation analysis. The probability below 0.05 at both sided was considered as statistically significant.

Results: There was a significant association between FPG and all diagnostic methods (BMI *, BMD fat**, CT**) after controlled age. To the contrary, there was a negative association between HDL cholesterol and some methods (BMI*, CT*) after controlled age. (* p < 0.05, ** p < 0.01)

Conclusion: In conclusion, visceral measurement through computerized tomography was considered as the most precise significant determinant to associate with metabolic derangement in Korean overweight subjects.



T1:PO.051

Accuracy of predictive equations for estimating resting energy expenditure in overweight adult females

Rosa Sammarco, Maurizio Marra, Fiorella Vitale, Maria Luisa Di Guglielmo, Michele Onufrio, Marianna Naccarato, Iolanda Cioffi, Feliciano Fierro, Franco Contaldo, Fabrizio Pasanisi

Dept of Clinical Medicine and Surgery, University "Federico II", Naples, Italy

Introduction: During the last three decades the prevalence of overweight and obesity has rapidly increased in adolescents living in European countries. An accurate assessment of energy needs is required to improve individual clinical and nutritional evaluation in order to plan a more appropriate therapeutic intervention. The aim of this study was to compare resting energy expenditure (REE), calculated by different predictive equations, with REE measured by indirect calorimetry in overweight adult females.

Methods: One hundred and sixty-nine overweight (BMI= 25–30 kg/m²) females aged 18–50 years were included. Measured REE (MREE) was compared with predicted REE (PREE) estimated by the most common equations applied in clinical practice (Harris-Benedict, FAO/WHO/UNU, Mifflin, and Owen) and equations derived by overweight-obese samples (De Lorenzo, Lazer, Marra, Ireton, Bernstein, Siervo and Huang). The mean MREE and mean differences between PREE and MREE, as well as the prediction accuracy at 5% were evaluated. Body composition was estimated by bioimpedance.

Results: The differences between PREE and MREE was less than 5% for Harris-Benedict, Marra, Ireton, De Lorenzo and Lazer. In the clinical setting (i.e. with the single patient) the accuracy (calculated as the percentage of subjects whose REE was predicted within \pm 5% of MREE) was less than 40% considering all predictive equations.

Conclusion: Equations derived for overweight-obese individuals are more suitable than those for the general population to predict REE, while in clinical practice (single patient) all considered predictive equations are not sufficiently accurate to evaluate REE in overweight female. Measurement of REE with indirect calorimetry is often necessary in overweight adult females to obtain a more accurate assessment in the individual patient.

T1:PO.052

Thylakoids, extracted from spinach, supplemented to a high fat diet given to rats, reduce fat mass without affecting body weight

Eva-Lena Stenblom, Emil Egecioglu, Caroline Montelius, Björn Weström, Charlotte Erlanson-Albertsson

Lund University

Introduction: Excess adipose tissue is associated with cardiovascular disease (1). The aim of this study was to investigate how thylakoids affect fat metabolism in rats fed a high fat diet (HFD).

Methods: 16 male SD rats were fed either 15 g/night of HFD (45% fat) with thylakoids or an isocaloric diet without thylakoids (control) for 14 days. During the day, all rats had access to ad libitum amounts of HFD without thylakoids. Body weight and food intake were measured daily. The last day, fat depots were dissected and weighed.

Results: The thylakoid-fed rats had less body fat ($p < 0,05$), although there were no differences in body weight after the 14 day study. The thylakoid rats consumed more of the ad libitum HFD during daytime, compared to control ($p < 0,05$).

Conclusion: The lower body fat percentage in the thylakoid-fed rats compared to control implicates that thylakoids affect fat metabolism when supplemented to a high fat diet for 14 days. There was no sign of steatorrea. We suggest that the decreased body fat reflects increased intestinal fatty acid oxidation and/or an increased thermogenesis.

Reference:

1 Berg A. et al.: Adipose Tissue, Inflammation, and Cardiovascular Disease. *Circ Res.* 2005;96:939–949.

T1:PO.053

Changes in weight and metabolic parameters after bariatric surgery

Joana Oliveira¹, Eva Lau¹, Filipe Cunha¹, Cláudia Nogueira¹, Sandra Belo¹, Ana Saavedra², Maria Manuel Costa², Ana Cristina Santos³, Paula Freitas⁴, Ana Varela⁴, Joana Queirós⁴, Flora Correia⁵, Davide Carvalho¹, AMTCO Group⁶

¹Endocrinology, Diabetes and Metabolism Department of Centro Hospitalar São João, Porto, Portugal; Faculty of Medicine of University of Porto, Portugal

²Endocrinology, Diabetes and Metabolism Department of Centro Hospitalar São João, Porto, Portugal

³Clinical Epidemiology, Predictive Medicine and Public Health Department, Porto, Portugal; Faculty of Medicine of University of Porto, Portugal

⁴Endocrinology, Diabetes and Metabolism Department of Centro Hospitalar São João; AMTCO Group; Faculty of Medicine of University of Porto

⁵Endocrinology, Diabetes and Metabolism Department of Centro Hospitalar São João; AMTCO Group; Faculty of Nutrition and Food Sciences of University of Porto, Portugal

⁶Multidisciplinary Assessment of Surgical Treatment of Morbid Obesity of High Differentiation Center of Surgical Treatment of Obesity of Centro Hospitalar de São João, Porto, Portugal

Introduction: Bariatric surgery (BS) is the treatment of choice of morbid obesity. Its main objective is weight loss, but it also has a positive impact on several metabolic parameters. The adjustable gastric band (LAGB) and gastric bypass (GBP) are 2 of most used BS procedures.

Objective: To evaluate the differences in anthropometric measures, glucose, A1c, HOMA-IR and lipid profile before and after BS.

Methods: Cross-sectional study of a population of 462 morbidly obese adults who underwent bariatric surgery between 2010 and 2011 in our hospital. We compared those parameters at 0 and 12 months after surgery on each surgical group: LABG and GBP.

Results: In the cohort of 427 patients, 376 (88.1%) were female. The mean age was 42.7(10.6) years and mean BMI of 44.7(5.2) kg/m² for women and 44.4 (4.8) for men. 227 (53.2% patients underwent LAGB procedure. There was a statistically significant difference (in all cases $p < 0.001$) in weight loss (–20.5 vs. –40.3), waist circumference reduction (–15.7 vs. –29.5), hip circumference reduction (–13.8 vs. –27.2), glucose (–0.08 vs. –0.1), HOMA-IR (–1.78 vs. –3.08), total cholesterol (–0.05 vs. –0.28) and LDL cholesterol (–0.08 vs. –0.28). There was no statistically significant reduction in A1c and triglycerides, or statistically significant increase in HDL cholesterol.

Conclusion: Bariatric surgery induces a significant improvement in anthropometric measures and results in benefit in metabolic parameters. The gastric bypass procedure seems to have a greater impact on all variables considered, which may explain their increasing choice as obesity surgery in our hospital.

T1:PO.054

Assessment of central obesity among university students by using weight to height ratio

Saniye Bilici, Nevin Sanlier, Hande Yilmaz, Semra Navruz, Büşra Ayhan, Süleyman Kose

Introduction: Body mass index (BMI) is a widely used measure to evaluate the obesity however it does not always relate to central obesity. Another anthropometric index, waist to height ratio (WHtR), was shown to be better to detect the central obesity and related several health risks.

Methods: The cross-sectional study was carried out on 688 randomly selected university students (385 female, 303 male). A questionnaire was

applied and anthropometric measurements (height, weight, waist circumference) were done by the researchers. The aim of the study is to assess central obesity among university students.

Results: The mean age was 20.6 ± 1.66 years and it was found that 56 students (8.1%) were classified as underweight, 531 students (77.2%) as normal weight, 91 students (13.2%) as overweight, and 10 students (1.5%) as obese with respect to BMI. Also it was shown that WHtR of 588 students (85.5%) were less than 0.5; 92 students (13.4%) were between 0.5 and 0.6 (take care); 8 students (1.2%) were ≥ 0.6 (action). Females' mean WHtR was significantly more than males' ($p < 0.01$).

Conclusion: Our study had shown that when using WHtR, as much as 14.6% of the population was at risk. It is suggested that WHtR is more sensitive than BMI as an early warning of health risks and also is cheaper and easier to measure and calculate. It is important to create awareness throughout childhood, into adult life with a public health message like: 'Keep your waist circumference to less than half your height'.

T1 – Genetics, Epigenetics and Omics

T1:PO.055

Changes induced by resveratrol in the expression of microRNAs in rat adipose tissue

Ana Gracia^{1,2}, Jonatan Miranda^{1,2}, Alfredo Fernández-Quintela^{1,2}, María del Puy Portillo^{1,2}

¹Nutrition and Obesity Group. Dpt. Nutrition and Food Science, Faculty of Pharmacy. University of the Basque Country (UPV/EHU). Vitoria-Gasteiz (Spain).

²CIBERobn Physiopathology of Obesity and Nutrition, Institute of Health Carlos III (ISCIII) (Spain)

Introduction: The mechanisms of action of resveratrol as an anti-obesity molecule have been studied and reported in the literature; however, the epigenetic mechanisms have not been addressed so far. The aim of the present study was to assess resveratrol-induced changes in microRNA (miRNA) profile in white adipose tissue from rats, and to explore whether these modifications can be related to the reported changes induced by this polyphenol in triacylglycerol metabolism in this tissue.

Methods: Sixteen male Wistar rats were divided into two groups and fed an obesogenic diet supplemented or not (control group; CO) with resveratrol (30 mg/kg/d; RSV), for 6 weeks. Adipose tissue from various anatomical locations were dissected and weighed. A miRNA microarray was carried out in perirenal adipose tissue. Three miRNA (miR-211-3p, miR-1224 and miR-511-3p) were selected for RT-PCR validation.

Results: Resveratrol treatment reduced adipose tissue size. From a total of 273 detected miRNAs, 22 were significantly modified by resveratrol: 16 were up-regulated (i.e. miR-465, miR-206, miR-188) and 6 down-regulated (i.e. miR-511, miR-129, miR-487). Some of the miRNAs which showed significant changes, miR-328 ($P = 0.02$) and miR-129 ($P = 0.05$), have target genes related with triglycerides metabolism, lipase hormone sensitive (HSL) and peroxisome proliferator-activated receptor gamma (PPAR γ).

Conclusion: Resveratrol modifies miRNA profile in perirenal white adipose tissue, thus indicating the involvement of epigenetic mechanisms in the effects of this polyphenol. As far as triacylglycerol metabolism is concerned, some of the miRNAs significantly modified by this polyphenol have validated or predicted target genes which, in turn, are targets for resveratrol as an anti-obesity biomolecule.

T1:PO.056

Association between obesity and common polymorphisms in *FTO*, *HOXB5*, *LCT*, *MC4R*, *MSRA*, *NRXN3*, *OLFM4*, *PPARGC1A*, *SEC16B*, *TFAP2B*, and *TMEM18* genes among a sample of Portuguese children

David Albuquerque¹, Clévio Nóbrega², Licínio Manco¹

¹Research Centre for Anthropology and Health (CIAS), Department of Life Sciences, University of Coimbra, Portugal

²Center for Neuroscience and Cell Biology, University of Coimbra, Portugal

Introduction: At least 39 genetic *loci* were associated with BMI. However, little is known about the genetic basis of obesity among children. The aim of this study was to test for the first time the association of 14 polymorphisms in *FTO*, *HOXB5*, *LCT*, *MC4R*, *MSRA*, *NRXN3*, *OLFM4*, *PPARGC1A*, *SEC16B*, *TFAP2B*, and *TMEM18* genes with obesity-related traits among Portuguese children.

Methods: Anthropometric measures were recorded in 730 children (360 boys; 370 girls) aged 6–12 years-old, randomly recruited from public schools of central region of Portugal. Overweight/obesity was categorized according to IOTF cut-offs (Cole *et al.* 2000). Abdominal obesity was defined as waist circumference (WC) over the 90th percentile. DNA samples were isolated from buccal swabs and genotyped for all polymorphisms by allelic discrimination Taqman assay.

Results: The significant associations ($p < 0.05$) with the risk of obesity were found for the *FTO* (rs9939609 and rs1421085) and *MC4R* (rs12970134) polymorphisms in a case-control study. In addition, *TFAP2B* (rs987237) showed marginally significant association with obesity ($p = 0.056$) and *LCT* (rs4988235) was found associated with abdominal obesity ($p = 0.030$). The *TMEM18* (rs7561317) polymorphism was associated with BMI ($p = 0.040$) and WC ($p = 0.024$); the *TFAP2B* rs987237 polymorphism was associated with WC ($p = 0.030$); the *MC4R* rs12970134 polymorphism was associated with BMI Z-score ($p = 0.031$), weight ($p = 0.050$) and WC ($p = 0.026$); and the *FTO* rs9939609 polymorphism was associated with all obesity-related traits ($p < 0.05$).

Conclusion: Our data highlighted the possible association of *FTO*, *LCT*, *MC4R*, *TFAP2B* and *TMEM18* polymorphisms with susceptibility to obesity in a sample of Portuguese children.

Reference: Cole *et al.*, *BMJ*, 2000; 320:1–6.

T1:PO.057

DNA-Methylation pattern of genes involved in triacylglycerol metabolism in rat adipose tissue induced by an obesogenic diet and polyphenol supplementation.

Ana Gracia¹, Xabier Elcoroaristizaba², Jonatan Miranda¹, Alfredo Fernandez-Quintela¹, Marian Martinez de Pancorbo², Naiara G. Bediaga², Agnes Rimando³, María Puy Portillo¹

¹Nutrition and Obesity Group. Department of Nutrition and Food Science, University of the Basque Country (UPV/EHU), Vitoria, Spain. CIBERobn Physiopathology of Obesity and Nutrition, Institute of Health Carlos III, Spain.

²BIOMICs Research Group, University of the Basque Country (UPV/EHU), Vitoria, Spain.

³United States Department of Agriculture, Agricultural Research Service. Natural Products Utilization Research Unit, University, MS, USA

Introduction: The aim of the present work was to assess changes induced by an obesogenic diet in the DNA-methylation profile of genes involved in triacylglycerol metabolism in white adipose tissue from rats, and to determine whether this methylation pattern can be altered by the administration of two polyphenols, resveratrol and pterostilbene.

Methods: Thirty two rats were divided into four groups ($n = 8$). Control group (CO) was fed a commercial standard diet. The other three groups received a high-fat, high-sucrose diet: HFS group, RSV group (30 mg resveratrol/kg/day) and PT group (30 mg pterostilbene/kg/day). Gene expression (RT-PCR) and gene methylation (pyrosequencing) assays were performed in perirenal adipose tissue. The DNA-methylation study

was conducted in genes involved in triacylglycerol metabolism: fatty acid synthase (*fasn*), adipose triglyceride lipase (*pnpla2*) and peroxisome proliferator-activated receptor gamma (*pparg*).

Results: The perirenal adipose tissue was increased by obesogenic diet and reduced after polyphenols administration. Changes in methylation levels were found only in *fasn*. These changes were significant only in the position -90 bp: obesogenic feeding induced a decrease (-9%) and pterostilbene totally reversed this change. By contrast, resveratrol did not change the methylation percentage in this position when compared with HFS group. mRNA levels of *fasn* were decreased in both RSV and PT groups (-55%, -63% vs HSF group). Changes in gene expression were negatively correlated to changes in methylation levels ($P < 0.01$).

Conclusion: Although both resveratrol and pterostilbene prevented the up-regulation of *fasn* induced by an obesogenic feeding, only pterostilbene avoided the change observed its DNA-methylation profile.

T1:PO.058

Does dietary total antioxidant capacity contribute to maintain telomere length in children and adolescents?

Sonia Garcia-Calzon¹, Adriana Moleres¹, Miguel Angel Martinez-Gonzalez², M Cristina Azcona-Sanjulian³, J Alfredo Martinez⁴, Guillermo Zalba⁵, Amelia Marti⁴

¹Department of Nutrition, Food Science and Physiology, University of Navarra, Pamplona, Spain.

²Department of Preventive Medicine and Public Health, University of Navarra, Pamplona, Spain. CIBERObn, Physiopathology of Obesity and Nutrition. Carlos III Health Institute, Madrid, Spain

³Pediatric Endocrinology Unit, Department of Pediatrics, University of Navarra Hospital, Pamplona, Spain

⁴Department of Nutrition, Food Science and Physiology, University of Navarra, Pamplona, Spain CIBERObn, Physiopathology of Obesity and Nutrition. Carlos III Health Institute, Madrid, Spain

⁵Department of Biochemistry and Genetics, University of Navarra, Pamplona, Spain.

Introduction: Inflammation and oxidative stress seem to be biological mechanisms for telomere shortening. A lack of specific antioxidants is believed to lead to increases in free radical damage and more risk for damage to telomeres. The aim was to evaluate the relationship between diet and telomere length (TL) in a cross-sectional study of children and adolescents. We hypothesized that dietary total antioxidant capacity (TAC) would be positively associated with TL.

Methods: A subsample of 287 Spanish children and adolescents (55% males, aged 6–18 yr) were randomly selected from the GENOI study. TL was measured by RT-PCR and the dietary pattern was assessed using a validated semi-quantitative food frequency questionnaire.

Results: A positive correlation was found between dietary TAC and TL ($r = 0.157$, $p = 0.007$) after adjustment for age and energy intake. Among subjects in the highest quintile (>15 mmol) of dietary TAC, their TL was 0.29 higher (95% CI, 0.08–0.50) as compared with those in the lowest quintile. However, white bread consumption appeared to have the major adverse effect on TL ($\beta = -0.204$, $p = 0.002$) in fully-adjusted models. Interestingly, those individuals who had simultaneously a higher dietary TAC intake and a lower consumption of white bread significantly presented the longest telomeres. Moreover, the multivariable-adjusted odds ratio for very short telomeres was 0.30 for dietary TAC ($p = 0.023$) and 1.37 for white bread ($p = 0.025$).

Conclusion: Longer telomeres were associated with a higher dietary TAC and a lower consumption of white bread in Spanish children and adolescents.

T1:PO.059

Activation of pathway of Notch signaling in hippocampus in mice offspring by maternal consumption of high-fat diet during pregnancy and lactation

Cristiano Mendes-da-Silva¹, Simone Ferreira Lemes², Tanyara da Silva Baliani², Milena Diorio Versutti², Lício Augusto Velloso³, Marcio Alberto Torsoni²

¹Laboratory of Metabolism Disorders – Faculty of Applied Sciences – State University of Campinas (UNICAMP). Limeira/SP/Brazil. Department of Biosciences – Federal University of Sao Paulo (UNIFESP)/Campus Baixada Santista. Santos/SP/Brazil.

²Laboratory of Metabolism Disorders – Faculty of Applied Sciences – State University of Campinas (UNICAMP). Limeira/SP/Brazil.

³Department of Internal Medicine – Faculty of Medical Sciences – State University of Campinas, (UNICAMP). Campinas/SP/Brazil.

Introduction: The high-fat diet (HFD) induced obesity in female mice has been used as a model for maternal obesity. Recent evidence has shown that consumption of HFD is associated with impaired hippocampus-dependent learning and memory. In addition, the activation of Notch signaling leads to up-regulation of Hes5, condition known inhibit proliferation and differentiation of neural progenitors and this can impair to hippocampal neurogenesis.

Methods: Female Swiss mice were fed a control diet (CD – 14.7% fat) or HFD (45.0% fat) throughout pre-mating until suckling. From weaning until experimental day (d28) offspring from CD or HFD received standard chow. Body weight and adipose tissue of mothers and pups also were measured. The proteins Notch1, Hes5, Mash1, Delta1 and Sirt1 in the hippocampus were assessed by RT-PCR and western blot.

Results: Our findings show that dams fed HFD and your pups exhibit increased body weight gain and adipose tissue. Furthermore, under maternal feeding conditions, HFD offspring exhibited increase of Hes5 in the hippocampus when compared CD. In addition, HFD offspring also showed gene expression increased of Notch1 and Hes5, while Mash1 expression was decreased. However expression of Delta1 and Sirt1 did not change significantly.

Conclusion: We propose that overexpression of Hes5, known Notch effector, down-regulates expression of the proneural gene Mash1 in offspring from obese mothers, promoting slow down cell differentiation. Our results provide further evidence of molecular susceptibility offspring's hippocampus to maternal HFD and suggest that Notch1 signaling in this brain area is pivotal for neuronal differentiation.

T1:PO.060

Additive effects of common gene variants on obesity and related traits in Czech adolescents

Lenka Dusatkova, Hana Zamrazilova, Irena Aldhoon Hainerova, Barbora Sedlackova, Josef Vcelak, Petr Hlavaty, Bela Bendlova, Marie Kunesova, Vojtech Hainer

Institute of Endocrinology, Prague

Introduction: Number of common gene variants associated with body mass index (BMI) and obesity has been identified by genome-wide association studies so far. However, their influence on BMI variance remains low. In Czech adolescents, the effect of ten previously reported gene variants was examined both individually and together. Moreover, we investigated combined effect of the widely replicated variants in *FTO* and *MC4R* genes.

Methods: Genotyping of variants in/near genes *PCSK1* (rs6232, rs6235), *BDNF* (rs925946, rs4923461), *SEC16B* (rs10913469), *TMEM18* (rs7561317), *SH2B1* (rs7498665), *KCTD15* (rs29941), *MC4R* (rs17782313) and *FTO* (rs9939609) was performed in 2,106 adolescents (978 overweight/obese; 1,128 normal weight) aged 13–18 years. Anthropometric parameters, body and trunk fat were assessed.

Results: The only *FTO* and *SEC16B* variants showed individual significant association with overweight/obesity (OR=1.40, 95% CI: 1.24–1.58, p

<0.001 and OR=1.23, 95% CI: 1.05–1.45, $p = 0.014$, respectively). More pronounced risk of obesity was observed in carriers of more than three risk alleles of the *FTO* and *MC4R* variants in comparison with non-carriers (OR=1.84, 95% CI: 1.31–2.58, $p < 0.001$). The *FTO* and *MC4R* risk alleles carriers also showed increased values of anthropometric characteristics, body and trunk fat ($p < 0.001$). The sum of the risk alleles of all examined variants was associated with an increase of body weight, BMI, body circumferences, body and trunk fat ($p < 0.001$). Interestingly, above mentioned associations were demonstrated only in boys.

Conclusion: Investigated gene variants showed additive effect on obesity and related traits. Furthermore, the combined effect of the *FTO* and *MC4R* variants was confirmed in adolescent boys.

T1:PO.061

Saturated fat intake modulates the association between and obesity genetic risk score and BMI in two US populations

Patricia Casas-Agustench¹, Donna K. Arnett Arnett², Caren Smith³, Chao-Qiang Lai³, Laurence Parnell³, Ingrid Boreckí⁴, Yu-Chi Lee³, José Maria Ordovás¹

¹Nutrition and Genomic Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, MA, USA; Instituto Madrileño de Estudios Avanzados (IMDEA) Alimentación, CEI UAM+CSIC, Madrid, Spain

²Department of Epidemiology, School of Public Health, and Clinical Nutrition Research Center, University of Alabama at Birmingham, AL, USA

³Nutrition and Genomic Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, MA, USA

⁴Division of Statistical Genomics in the Center for Genome Sciences, Washington University School of Medicine, Saint Louis, MO, USA

Introduction: Combining multiple genetic variants related to obesity into a genetic risk score (GRS) might improve identification of individuals at risk of developing obesity. Characterizing gene-diet interactions is a research challenge to establish dietary recommendations to individuals with higher predisposition to obesity. We aimed to analyze the association between an obesity GRS and BMI in the Genetics of Lipid Lowering Drugs and Diet Network (GOLDN) population, with focus on gene-diet interactions with total fat and SFA intake and to replicate these findings in Multi-Ethnic Study of Atherosclerosis (MESA).

Methods: Cross-sectional analyses included 783 US Caucasians from GOLDN study and 2035 from MESA. Dietary intakes were estimated with validated food frequency questionnaires. Height and weight were measured. A weighted GRS was calculated on the basis of 63 obesity-associated variants. Multiple linear regression models adjusted by potential confounders were used to examine gene-diet interactions between dietary intake and the GRS in determining BMI.

Results: We found significant interactions between total fat intake and the GRS using variables as continuous for BMI (P for interaction = 0.010, 0.046, and 0.002 in GOLDN, MESA and meta-analysis, respectively). These association terms were stronger when assessing interactions between SFA intake and GRS for BMI (P for interaction = 0.005, 0.018, and <0.001 in GOLDN, MESA and meta-analysis, respectively).

Conclusion: SFA intake interacts with an obesity GRS in modulating BMI in two US populations. These findings suggest that potential dietary recommendations to reduce BMI in populations with high obesity GRS would be to reduce total fat intake mainly by limiting SFAs.

T1:PO.062

The polymorphism of Arg158Cys ApoE gene in patients with obesity

Olga Kirillova, Tatyana Sentsova, Ilya Vorozhko, Kamilla Gapparova, Yulya Chekhonina

Institute of Nutrition RAMS

Introduction: Patients with obesity have dyslipidaemia. The lipid metabolism is regulated by different genes including ApoE gene.

Methods: We examined 96 patients with obesity, 22–64 years old (males – 36, females – 60). The diagnosis of obesity was based on body mass index (BMI) and bioimpedance body composition analysis. Twenty eight patients had 1st grade of obesity (BMI=30–35 kg/m²), 16 patients – 2nd grade (BMI=35–40 kg/m²), and 51 patients had 3rd grade of obesity (BMI>40 kg/m²). Serum lipid status was examined by turbidimetric method on spectrophotometer analyzer Konelab 30i. The polymorphism of Arg158Cys (E2) gene was examined by PCR-RealTime method.

Results: The prevalence of allelic variant E2 in patients with obesity was 28% whereas in population study this allele was founded in 12% cases. E2/E3 genotype was registered in 16.6% patients with obesity, E2/E2 genotype – in 12.5%. The decrease of triglycerides level after nutritional therapy was different in patients with E2/E3 and E3/E3 genotypes (0.75 ± 0.36 mmol/ml vs 0.21 ± 0.45 mmol/ml, $r = 0.8$; $p = 0.033$). Patients with E2/E2 genotype had more evident decrease of triglycerides level (1.18 ± 0.86 mmol/ml) in comparison with wild E3/E3 genotype (0.21 ± 0.45 mmol/ml), $r = 1$; $p = 0.049$.

Conclusion: The detection of the polymorphism of Arg158Cys ApoE gene is important prognostic factor of positive dynamics of lipid metabolism in patients with obesity during nutritional therapy.

T1:PO.063

Metabolomics and microbiomics of obesity – when ‘too much’ is not too much

Gateva

1. Department of Pharmacology and Toxicology Pre-clinical Study Center Faculty of Medicine Medical University Sofia Bulgaria 2. Department of Internal Medicine, Pharmacology and Clinical Pharmacology, Pediatrics, Epidemiology, Infection Diseases

Introduction: Metabolomics (evaluation of all metabolites in a sample from an organism) and microbiomics (evaluation of all microbiota from a particular compartment of the organism) are relatively new tools offering possibilities for more complex pathophysiological picture with outlying the most important players. The aim of this work is to perform analysis of the literature on metabolomic and microbiome studies in obesity in order to reveal the most relevant findings with theoretical and practical application in this field.

Methods: Analysis of all Medline publications by years with key words ‘metabolomics and obesity’ and ‘microbiome and obesity’ was performed.

Results: The first published paper on metabolomics and obesity is from 2004. Since then 154 papers can be found in Medline. The total number of reviews is 40 with highest rate of publication in 2012. Original evaluations in humans are 4 times higher than original researches in rats. The role of diet was studied in 68 of the papers and the role of physical activity was assessed only in one study with 12 patients. The only pharmacometabolomic study we found in Medline was on the effect of Morning Glory seeds in rats.

The first paper on microbiome and obesity in Medline is from 2004 with total number of such publications 608. Of them the number of reviews is 254 with highest rate of publication in 2013.

Conclusion: Interplay between gut microbiome and metabolomics are revealed in the last years. This means that the plethora of studied parameters surprisingly give us a new torch on obesity.

T1 – Inflammatory pathways and metabolic diseases

T1:PO.064

Hepatic aquaporin-9 and glycerol permeability are decreased in human non-alcoholic fatty liver disease and related to insulin resistance

Amaia Rodríguez¹, Patrizia Gena², Leire Méndez-Giménez¹, Anna Rosito², Víctor Valentí³, Fernando Rotellar³, Iosu Sola⁴, Rafael Moncada⁵, Camilo Silva⁶, Maria Svelto⁷, Javier Salvador⁶, Giuseppe Calamita⁷, Gema Frühbeck¹

¹Metabolic Research Laboratory, Clínica Universidad de Navarra, Pamplona, Spain; CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), Instituto de Salud Carlos III

²Department of Biosciences, Biotechnologies and Biopharmaceutics, University of Bari Aldo Moro, Bari, Italy

³Department of Surgery, Clínica Universidad de Navarra, Pamplona, Spain

⁴Department of Pathology, Clínica Universidad de Navarra, Pamplona, Spain

⁵Department of Anesthesia, Clínica Universidad de Navarra, Pamplona, Spain

⁶Department of Endocrinology & Nutrition, Clínica Universidad de Navarra, Pamplona, Spain

⁷Department of Biosciences, Biotechnologies and Biopharmaceutics, University of Bari Aldo Moro, Bari, Italy; Centro di Eccellenza di Genomica in campo Biomedico ed Agrario (CEGBA), Bari, Italy

Introduction: Glycerol constitutes a direct source of glycerol-3-phosphate for triacylglycerol synthesis and an important substrate for hepatic gluconeogenesis during fasting. We analysed the hepatic expression and functionality of aquaporin-9 (AQP9), a channel mediating glycerol influx into hepatocytes, in patients with non-alcoholic fatty liver disease (NAFLD) and steatohepatitis (NASH) in the context of insulin resistance.

Methods: Liver biopsies were obtained from 66 morbid obese patients undergoing bariatric surgery with available echography and pathology analysis of the biopsies. Subjects were classified according to normoglycaemia (NG), impaired glucose tolerance (IGT) or type 2 diabetes (T2D). The expression of AQP9 in human liver was analyzed by real-time PCR, Western blot and immunohistochemistry while glycerol permeability (Pgly) was measured by stopped-flow light scattering.

Results: AQP9 exhibited higher ($P < 0.0001$) transcript levels in human liver than other aquaglyceroporins (AQP9 >>> AQP3 > AQP7 > AQP10). Increased plasma glycerol as well as lower Pgly and hepatic AQP9 expression were found in obese patients with T2D. The prevalence of NAFLD and NASH in T2D patients was 100% and 65%, respectively. Interestingly, patients with NAFLD and NASH showed a reduction of AQP9 mRNA and protein expression as compared with those without hepatosteatosis, in direct relation to the degree of steatosis and lobular inflammation, being further reduced in insulin-resistant individuals. The association of AQP9 with insulin sensitivity was independent of BMI and age.

Conclusion: The reduction of hepatic AQP9 and glycerol permeability in insulin-resistant states emerge as a compensatory mechanism whereby the liver counteracts further triacylglycerol accumulation and *de novo* synthesis of glucose in patients with NAFLD.

T1:PO.065

Inflammatory phenotype interacts with BMI to modulate postprandial response to an oral glucose tolerance test and oral lipid tolerance test in healthy adults

McMorrow¹, O'Grada¹, Morine², Morris³, Dillon¹, Ryan³, Walsh³, Gibney³, Gibney³, Brennan³, Roche¹

¹Nutrigenomics Research Group, UCD Conway Institute of Biomolecular and Biomedical Research, School of Public Health and Population Science, University College Dublin, Belfield, Dublin 4, Ireland

²The Microsoft Research, University of Trento Centre for Computational Systems Biology (COSBI), Rovereto, Italy

³Institute of Food and Health, University College Dublin, Belfield, Dublin 4, Ireland

Introduction: Acute nutritional challenges are a useful tool to determine metabolic flexibility. Investigation of factors contributing to inter-subject variability in responsiveness may help to inform personalised nutrition approaches. This analysis focused on how the inflammatory phenotype interacts with BMI to modulate the metabolic response to lipid and glucose metabolic challenges.

Methods: An oral glucose tolerance test (OGTT) and oral lipid tolerance test (OLTT) were completed in $n = 74$ healthy adults (mean \pm SD age 33.9 ± 11.2 y; BMI 27.2 ± 6.5 kg/m²). Responses to OGTT and OLTT were determined by AUC insulin and AUC triacylglycerol, respectively. Inflammatory profiles at baseline and peak of each challenge were characterised by a composite inflammatory score; which reflected circulating adipokines, cytokines, acute phase proteins and growth factors.

Results: BMI and baseline inflammatory score were positively associated with postprandial response to OGTT ($p < 0.001$ for both BMI and inflammatory score) and to a greater extent with OLTT ($p < 0.001$ for both). An interaction between BMI and baseline inflammatory score was identified by multiple linear regression ($p < 0.01$), wherein an adverse inflammatory score strengthened the positive association between BMI and response to both OGTT ($p = 0.003$) and OLTT ($p = 0.001$). In contrast, a low inflammatory score was protective such that the association between high BMI and high postprandial response dissipated (OGTT $p = 0.748$; OLTT $p = 0.642$). A similar pattern was demonstrated when peak inflammatory profiles were examined.

Conclusion: Inflammatory phenotype may modulate the relationship between BMI and metabolic response to an acute dietary challenge; wherein a high BMI and pro-inflammatory profile interaction has an additional adverse perspective.

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T1:PO.066

Microbiome of prebiotic treated mice reveals novel targets involved in host-response during obesity and diabetes

Amandine Everard¹, Vladimir Lazarevic², Nadia Gaïa², Nathalie M. Delzenne¹, Jacques Schrenzel³, Patrice François², Patrice D. Cani¹

¹Université catholique de Louvain, Louvain Drug Research Institute, WEL-BIO (Wallon Excellence in Life sciences and BIotechnology), Metabolism and Nutrition research group, Belgium

²Geneva University Hospitals, Genomic Research Lab, Geneva, Switzerland

³Geneva University Hospitals, Genomic Research Lab, Geneva, Switzerland and Geneva University Hospitals, Laboratory of Bacteriology, Geneva, Switzerland

Introduction: The gut microbiota is involved in metabolic and immune disorders associated with obesity and type 2 diabetes. We previously demonstrated that prebiotic treatment may significantly improve host health by modulating bacterial species related to the improvement of gut endocrine, barrier and immune functions. An analysis of gut functional potential is needed to determine which bacterial function and taxa are

relevant in microbiota-host beneficial interactions upon nutritional intervention.

Methods: We subjected mice to prebiotic (Pre) treatment under physiological (control diet: CT) and pathological conditions (high-fat diet: HFD) for 8 weeks and investigated the production of intestinal antimicrobial peptides and the gut microbiome.

Results: HFD feeding significantly decreased the expression of regenerating islet-derived 3-gamma (Reg3g) and phospholipase A2 group-II (PLA2g2) and tended to decrease lysozyme-C (Lyz1) in the jejunum. Prebiotic treatment increased Reg3g expression (by approximately 50-fold). Deep metagenomic sequencing analysis revealed that HFD and prebiotic treatment significantly affected the gut microbiome at different taxonomic levels. A total of 20 genera were significantly affected in the HFD group, whereas prebiotic treatment under HFD significantly affected 27 genera. Of these genera, 15 were mainly affected in the opposite direction. Finally, functional analyses based on the occurrence of clusters of orthologous groups of proteins (COGs) in the gut microbiome revealed significant alterations for the dietary conditions, with distinct profiles for the HFD, HFD-Pre and CT groups.

Conclusion: Thus, we identified novel putative taxa and metabolic functions that may contribute to the development of or protection against the metabolic alterations observed during HFD feeding and HFD-Pre feeding.

T1:PO.067

Interdisciplinary therapy promotes reduction of stearoyl-CoA desaturase 1 activity in obese adolescents with Non-alcoholic fatty liver diseases

Claudia Maria Oller do Nascimento, Aline de Piano, Debora Estadella, Lila Oyama, de Souza Gabriel, Aline Santamarina¹, Deborah Masquio², Lian Tock, June Carnier, Dâmaso Ana, et al.

Universidade Federal de São Paulo – Escola Paulista de Medicina

Introduction: The amount and type of fatty acids and desaturases indices can exert an influence on steatosis development and are associated with inflammatory processes, however it remains unclear whether the interdisciplinary therapy can reduce the enzyme stearoyl-CoA desaturase-1 activity acting in the NAFLD development. The aim was to assess the effect of interdisciplinary therapy on the composition of the serum fatty acids and stearoyl-CoA desaturase activity in obese adolescents, as well as their correlation with NAFLD.

Methods: Obese adolescents, 14 to 19 years old, with BMI above the 95th percentile, as proposed by the Centers for Disease Control and Prevention, were selected and were submitted to long-term interdisciplinary treatment, including physical exercise and clinical, nutritional and psychological interventions. Blood samples were collected to assess glycaemia, hepatic transaminases, insulinaemia, lipid profiles, leptin and adiponectinemia. Serum fatty acid composition was determined by chromatography in fizzy phase and the SCD-1 desaturase activity was measured by 16:1n7/16:0 ratio.

Results: The intervention improved body mass, BMI, subcutaneous and visceral fat, insulin, plasmatic lipids and significantly decreased serum myristic and palmitoleic acids. Palmitoleic acids presented a positive correlation with plasmatic triglycerides and insulin levels. In addition, polyunsaturated fatty acids were negatively associated with triacylglycerol, insulin, HOMA-IR and stearoyl-CoA desaturase activity. Stearoyl-CoA desaturase activity represents a valuable biomarker for the inflammatory process in NAFLD.

Conclusion: Interdisciplinary therapy was effective in significantly improving non-invasive biomarkers of NAFLD, reducing the SCD-1 desaturase activity, modifying the plasmatic fatty acid composition, which is associated with the greatest risk for this disease in young population.

T1:PO.068

Nutritional status, insulin resistance and circulating visfatin/NAMPT in elderly population

Magdalena Olszanecka-Glinianowicz¹, Aleksander Owczarek², Maria Bożentowicz-Wikarek³, Aniceta Brzozowska¹, Małgorzata Mossakowska⁴, Tomasz Zdrojewski⁵, Tomasz Grodzicki⁶, Andrzej Więcek⁷, Jerzy Chudek³

¹Health Promotion and Obesity Management Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

²Division of Statistics, Department of Instrumental Analysis, Medical University of Silesia, Katowice, Poland

³Pathophysiology Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

⁴International Institute of Molecular and Cell Biology, Warsaw, Poland

⁵Department of Arterial Hypertension and Diabetology, Medical University of Gdansk, Gdansk, Poland

⁶Department of Internal Medicine and Gerontology, Jagiellonian University Medical College, Krakow, Poland

⁷Department of Nephrology, Endocrinology and Metabolic Diseases, Medical University of Silesia, Katowice, Poland

Introduction: Circulating visfatin/NAMPT levels are according to the results of some studies related to nutritional status and insulin resistance. These associations have not been studied in large elderly populations, yet. Therefore, the aim of the study was to assess the relationships between circulating visfatin/NAMPT levels and nutritional status, and insulin resistance in a large population-based elderly cohort.

Methods: The analysis included 3050 elderly (1459 females) participants of PolSenior study. Serum glucose, CRP, interleukin-6, plasma insulin and visfatin/NAMPT (by ELISA) concentrations were assessed, and HOMA-IR was calculated.

Results: Higher plasma visfatin/NAMPT levels were observed in obese than overweight and normal weight as well as non-diabetic insulin resistant than insulin sensitive and subjects diagnosed with diabetes, however the differences were significant only for women (men: 0.98/1.2 vs. 0.97/0.96 vs. 0.91/1.03, $p < 0.07$; women: 1.06/1.09 vs. 0.93/1.09 vs. 0.93/1.00, $p < 0.05$ and men: 0.99/1.00 vs. 0.92/0.97 vs. 0.97/1.18, $p = 0.16$; women: 1.06/1.06 vs. 0.88/1.07 vs. 0.99/1.08, $p < 0.05$, respectively). The regression analysis models showed that plasma visfatin/NAMPT levels declining with age and increasing with waist circumference, BMI and serum concentrations of hs-CRP. Among models not adjusted for sex, these including waist circumference was better adjusted than those with BMI. While, in analyses stratified to sex, better adjusted was the model with BMI than those with waist circumference.

Conclusion: Our study revealed that in elderly subjects circulating visfatin/NAMPT levels are related to age, visceral obesity, inflammation but not to glucose metabolism disturbances.

T1:PO.069

Neuroendocrine control of food intake, inflammatory markers and depressive symptoms in obese adults: Effects of therapy interdisciplinary

Moraes¹, Cipullo², Poli¹, Furlan³, Carvalho⁴, Badan¹, Oyama⁴, Dâmaso⁴, Caranti¹

¹Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos (SP), Brazil.

²Department of Biosciences, Federal University of São Paulo – UNIFESP – Santos (SP), Brazil.

³Post Graduate Program of Food and Nutrition, University of Campinas – UNICAMP – Campinas (SP), Brazil

⁴Post Graduate Program of Nutrition, Federal University of São Paulo – UNIFESP – São Paulo (SP), Brazil.

Obesity markedly increases the risks of developing depression. Depressed mood not only impairs motivation, quality of life and overall functioning but also increases the risks of obesity complications. The aim of this study was to evaluate the effects of interdisciplinary therapy in the neuroendo-

crine control of food intake, inflammatory markers and depressive symptoms in obese women.

Methods: Forty-seven (47) obese women (43.32 ± 5.82 years, 34.86 ± 3.08 kg/m²) female volunteers, aged between 30 and 50 years and BMI between 30 and 40 kg/m², were subjected to long-term therapy (36 weeks). During the therapy was applied the questionnaire BDI (Beck Depression Inventory) to assess the degree of depression symptoms. This flowchart identifies our study protocol.

Results: Our findings were described in the Table 1. After long-term therapy, we verified a significant reduction in body mass ($\Delta 5.36$ Kg), BMI ($\Delta 2.01$ kg/m²), waist circumference ($\Delta 9.09$ cm) and serum leptin ($\Delta 15.62$ ng/mL). The proposed therapy also demonstrated an improvement in the quality of depression scores ($\Delta 6.63$ p < 0.001).

Conclusion: This study, demonstrated decreased the degree of inflammation status and anthropometric parameters. In addition, decreased the symptoms of depression of the volunteers. Therefore, our results reinforce the use of this interdisciplinary therapy to treat the obesity.

T1:PO.070

Insulin signaling molecules are expressed and modulated by insulin and interleukin-1 β in human primary preadipocytes

Mohamed Madi¹, Paul Trayhurn², Chen Bing²

¹Department of Obesity and Endocrinology, Institute of Ageing and Chronic Diseases, University of Liverpool, Liverpool L69 3GA, UK

²Department of Obesity and Endocrinology, Institute of Ageing and Chronic Diseases, University of Liverpool,

Introduction: Preadipocytes are important in adipose tissue remodelling but their role in the development of insulin resistance is largely unknown. Interleukin-1 β is shown to have a link with insulin resistance. This study investigated whether the insulin signaling molecules are present and response to insulin in human preadipocytes, and whether IL-1 β affects the insulin signaling pathway in preadipocytes.

Methods: Human primary preadipocytes and adipocytes were cultured and stimulated with insulin; cell lysates were collected for detecting and determining the protein expression of the insulin signaling molecules (pIR, IRS-1, PI3K p85 α , total and phosphorylated AKT) using western blotting. To examine the effect of IL-1 β , preadipocytes were treated with IL-1 β for 4 and 24 h.

Results: Basal expression of the insulin signaling molecules was detected in preadipocytes. Insulin stimulation led to a significant increase in the phosphorylation of pIR, pIRS-1(Ser 612) and pAkt in preadipocytes. IL-1 β significantly reduced protein abundance of insulin-stimulated pIR at 4 h and at 24 h. IL-1 β also decreased phosphorylation of pIRS-1(Ser612) at 4 h and 24 h. However, the phosphorylation of pAKT at 4 h was not affected but was significantly increased at 24 h.

Conclusion: Protein expression of the insulin signaling molecules (pIR, pIRS-1, PI3K p85 α and pAkt) was present and detectable in human preadipocytes. The phosphorylation of the proteins (pIR, pIRS-1 and pAkt) can be induced by insulin whereas IL-1 β inhibited basal and insulin-stimulated pIR.

T1:PO.071

Oligofructose supplementation during pregnancy and lactation impairs offspring development associated to an increase in mRNA levels of IL-6R in 21-d-old pups

Lila Missae Oyama¹, Laís Vales Mennitti², Juliana Lopez de Oliveira¹, Ana Claudia Losinskas Hachul¹, Aline Boveto Santamarina¹, Aline Alves de Santana¹, Marcos Hiromu Okuda¹, Eliane Beraldi Ribeiro¹, Claudia Maria da Penha Oller do Nascimento¹, Luciana Pellegrini Pisani³

¹Departamento Fisiologia, Disciplina de Fisiologia da Nutrição, Escola Paulista de Medicina, Universidade Federal de São Paulo, Rua Botucatu, 862, 2^o andar, Vila Clementino, São Paulo, SP, Brazil.

²Programa de Pós Graduação Interdisciplinar em Ciências da Saúde, Universidade Federal de São Paulo, Santos, SP, Brazil.

³Departamento de Biociências, Instituto de Saúde e Sociedade, Universidade Federal de São Paulo, Rua Silva Jardim, 136, Térreo, Vila Mathias, Santos, SP, Brazil.

Introduction: Probiotics can alter the bacterial population and decrease serum concentrations of lipopolysaccharides (LPS), benefiting the mother and the newborn until adulthood. LPS can induce TLR-4 activation, contributing to pro-inflammatory cytokines production and decreased in adiponectin levels. The objective was evaluate the effect of oligofructose 10% diet supplementation during pregnancy and lactation on the development, inflammatory status and bacterial composition of 21-d-old offspring.

Methods: On the first day of pregnancy rats were divided into two groups: control diet (C) and control diet supplemented with 10% oligofructose (CF). Diets were maintained during pregnancy and lactation. At birth, 7th, 14th and 21th, pups were weighed and length was measured. At 21th, pups were decapitated. Free fatty acids (FFA) serum concentration was performed by specific kit. Bacterial DNA in faeces and mRNA levels of IL-6R in white adipose tissue (WAT) and AdipoR1 in soleus (SOL), and extensor digital longus (EDL) muscles were determined by real-time PCR. Statistical analysis was performed with *t* test. p < 0.05.

Results: Oligofructose (10%) supplementation during pregnancy and lactation reduced body weight, body weight gain, length, serum FFA and mRNA levels of AdipoR1 in SOL and EDL of the 21-d-old offspring, accompanied by an increase in the genomic DNA levels of lactobacillus spp. on colonic faeces and gene expression of IL-6R in pup's WAT, compared to control group.

Conclusion: Dam's diet supplementation with 10% of oligofructose during pregnancy and lactation harms the offspring development, contributes to increase in pro-inflammatory status and alters the colonic bacterial composition in 21d-old pups.

T1:PO.072

The Association between Oxidative Stress and Metabolic Syndrome in Adults

Sang-Wook Song, So-Won Chung, Ha-Na Kim, Kyung-Soo Kim

Department of Family Medicine, The Catholic University of Korea College of Medicine, Seoul, Korea

Introduction: In this Study, we investigated the effects of lifestyle and metabolic syndrome on free oxygen radical levels in men and women in Korea.

Methods: A total of 254 adults were included in this study from February 2011 to June 2012 at a health promotion center. Information of the lifestyles and presence of metabolic syndrome factors was obtained. Biochemical markers were measured and free oxygen radicals test (FORT) was performed on the blood.

Results: Of the 254 subjects, 86 (33.9%) had metabolic syndrome, and 187 (73.6%) were men. Between the subjects with and without metabolic syndrome, there was a significant increase in alanine aminotransferase and serum FORT values in the subjects with metabolic syndrome. Multi-

ple linear regression analysis showed that high-sensitivity C-reactive protein (hs-CRP) ($P = 0.004$), metabolic syndrome ($P = 0.037$), and female gender ($P = 0.030$) were independent predictors of serum FORT values. The subjects with high fasting blood sugar level or low high density lipoprotein cholesterol levels showed high serum FORT values.

Conclusion: High hs-CRP, the presence of metabolic syndrome, and female gender were associated with the high oxidative stress. High oxidative stress was associated with the presence of metabolic syndrome.

T1:PO.073

Anti-inflammatory effects of EPA and DHA supplementation. Correlation of changes in biochemical markers of low-grade systemic inflammatory during obesity with the expression of miRNAs

Anna Polus¹, Urszula Razny¹, Joanna Goralska¹, Małgorzata Malczewska-Malec¹, Dominika Wnek¹, Beata Kiec-Wilk², Anna Zdzienicka¹, Aldona Dembinska-Kiec¹

¹Department of Clinical Biochemistry, Collegium Medicum, Jagiellonian University, Krakow, Poland

²Department of Metabolic Diseases Collegium Medicum, Jagiellonian University; Krakow, Poland

Introduction: It was postulated that ω -3 fatty acids: EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) have anti-inflammatory effects on low-grade inflammation associated with obesity and prediabetes. It was found that ω -3 inhibits synthesis of proinflammatory arachidonic acid derivatives, the expression of inflammatory cytokines and endothelial adhesion proteins. Relationship between therapeutic response and modifications of microRNA (miRNA) transcriptome in obesity or metabolic syndrome remains interesting for further exploration. The aim was analysis of anti-inflammatory effects EPA and DHA through modulation of the level of the miRNA targets of proinflammatory cytokines genes.

Methods: Blood samples of patients with prediabetes obtained before and after three-month long diet supplementation with low doses of n-3 PUFA (3x600 mg/day DHA:EPA (5:1)), the inflammatory cytokines: adhesion proteins (sE-Selectin, s-VCAM-1, sPECAM-1, and hsCRP, IL-6, MCP-1, were determined using ELISA kit. Parallel customizable 384-well micro fluidic cards were used for the simultaneous analysis of miRNA expression (TaqMan[®] Low Density Array Human Apoptosis Panel, Applied Biosystems, Foster City, CA, USA) on the 7900HT Fast Real-Time PCR System.

Results: The 3 months of PUFA supplementation, reduced the measured inflammatory markers such as sE-Selectin, s-VCAM-1, s-PECAM-1 and hsCRP. Some correlation with expression of miRNA was found.

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T1:PO.074

SNPs in the IL 18 gene could modulate the presence of obesity in a South European population

Jose F. Martinez-Valls¹, Sergio Martinez-Hervas², Vanesa Martinez-Barquero³, Ana Artero⁴, Ester Nuñez-Savall⁵, Esther Benito⁶, Miguel Civera⁵, F. Javier Chaves⁷, Jose T. Real⁸, Juan F. Ascaso⁸

¹Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de Valencia. Spain. Departamento de Medicina. Universidad de Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain.

²Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de Valencia. Spain. Departamento de Medicina. Universidad de Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain. CIBER de Diabetes y Enfermedades Metabólicas asoci

³Unidad de Genotipado y Diagnóstico Genético. Fundación Investigación Hospital Clínico-INCLIVA. Valencia. Spain

⁴Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain.

⁵Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de

Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain

⁶Instituto de Investigación Sanitaria INCLIVA. Spain. CIBER de Diabetes y Enfermedades Metabólicas asociadas (CIBERDEM). Spain.

⁷CIBER de Diabetes y Enfermedades Metabólicas asociadas (CIBERDEM). Spain. Unidad de Genotipado y Diagnóstico Genético. Fundación Investigación Hospital Clínico-INCLIVA. Valencia. Spain

⁸Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de Valencia. Spain. Departamento de Medicina. Universidad de Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain. CIBER de Diabetes y Enfermedades Metabólicas asoci

Introduction: Obesity is an inflammatory disease. Different studies have shown that plasmatic levels of IL 18 rise in subjects with abdominal obesity. It is not well studied whether SNPs in the IL 18 gene modulate the presence of obesity. Our aim was analyze if plasmatic levels of IL 18 could be modulated by SNPs in the IL 18 gene and its possible relation with the presence of obesity.

Methods: During a period of two years 746 individuals were included. They were selected by opportunistic method in the out-patient clinic of our Service. We measured usual parameters by standard methodology. We determined IL 18 levels by ELISA.

Results: Subjects with obesity showed significant higher levels of IL 18 compared to those without obesity (406.9 ± 191.8 vs 489.1 ± 209.2). We found a significant correlation between IL 18 and BMI. Finally the T allele of the SNP rs2293225 was associated with lower BMI and lower abdominal waist, and also with lower risk of obesity.

Conclusion: The SNP rs2293225 in the IL18 gene could modulate anthropometric parameters, as well as the risk of obesity.

T1:PO.075

Neuroendocrine control of food intake, inflammatory markers and depressive symptoms in obese adults: Effects of therapy interdisciplinary

Moraes¹, Cipullo², Escardovelli², Poli¹, Furlan³, Carvalho³, Badan⁴, Oyama⁵, Dâmaso⁵, Caranti¹

¹Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos (SP), Brazil.

²Department of Biosciences, Federal University of São Paulo – UNIFESP – Santos (SP), Brazil.

³Post Graduate Program of Food and Nutrition, University of Campinas – UNICAMP – Campinas (SP), Brazil.

⁴Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos (SP), Brazil.

⁵Post Graduate Program of Nutrition, Federal University of São Paulo – UNIFESP – São Paulo (SP), Brazil.

Introduction: Obesity markedly increases the risks of developing depression. Depressed mood not only impairs motivation, quality of life and overall functioning but also increases the risks of obesity complications. The aim of this study was to evaluate the effects of interdisciplinary therapy in the neuroendocrine control of food intake, inflammatory markers and depressive symptoms in obese women.

Methods: Forty-seven (47) obese women (43.32 ± 5.82 years, 34.86 ± 3.08 kg/m²) female volunteers, aged between 30 and 50 years and BMI between 30 and 40 kg/m², were subjected to long-term therapy (36 weeks). During the therapy was applied the questionnaire BDI (Beck Depression Inventory) to assess the degree of depression symptoms. This flowchart identifies our study protocol.

Results: Our findings were described in the Table 1. After long-term therapy, we verified a significant reduction in body mass ($\Delta 5,36$ kg), BMI ($\Delta 2,01$ kg/m²), waist circumference ($\Delta 9,09$ cm) and serum leptin ($\Delta 15,62$ ng/mL). The proposed therapy also demonstrated an improvement in the quality of depression scores ($\Delta 6.63$ p < 0.001).

Conclusion: This study, demonstrated decreased the degree of inflammation status and anthropometric parameters. In addition, decreased the symptoms of depression of the volunteers. Therefore, our results reinforce the use of this interdisciplinary therapy to treat the obesity.

T1:PO.076

The role of adiponecitr/leptin ratio on bone metabolism in obese adolescents undergoing therapy

Raquel Campos¹, Deborah Masquio², Ana Paula Clemente², Flávia Corgosinho², Joana Carvalho-Ferreira², Bárbara Dal Molin Netto², Carolina Ackel-D'Elia², Lian Tock³, Sergio Tufik¹, Marco Túlio de Mello², Ana Dâmaso²

¹Universidade Federal de São Paulo

²Universidade Federal de São Paulo – UNIFESP

³Weight Science

Introduction: Obesity is a multifactorial disease associated with pro-inflammatory state including lower adiponectinemia and hyperleptinemia framework. Many comorbidities are associated with obesity, including bone mineral alterations, metabolic syndrome, cardiovascular complications, non-alcoholic fatty liver disease, sleep disorders and asthma. The purpose of this study were to investigate the role of adiponectin/leptin ratio and the effects of two different kinds of long term interdisciplinary therapy (Clinical and Counseling) on biomarkers of inflammation and bone metabolism in obese adolescents.

Methods: For this study, it was involved 60 post-puberty obese adolescents with age of 15–19 years with primary obesity, body mass index (BMI) greater than >95th percentile of the CDC reference growth charts. Measurements of inflammatory biomarkers, bone metabolism, body composition, visceral and subcutaneous fat were performed. The adolescents were randomized in two different groups that were submitted to a clinical or counseling interdisciplinary therapy during a long-term.

Results: The most important find in the present investigation was the positive correlation between adiponectin/leptin ratio with osteocalcin. Moreover, we showed negative associations between leptin with osteocalcin and adiponectin with Beta CTX-collagen. However, comparing the magnitude effects between the therapies only Clinical Therapy improves adiponectin, bone mineral content in obese adolescents.

Conclusion: The pro-inflammatory profile present in obese adolescents is related to an increase in Beta CTX-collagen. Although clinical weight loss therapy up-regulates adiponectin concentration leading to an improvement of bone reabsorption.

Conflict of interest: Nothing to disclose.

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T1:PO.077

Serum high sensitivity reactive protein as a marker of inflammation in patients with psoriasis

Galina Zhelezova¹, Ludmila Ivanova², Grisha Mateev³, Snezhina Vassileva³, Blagovesta Pencheva⁴, Rosen Michailov⁴

¹Department of Biology, Medical Genetics and Microbiology, Medical Faculty, Sofia University, "St. Kliment Ohridski"

²Department of Neurology, Psychiatry and Rehabilitation, Preventive Medicine and Public Health Medical Faculty, Sofia University, "St. Kliment Ohridski"

³Department of Dermatology and Venerology, Medical University, Sofia

⁴Medical Diagnostic Laboratory, "Ramus", Sofia

Introduction: Psoriasis is a disease of systemic Inflammation with comorbidities as obesity/metabolic syndrome, autoimmune diseases, cardiovascular diseases et al. The majority of the current data about psoriasis include the role of inflammation in the pathogenesis of the disease. This study aimed to examine the association between the psoriasis and serum high sensitivity C-reactive protein (hs-CRP) as a marker of systemic inflammation, infection, and tissue damage and risk predictor for the development of cardiovascular diseases and metabolic syndrome.

Methods: Twenty one patients with mild to moderate psoriasis and 25 healthy sex and age-matched adults were included in this study. Blood samples were obtained for hs-CRP determination. Psoriasis area severity

index (PASI) used to express the severity of psoriasis was determined. Diet, alcohol consumption, smoking and fasting glucose were assessed, too.

Results: The mean serum level of hs-CRP in psoriatic patients was significantly higher than that in controls ($P < 0.05$) and had significant positive correlation with PASI index.

Conclusion: Based on these results, the link between hs-CRP and psoriasis might be supported. The results showed that psoriatic patients have increased CRP levels and it was also suggested that psoriasis is a systemic inflammatory disease preparing a convenient environment for cardiovascular diseases and other comorbidities.

T1:PO.078

Downregulation of complement C3 and C3aR expression in subcutaneous adipose tissue in obese Caucasian women

Abhishek Gupta¹, Reza Rezvani¹, Marc Lapointe¹, Pegah Poursharifi¹, Picard Marceau², Sunita Tiwari³, Andre Tcherno¹, Katherine Cianflone¹

¹Department of Obesity-Metabolism, IUCPQ, Université Laval, Canada

²Dept. of Surgery, IUCPQ, Université Laval, Canada

³Dept. of Physiology, KGMU, Lucknow, India

Introduction: The central component of the complement system, C3, is associated with obesity, type 2 diabetes and cardiovascular disease however the underlying reasons are unknown. In the present study we evaluated gene expression of C3, the cleavage product C3a and its cognate receptor C3aR in subcutaneous and omental adipose tissue in women.

Methods: Women ($n = 140$, 21–69 years, BMI 19.5–79 kg/m²) were evaluated for anthropometric and blood parameters, and adipose tissue gene expression.

Results: Subjects were separated into groups ($n = 33–36$) according to obesity: normal/overweight (≤ 30 kg/m²), obese I (≤ 45 kg/m²), obese II (≤ 51 kg/m²), and obese III (≤ 80 kg/m²). Overall, while omental expression remained unchanged, subcutaneous C3 and C3aR gene expression decreased with increasing adiposity (2-way ANOVA, $p < 0.01$), with a concomitant decrease in SC/OM ratio ($p < 0.001$). In subcutaneous adipose, both C3 and C3aR expression correlated with apoB, and apoA1 and inversely with waist circumference and blood pressure, while C3aR also correlated with glucose ($p < 0.05–0.0001$).

While omental C3aR expression did not correlate with any factor, omental C3 correlated with waist circumference, glucose and apoB (all $p < 0.05$). Further, while plasma C3a/C3adesArg increased and adiponectin decreased with increasing BMI, both correlated (C3a negatively and adiponectin positively) with subcutaneous C3 and C3aR expression ($p < 0.05–0.001$) or less).

Conclusion: The obesity-induced down-regulation of complement C3 and C3aR which is specific to subcutaneous adipose tissue, coupled to the strong correlations with multiple anthropometric, plasma and adipokine variables support a potential role for complement in immunometabolism.

T1:PO.079

Probiotic as antioxidant in juvenile rats' fat-rich diet

Georgi Bogdanov

Department of Pharmacology and Toxicology, Medical Faculty, Medical University of Sofia

Introduction: Excessive free radicals production due to dietary fat overload may onset Oxidative Stress related diseases. A Probiotic was used in attempt to indirectly control the Oxidative Stress in rat model of juvenile males exposed to fat-rich diet.

Methods: Juvenile male Wistar rats were fed with standard rodents' food (two control groups), or refined Palm Oil and Lard, alone and in combination with Probiotic (*Lactobacillus bulgaricus*-LB51), for 28 days. The Refined Palm Oil is the worldwide most abundant cooking vegetable oil,

while lard is still preferred in some regions. Rats' body weights were measured at 1st, 14th and 28th days. After decapitation, the free radicals in blood plasmas and livers were measured spectrophotometrically using the MTT-method. Microsoft Office Program Package was used for data management.

Results: Alone and in combination with Probiotic, the fat-rich diets did not affect the Body Weight gain compared with this of the Control group. If alone, they increased the free-radicals accumulation, compared with the corresponding levels in control animals. In combination with Probiotic, both fat-rich diets did not affect the free radicals accumulation in the blood plasma, compared with this of the Control group. The Probiotic limited the free radicals accumulation in the liver, more strongly for the Lard-enriched diet.

Conclusion: The observed for the first time indirect *in vivo* antioxidant effect of *Lactobacillus bulgaricus* in dietary fat overload model might help to diminish the risk for Oxidative Stress related diseases.

T1:PO.080

Identification of adipokine clusters related to parameters of fat mass, insulin sensitivity or inflammation

Flehmig¹, Klötting², Fasshauer¹, Tönjes¹, Stumvoll¹, Youn³, Blüher¹

¹Department of Medicine, University of Leipzig, Leipzig, Germany

²IFB ObesityDiseases, Junior Research Group Animal Models, University of Leipzig, Leipzig, Germany

³AdipoGen, College of Life Science and Biotechnology, Korea University, Seoul, Korea

Introduction: In obesity, elevated fat mass and ectopic fat accumulation are associated with changes in adipokine secretion, which may link obesity to inflammation and the development of insulin resistance. Therefore, alterations in circulating adipokine patterns could be used as markers for adipose tissue dysfunction, subclinical inflammation and obesity related metabolic diseases.

Methods: Serum concentrations of 19 adipokines were measured in 167 Caucasian men (n = 78) and women (n = 89) with a wide range of body weight, fat distribution, parameters of hyperglycemia and insulin sensitivity. Unbiased, distance-based hierarchical cluster analyses were performed to test the hypothesis that distinct adipokine patterns either reflect fat mass/distribution, impaired glucose metabolism, insulin sensitivity and/or a pro-inflammatory state.

Results: We identified three major adipokine clusters reflecting body fat mass (ANGPTL3, DLL1, chemerin, clusterin, Nampt, resistin, GPX3), impaired insulin sensitivity (ANGPTL6, progranulin, RBP4) or subclinical inflammation (adiponectin, DLK1, SFRP5, BMP7, vaspin, glypican 4, CTRP3 and 5, omentin). In addition, we found distinct adipokine patterns reflecting differences in insulin sensitivity in subgroups of obese individuals, patients with type 2 diabetes and healthy controls. Logistic regression analyses revealed that up to 48% of the type 2 diabetic state can be explained by these adipokine patterns.

Conclusion: Despite strong overlapping associations with anthropometric and metabolic parameters, we found circulating adipokine patterns which mainly reflect fat mass, insulin sensitivity or a pro-inflammatory state. Although such adipokine patterns may not be clinically relevant for the diagnosis of metabolic diseases they could be used to predict the outcome of diabetes and associated diseases.

T1 – Micronutrients and nutrition

T1:PO.081

Mineral content of oral hospital diets offered to chronic renal failure patients pre-dialysis

Janiara David Silva¹, Daniele Moreira¹, Júlia Sá¹, Aline Nemer², Marcelo Morgano³, Késia Diego Quintaes⁴

¹Nutrition School, Federal University of Ouro Preto (UFOP)

²Department of Nutrition, Federal University of Juiz de Fora (UJFJ) and

³Nutrition School, Federal University of Ouro Preto (UFOP)

⁴Institute of Food Technology (ITAL)

⁴Nutrition School, Federal University of Ouro Preto

Introduction: The diet for patients with Chronic Kidney Disease (CKD) has important clinical impact on the disease progression. This study determined the contents of Ca, P, K, Na, Mg, Fe, Mn, Cu, Zn and Se in an oral hospital diet and a Food Oral Complement (FOC), prepared for CKD patients, with the adequacy quantified with respect to nutritional recommendations.

Methods: Samples of the diet were collected in a Brazilian public hospital, with mineral determination by ICP-OES. The Dietary Reference Intake and specific nutritional recommendations for CKD patients were used to assess the nutritional adequacy.

Results: About 14.3% of the diets produced for CKD patients were analyzed. The levels of P, K, Mn and Na were over the recommendation, with Na exceeding the Upper Level. For men there was deficit of Mg, Zn and Se, with a Fe deficit observed for women. The combination of OFC with the diet was sufficient to provide adequate levels of Mg, Cu and Fe, did not turn Ca, Zn and Se contents to adequate levels, and added unnecessary levels of P, K, Mn and Na.

Conclusion: With the exception of K, P and Mn, the diets exhibited insufficient mineral contents and toxic levels of Na. Diet menus and OFC compositions need to be changed to meet the nutritional recommendations and support the clinical assistance of CKD patients.

T1:PO.082

The effect of phosphorus ingestion on postprandial hormonal status of overweight and obese subjects

Omar Obeid, Marwa Hassan, Hala Ghattas, Sani Hlais

AUB

Introduction: Plasma phosphorus was reported to be positively related to insulin sensitivity and we have previously shown that the addition of phosphorus to oral glucose load was able to improve insulin sensitivity of healthy subjects (Khattab et al., 2011). However, the impact of phosphorus on incretin hormones (GLP-1 and GIP), which are known to affect insulin sensitivity, is not clear. The objective of this study was to assess the effect of phosphorus ingestion with oral glucose load on postprandial status of GLP-1 and GIP in overweight and obese subjects.

Methods: Seven overnight fasted subjects (BMI>25 kg/m²) were given a glucose solution (75gm) together with either phosphorus or placebo pills. Postprandial status of insulin, phosphate, glucose, GLP-1, GIP and triglycerides were monitored for 4 hours.

Results: No significant change in the levels of insulin, glucose, GIP and triglycerides was observed between the two treatments. However, in the phosphorus treated group the AUC of serum GLP-1 was significantly higher

Conclusion: Exogenous phosphorus seems to stimulate GLP-1 release and thus may partially contribute to the impact of phosphorus on insulin sensitivity.

T1:PO.083

Very-high-fat and isocaloric low-fat diet interventions in overweight middle-aged men – results from a randomized trial

*Vivian Veum*¹, *Johnny Laupsa-Borge*², *Øyvind Eng*³, *Espen Rostrup*⁴, *Margit Solsvik*⁵, *Terje Larsen*⁶, *Jan-Erik Nordrehaug*⁷, *Ottar Nygaard*⁸, *Jørn Sagen*⁵, *Oddrun Gudbrandsen*⁹, *Simon Danke*⁶, *Gunnar Mellgren*⁹

¹Department of Clinical Science, University of Bergen, Bergen, Norway
N-502¹Hormone Laboratory, Haukeland University Hospital, Bergen, Norway
N-502¹3KG Jebsen Center for Diabetes Research, University of Bergen, Bergen, Norway N-5021

²Department of Clinical Science, University of Bergen, Bergen, Norway
N-502¹Hormone Laboratory, Haukeland University Hospital, Bergen, Norway N-5021

³Hormone Laboratory, Haukeland University Hospital, Bergen, Norway N-5021

⁴Department of Clinical Science, University of Bergen, Bergen, Norway
N-502¹Department of Heart Disease, Haukeland University Hospital, Bergen, Norway N-5021

⁵Department of Clinical Science, University of Bergen, Bergen, Norway
N-502¹Hormone Laboratory, Haukeland University Hospital, Bergen, Norway
N-502¹KG Jebsen Center for Diabetes Research, University of Bergen, Bergen, Norway N-5021

⁶Department of Heart Disease, Haukeland University Hospital, Bergen, Norway N-5021

⁷Department of Clinical Science, University of Bergen, Bergen, Norway N-5021

⁸Department of Clinical Science, University of Bergen, Bergen, Norway
N-502¹KG Jebsen Center for Diabetes Research, University of Bergen, Bergen, Norway N-5021

⁹Department of Clinical Science, University of Bergen, Bergen, Norway
N-502¹Hormone Laboratory, Haukeland University Hospital, Bergen, Norway
N-502¹KG Jebsen Center for Diabetes Research, University of Bergen, Bergen, Norway N-5021

Introduction: Different varieties of low-carbohydrate diets have been explored in randomized controlled trials, but very few have been high in fat. In this intervention we compared effects of a very-high-fat diet (VH-FLC) with an isocaloric low-fat-diet (HCLF) for fat loss.

Methods: Thirty-eight healthy overweight men were randomized to a VHFLC (73% fat) (n = 20) or a LFHC (30% fat) (n = 18) diet for 12 weeks. The diets were isocaloric, with moderate energy restriction (2090 kcal/day) and equally balanced in protein (17%). Body composition was assessed by bioelectrical-impedance-analysis, and biochemical measures were collected at baseline, 4, 8, and 12 weeks of follow-up. Paired t-tests were used for calculating differences between baseline and 12 weeks follow-up whereas ANOVA was used for differences between groups.

Results: Both groups showed highly significant reduction from baseline to 12 weeks follow-up in most biochemical measurements and BMI (kg/m²) (VHFLC, 34.1 ± 2.4 to 30.6 ± 1.9 (p < 0.001); LFHC, 33.6 ± 3.6 to 29.9 ± 3.3 (p < 0.001)), %body-fat (34.0 ± 4.8 to 28.0 ± 5.3 (p < 0.001) and LFHC, 33.3 ± 5.4 to 26.73 ± 6.1 (p < 0.001)) and visceral adipose tissue (in cm²) (VHFLC, 196.3 ± 10.7 to 138.7 ± 6.0 (p < 0.001) and LFHC, 197.4 ± 13.4 to 141.0 ± 11.4 (p < 0.001)), whereas no significant differences between groups were found, except for total-cholesterol and LDL-cholesterol that decreased significantly only in the LFHC-group, leading to significant between-group differences (p = 0.033 and p = 0.019 respectively). Only VHFLC increased HDL cholesterol significantly (p = 0.02), but the between-group difference was not significant.

Conclusion: We found similar reductions in BMI, %body-fat and visceral adipose tissue in both groups after 12 weeks. There were no significant between-group differences in biochemical analyses except for total- and LDL-cholesterol.

T1:PO.084

Increased red blood cell membrane protein glycation induced by one-month treatment of rats with a cafeteria diet

Christian Baron, *Agnelli Silvia*, *Sofía Arriarán*, *Maria del Mar Grasa*, *José-Antonio Fernández-López*, *Xavier Remesar*, *Marià Alemany*

Dept. Nutrition and Food Sciences. University of Barcelona. Barcelona, Spain

Introduction: Protein non-enzymatic glycosylation is a consequence of glucose being an aldehyde, producing Maillard conjugates. HbA1C is currently taken as index of red blood cell (RBC) exposure to hyperglycemia, but hemoglobin is inside the cells. We assumed that membrane proteins glycosylation may constitute a better index of continued exposure to hyperglycemia. Glycosylation of RBC membrane proteins was analyzed by measuring the release of hydroxymethyl-furfural (HMF).

Methods: Adult female and male rats subjected for 28d to control or cafeteria diets were anesthetized and bled. Blood cells were centrifuged and frozen. Frozen RBC were lysed, and membranes were recovered and washed. Membranes' phospholipid-phosphate and protein were analyzed. Glycated protein was estimated measuring HMF released (with thiobarbiturate) after incubation with oxalic acid for 24h at 100°C.

Results: Plasma glucose did not change with diet. Protein and phosphate content per mg of membrane were influenced by sex and diet. The ratio HMF/phosphate was higher in females and cafeteria diet. Molar comparison of protein and HMF gave higher (significant) values for males and cafeteria: 1.4 mol HMP/mol Protein in controls versus 3.3 in cafeteria).

Conclusion: Exposure of RBC to the relative hyperglycemia of cafeteria diet resulted in several-fold increases in membrane protein glycosylation; plasma proteins showed smaller but albeit significant differences. Expression of data in molar ratios showed a high degree of glycosylation. This may result in a highly sensitive index of exposure of RBC to hyperglycemia.

T1:PO.085

Long-term effects of green tea supplementation on fecal fat and energy content, resting energy expenditure and anthropometrics

*Pilou Janssens*¹, *Rick Hursel*², *Margriet Westerterp-Plantenga*³

¹MSc

²Dr.

³Prof.

Introduction: Green tea (GT) may play a role in body weight regulation. Suggested mechanisms are decreased fat absorption and increased energy expenditure. Objective: to assess fecal energy content (FEC), fecal fat content (FFC), anthropometrics and resting energy expenditure (REE) in response to GT supplementation for 12 weeks.

Methods: Sixty subjects (BMI: 23.5 ± 4.5 kg/m², age: 28.3 ± 10.2 years) were included in a randomized, placebo-controlled design in which FFC, FEC, REE, respiratory quotient (RQ), body weight (BW), body fat% (BF%), and waist-to-hip ratio (WHR) were measured two times (at baseline, and after 12 weeks). For 12 weeks, subjects consumed either GT (250 mg/capsule [>62.5 mg epigallocatechin-gallate + >31.3 mg caffeine]) or placebo (PL) capsules (9 capsules/day). Three days before the measurements, subjects collected feces and recorded energy intake (EI).

Results: No significant differences between conditions (GT vs. PL) and no significant changes over time (baseline vs. week 12) were observed for the measured variables (Table 1).

Table 1.

	Green tea		Placebo	
	Baseline	Week12	Baseline	Week12
FEC (kJ/g)	22.6 ± 1.8	22.6 ± 1.8	23.3 ± 1.5	22.8 ± 1.6
FFC (g/day)	6.48 ± 3.00	7.47 ± 3.00	7.67 ± 3.80	7.04 ± 3.77
REE (MJ/d)	6.05 ± 1.12	6.11 ± 1.15	6.01 ± 1.29	6.06 ± 1.25
RQ	0.83 ± 0.05	0.85 ± 0.05	0.85 ± 0.07	0.82 ± 0.06
BW (kg)	67.1 ± 14.7	67.1 ± 14.9	67.2 ± 13.8	67.4 ± 14.4
BF%	29.9 ± 8.6	29.9 ± 9.1	30.0 ± 8.5	30.3 ± 8.7
WHR	0.77 ± 0.11	0.77 ± 0.10	0.73 ± 0.08	0.73 ± 0.08
Reported EI (MJ/day)	7.8 ± 2.4	7.8 ± 2.4	8.2 ± 2.1	8.2 ± 2.1
Reported fat intake (En%)	34.7 ± 5.3	34.7 ± 5.3	34.0 ± 6.7	34.0 ± 6.7

Conclusion: GT supplementation for 12 weeks did not have a significant effect on FEC, FFC, REE and RQ and may therefore not have led to changes in anthropometrics.

T1:PO.086

Effects of casein, sucrose and a non-caloric sweetener on gastrointestinal hormone release using an *ex vivo* porcine small intestinal tissue model

*Dina Ripken*¹, *Nikkie van der Wielen*², *Heleen Wortelboer*³, *Jocelijn Meijerink*⁴, *Renger Witkamp*⁴, *H Hendriks*⁵

¹Top Institute Food and Nutrition, The Netherlands; ²Netherlands Organization for Applied Scientific Research, TNO, The Netherlands; ³Division of Human nutrition Wageningen University, The Netherlands

²Top Institute Food and Nutrition, The Netherlands; ; ³Division of Human nutrition Wageningen University, The Netherlands

²Netherlands Organization for Applied Scientific Research, TNO, The Netherlands;

⁴Division of Human nutrition Wageningen University, The Netherlands

⁵Top Institute Food and Nutrition, The Netherlands; ²Netherlands Organization for Applied Scientific Research, TNO, The Netherlands

Introduction: Exposure of nutrients to enteroendocrine cells result in the release of gastrointestinal hormones, such as Glucagon-like peptide 1 (GLP-1) and Peptide YY (PYY) known biomarkers for satiation and satiety. The release of these hormones may contribute to the so called ileal brake mechanism *in vivo*. The aim of this study was to investigate the GLP-1 and PYY potential stimulating capacity of protein, carbohydrate and non-caloric sweetener on various regions of the small intestine.

Methods: An *ex vivo* small intestinal porcine model was used. This model was previously developed to screen the effect of fatty acids, using small intestinal porcine tissue¹.

Results: Casein, safflower oil and rebudioside A stimulated GLP-1 release (>200%, $p < 0.05$) from proximal and distal ileum, whereas only the highest concentration of sucrose stimulated GLP-1 release (>150%, $p < 0.05$) from the distal ileum. GLP-1 release from mid ileum was only stimulated by rebudioside A (>200%, $p < 0.05$). PYY release from distal ileum was stimulated by casein, rebudioside A and safflower oil (>200%, $p < 0.05$), but not by sucrose.

Conclusion: Casein, rebudioside A and safflower oil have potential GLP-1 and PYY inducing capacity in proximal and distal ileum, but less so in other parts of the small intestine. These nutrients may be candidates for ileal brake induction *in vivo*.

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T1:PO.087

Protein leverage effects of beef, whey and soy protein on energy intake in humans

*Martens*¹, *Tan*², *Mattes*², *Westerterp-Plantenga*¹

¹Department of Human Biology, Maastricht University, Maastricht, The Netherlands.

²Department of Nutrition Science, Purdue University, West Lafayette, IN 47905, United States.

Introduction: The ‘protein leverage hypothesis’ requires specific evidence that protein intake is regulated more strongly than energy intake. Ad libitum energy intake, body weight changes, appetite profile, and nitrogen balance were determined in response to diets differing in protein-to-carbohydrate+fat ratio, and protein source.

Methods: A series of 12-day randomized crossover studies was performed [$n = 70/67$ (m/f); age: 34 ± 17 y; BMI: 24.0 ± 3.7 kg/m²], with the use of diets containing 5, 15, and 30 percent of energy (En%) from protein, predominantly from beef, whey or soy protein. Digestible indispensable amino acid scores (DIAAS) were used to represent protein quality by the extent to which IAA are provided.

Results: The reduction in energy intake with increasing dietary protein content from 5- and 15- up to 30En% was stronger for whey or soy compared with beef ($P = 0.01$). Appetite suppression with increasing relative protein content was stronger for beef than for whey or soy ($P < 0.01$). Nitrogen balance was maintained in the 5-, and was positive in the 15- and 30En%-protein conditions ($P = 0.001$). DIAAS was sufficient to meet IAA requirements in all conditions, irrespective of protein source.

Conclusion: Complete protein leverage did not occur because a common protein level was not reached at the expense of energy intake. Subjects did under-eat relative to energy requirements from the 30En%-protein diets. Possible overeating at 5En%-protein was not necessary considering nitrogen balance or DIAAS.

T1:PO.088

The effect of red wine on fat cells

Fani Bakaliou

Aristotle University of Thessaloniki

Introduction: Moderate consumption of red wine may be an excellent way of preventing the development and may help treating obesity. The key compound is resveratrol and its metabolite piceatannol.

Methods: Scientists from Ulm University in Germany used a strain of human fat cell precursors (pre-adipocytes). They used resveratrol to feed these cells and examine their development. Additionally, researchers of Stony Brook University, fed two groups of mice a diet in which 60% of calories came from fat. One of the groups was also fed a high dose of resveratrol (24mg/kg body weight). Finally, Purdue University supplemented 25–50 μM of piceatannol on 3T3-L1 adipocytes at 24 h after initiation of adipogenesis.

Results: According to the first study, resveratrol prevented the pre-fat cell from increasing in the number and being converted into mature fat cells. It also hindered fat storage. The second study showed that resveratrol did not stop the mice from putting on weight and growing as tubby as the other group of mice, however they lived longer and more active lives despite eating high fat diet. Resveratrol is mimicking the effect of calorie restriction diet which enlarges the lifespan of many animals, probably human as well. Purdue University proved that piceatannol inhibits antipogenesis of 3T3-L1 adipocytes, in an early phase and in a dose dependent manner.

Conclusion: Resveratrol and piceatannol have anti-obesity properties by exerting its effect directly on of fat cells. Thus, resveratrol and piceatannol may help prevent the development of obesity or might be suited to treat obesity.

T1:PO.089

The epigallocatechin-gallate (EGCG) improved the obesity by increasing hepatic mitochondrial activity in mice treated with high fat diet

Santamarina¹, Santana¹, Mennitti¹, Silva¹, Carnier¹, Lira², Gomes³, Carvalho-Silva³, Streck³, Ribeiro¹, Oller do Nascimento¹, Oyama¹

¹Universidade Federal de Sao Paulo

²Universidade Estadual Paulista

³Universidade do Extremo Sul Catarinense

Introduction: High fat diet promotes mitochondrial dysfunction and increase ectopic fat accumulation that contribute to insulin resistance. Green tea is widely consumed and has been described as an anti-oxidant and insulin-sensitizing agent. The most abundant catechin found in green tea is epigallocatechin-3-gallate (EGCG), which has been suggested to be responsible for many of the potential health effects of the tea.

Methods: We investigated the effects of green tea catechins (50 mg/kg, gavage) on metabolic effects of sixteen weeks treatment of HFD (30% lard) in male Swiss mice. Groups: control diet+tap water (CW) or EGCG (CE); HFD+tap water (HW) or EGCG (HE). Diet and water were provided *ad libitum*. After overnight fasting, mice were sacrificed and serum was analyzed for glucose and insulin levels. Liver fat deposition was analyzed by HE staining. Activities of mitochondrial respiratory chain (Complex I, II-III and IV) and malate dehydrogenase enzymes were analyzed in the liver.

Results: High fat diet promoted an increase in body weight gain, retroperitoneal adipose tissue relative weight, HOMA-IR, insulin level, complex II-III and IV and malate dehydrogenase activities and liver fat deposition. However, when associated with EGCG, the high fat diet decreased body weight gain, retroperitoneal adipose tissue relative weight, HOMA-IR, insulin level, liver fat depot and increased complex I, II-III and IV and malate dehydrogenase activities.

Conclusion: Our results suggest that the green tea improve insulin sensitive and obesity partially by increasing liver mitochondrial activity and fat oxidation.

T1 – Peptides and hormones

T1:PO.090

Leptin is essential for the response to acute central insulin administration on hepatic glycogen synthesis

Vicente Barrios¹, Emma Burgos-Ramos², Sandra Canelles¹, Amaia Rodríguez³, Javier Gómez-Ambrosi³, Julie Ann Chowen¹, Gema Frühbeck³, Jesús Argente¹

¹Department of Endocrinology, Hospital Infantil Universitario Niño Jesús and CIBERobn

²StemCells and CancerGroup, Molecular Pathology Programme, Centro Nacional de Investigaciones Oncológicas

³Metabolic Research Laboratory, Clínica Universidad de Navarra and CIBERobn

Introduction: Leptin has a profound influence on hepatic carbohydrate metabolism and some of these effects are due to modulation of the insulin response in diverse tissues. However, how central leptin and insulin signaling interact to modulate hepatic insulin signaling and glycogen synthesis remains unknown. We hypothesized that central insulin and leptin signaling interact to affect hepatic glucose metabolism. Thus, we studied how central leptin infusion modulates the effect of acute icv insulin administration on hepatic insulin signaling and glycogen levels.

Methods: Thirty-six male rats were divided into control (C), icv leptin infusion (12 µg/day) for 14 days (L) and pair-fed (PF) groups and treated with vehicle or a icv dose of 10 mU of insulin (CI, PFI and LI, respectively), being sacrificed 2 hours later. We measured the hepatic levels of GLUT2, SHP-1 and activation of JAK2 by Western blot, as well as the

interaction of SOCS3 with insulin receptor (IR) after immunoprecipitation. Phosphorylation of IRS1, Akt and GSK3β on Ser9 was determined by multiplexed bead immunoassay. Glycogen levels were measured by a colorimetric method.

Results: GLUT2 levels and phosphorylation of JAK2, Akt and GSK3β were increased in LI with respect to CI and PFI. Association of SOCS3 with IR was reduced in LI compared to CI and PFI, whereas SHP-1 levels were lower in L than in C and PF. Glycogen levels were increased in LI compared with the other groups.

Conclusion: Chronic central leptin infusion increases the hepatic response to a rise in central insulin levels.

T1:PO.091

Longitudinal changes in peripheral neurotransmitters levels after dietary restriction in subjects suffering from metabolic syndrome

Aurora Perez-Cornago¹, Maria J Ramirez², Miguel Angel Martinez-Gonzalez³, M Angeles Zulet⁴, J Alfredo Martinez⁴

¹Department of Nutrition, Food Science and Physiology. University of Navarra, Pamplona, Spain

²Department of Pharmacology and Toxicology, University of Navarra, Pamplona, Spain

³Department of Preventive Medicine and Public Health. University of Navarra, Pamplona, Spain CIBERobn, Physiopathology of Obesity and Nutrition. Carlos III Health Research Institute, Madrid, Spain

⁴Department of Nutrition, Food Science and Physiology. University of Navarra, Pamplona, Spain CIBERobn, Physiopathology of Obesity and Nutrition. Carlos III Health Research Institute, Madrid, Spain

Introduction: Reduced circulating neurotransmitters may have a role in the development of the metabolic syndrome (MetS), which is becoming a major health problem worldwide. This investigation aimed to examine the effect of a weight loss intervention on peripheral neurotransmitters levels in subjects with MetS.

Methods: The study population encompassed women (n = 25) and men (n = 37) with MetS according to IDF criteria (Age: 50 ± 10 y; BMI: 35.8 ± 4.3 kg/m²) selected from the RESMENA study after they completed the 6-months weight loss intervention (−30% of daily energy requirements). Anthropometric parameters, dietary records, as well as blood neurotransmitters levels (dopamine, serotonin and noradrenaline) determined by HPLC with fluorescence detection, were analysed before and after the 6-month-long study.

Results: Dopamine (+18.2%; p = 0.046) and serotonin (+16.1%; p = 0.020) blood levels significantly increased at the end of the study, while no changes in peripheral noradrenaline levels were found. Higher dopamine blood concentrations at the end of the study were inversely related with the carbohydrate intake during the intervention (B = −3.26; p = 0.045). Moreover, those subjects presenting higher serotonin levels after the weight loss intervention also showed a lower caloric intake during the treatment (B = −0.04; p = 0.025).

Conclusion: This study evidenced an increase in serotonin and dopamine blood levels after the weight loss treatment in patients with MetS, being this increase related with lower caloric and carbohydrate intakes, respectively.

T1:PO.092

Melanocortin's role in the adipocyte lipid metabolism

Adriana Rodrigues, Henrique Almeida, Alexandra Gouveia

Faculty of Medicine from University of Porto

Introduction: Melanocortin peptides are well recognized by their anorexigenic role promoting fat mobilization and weight loss. However, their role at the adipocyte was poorly investigated and constitutes the main aim of the current work.

Methods: The melanocortin effects on 3T3-L1 adipocytes were evaluated by measuring lipolytic rate through glycerol, nonesterified fatty-acids (NEFA) and triglyceride quantification. The specific role of MC5R was defined by using small interference RNA. The signaling mechanisms regulating lipolysis and fatty-acid biosynthesis were studied by immunofluorescence and western-blotting. Fatty-acid re-esterification was evaluated by quantifying the activity of phosphoenolpyruvate carboxykinase (PEPCK). Real-time PCR was employed to determine transcriptional alterations on adipocytes mediated by melanocortins.

Results: These studies demonstrated that the melanocortin effects on 3T3-L1 adipocytes are conveyed through MC5R. MC5R activation promotes lipolysis and impairs fatty acids re-esterification by glyceroneogenesis. The lipolytic effect is mediated by cAMP/PKA pathway and involves the activation of the HSL, ATGL and perilipins whereas the blockage on fatty acids re-esterification occurs through an ERK1/2-dependent inhibition of PEPCK activity. Moreover, melanocortins was shown to increase UCP-1 and decrease resistin gene expression. These results suggest that melanocortins induce transcriptional changes on adipocytes in order to acquire a brown-like genotype.

Conclusion: Altogether these results clearly uncover a key role for alpha-MSH/MC5R in adipocyte lipid metabolism: it promotes lipolysis, impairs fatty-acids re-esterification and changes adipocytes reprogramming to a brown-like genotype. These data offer new perspectives for the modulation of adipocyte physiology, a promising issue for future design of new drugs to combat obesity.

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T1:PO.093

Desacyl-Ghrelin does not influence Insulin sensitivity

Lúisa Veiga¹, Miguel Brito¹, Ana Oliveira¹, Carina Fortes¹, José Silva-Nunes²

¹ESTeSL

²ESTeSL Curry Cabral Hospital Endocrinology Department

Introduction: Ghrelin has two known forms of circulating hormone: the acylated (acyl-ghrelin – AG) and the desacylated (desacyl-ghrelin – DAG) forms. AG has been reported to increase food intake and adiposity, whereas DAG has been associated with amelioration in carbohydrate metabolism, namely through an increase in insulin sensitivity.

The aims of this study were to compare DAG between lean and obese patients and to evaluate the influence of DAG on insulin sensitivity.

Methods: We studied 223 obese (age=34.5 ± 8.2 years, BMI=42.0 ± 7.8 Kg/m²) and 95 lean (age=34.2 ± 8.4 years, BMI=21.4 ± 1.7 Kg/m²) premenopausal Caucasian women. No known disease condition other than obesity (in the obese group) was diagnosed and they were under no medication scheme (except for oral contraceptives). DAG, glucose and insulin levels were assessed at the fasting state. Insulin resistance was determined by model assessment (HOMA-IR). We compared the parameters studied between groups. In each group, we assessed for correlation between DAG and age, BMI, glycemia and HOMA-IR.

Results: No difference in age was present between groups, whereas BMI, glycemia and HOMA-IR were significantly higher in the obese group ($p < 0.001$ for all). Mean DAG levels were significantly lower in the obese group (221.2 ± 149.0 vs 350.2 ± 251.9 pg/ml; $p < 0.001$). However, considering obese and lean group separately, no direct correlation was present between DAG and age, BMI, glycemia or HOMA-IR.

Conclusion: These results suggest that although obese patients present lower levels of DAG, it does not exert influence on insulin sensitivity.

T1:PO.094

Latent effects of exercise on circulating acylated ghrelin, leptin and perceived appetite

James King, Benjamin Kelly, Andrew Jackson, Myra Nimmo

Loughborough University

Introduction: Single bouts of exercise do not cause compensatory appetite regulatory responses on the day that exercise is performed. Counter-regulatory responses may occur however over a greater time period. This study assessed the impact of a large exercise-induced energy deficit on appetite perceptions and key appetite regulatory hormones on the day following a single bout of exercise.

Methods: Nine healthy males (age 22 ± 3.7 y, BMI 22.6 ± 1.8 kg·m⁻²; mean ± SD) completed two, two-day experimental trials (exercise and control) in a randomised-counterbalanced fashion. On day one participants remained sedentary except between 10:30–12:00 during the exercise trial whereby participants ran on a treadmill at ~70% of their VO₂max. On day two circulating gut hormone (acylated ghrelin & leptin) and appetite responses (hunger, fullness, satisfaction, prospective consumption) were examined repeatedly over seven hours in response to two standardised meal tests (breakfast 08:00 and lunch 12:00). Diet was standardised across exercise and control trials.

Results: On the day after exercise (net energy expenditure 4908 ± 523 kJ) the diurnal leptin profile was markedly suppressed compared with control (two-way ANOVA, trial effect $P = 0.016$). Additionally, exercise attenuated the pre-lunch rise in plasma acylated ghrelin concentration (two-way ANOVA, interaction effect $P = 0.009$). Exercise had no impact on subjective appetite perceptions.

Conclusion: Large exercise-induced energy deficits perturb key components of the neuro-endocrine appetite regulatory system which first manifest on the day after exercise. Paradoxically, no conscious recognition of this energy deficit occurs within this period.

T1:PO.095

Differential effects of peripheral Acylated and Desacylated Ghrelin administration on mitochondrial function and reactive oxygen species (ROS) generation in rat skeletal muscle

Gortan Cappellari¹, Semolic¹, Zanetti¹, Ruozzi², Guarnieri¹, Giacca², Barazzoni¹

¹Dept of Medical, Surgical and Health Sciences, University of Trieste, Italy

²Molecular Medicine Lab, International Center for Genetics, Engineering and Biotechnology, Trieste, Italy

Introduction: Skeletal muscle substrate oxidation and reactive oxygen species (ROS) generation are important regulators of intermediate metabolism and may contribute to modulate insulin action. Ghrelin is a gastric orexigenic hormone whose acylated form (AG) is reportedly involved in regulating muscle mitochondrial oxidative capacity. Desacylated ghrelin (DG) has no orexigenic effects and is associated with improved insulin sensitivity in humans, but its potential involvement in the regulation of intermediate metabolism remains undefined.

Methods: Skeletal muscle ATP production and complex-dependent substrate oxidation, as well as mitochondrial and non-mitochondrial ROS generation were measured in 12-week-old male Wistar rats treated with saline (S), AG (AG) or DG (DG) for four days (twice-a-day 200 µg s.c. hormone injection).

Results: Compared to S, AG had higher ($P < 0.05$) mitochondrial ATP production rates, with unchanged mitochondrial and non-mitochondrial ROS generation. In contrast, DG lowered ROS generation from mitochondria and cytoplasmic nitric oxide synthase, associated with lower oxidized-to-total tissue glutathione (all $P < 0.05$). This effect was associated with lower mitochondrial ATP production ($P < 0.05$) but with preferential activation of glucose-associated complex I-dependent oxidative metabolism.

Conclusion: Enhanced mitochondrial function characterizes sustained AG administration, in the absence of changes in ROS generation and

redox state. DG independently lowers mitochondrial and non-mitochondrial ROS production and improves tissue redox balance, associated with lower mitochondrial ATP production. The current results suggest relevant independent roles of AG and DG in the regulation of muscle oxidative metabolism. The novel effects of DG could contribute to its reported association with insulin sensitivity in humans.

T1:PO.096

The effects of alginates on the appetite and weight in obese rats

Teodora Handjieva-Darlenska, Nadka Boyadjieva

Department of pharmacology and toxicology, Medical Faculty, Medical University, Sofia, Bulgaria

Introduction: Obesity continues to grow steadily despite of the numerous efforts to prevent and fight it. Food supplements containing alginate acid is an approved pharmacological treatment of obesity. However, the effect of such supplements on the appetite regulation and metabolism is still unknown. Thus, the aim of our study was to investigate possible effect of alginates on appetite hormones such as ghrelin and leptin in obese **Methods:** Male Wistar rats (n = 30) were randomly assigned to two different groups: 1st group – control (on a chow food) and 2nd group – experimental (on a high-fat diet). The nutritional period consisted of 2 months. The high-fat group increased their body weight in comparison with the control group. Then, the obese rats (n = 15) were put either on a food supplement with alginate acid or only on a high-fat diet. At the end of the study, rats were anaesthetized and killed. Blood specimens were taken for further biochemical analyses. Plasma ghrelin and leptin concentrations were examined by ELISA methodology.

Results: High-fat diet led to the development of obesity in male Wistar rats. The group treated with alginate acid showed a significant reduction of body weight and adiposity. Moreover, there were changes in the blood levels of ghrelin and leptin between those treated with/ without alginates.

Conclusion: The beneficial effect of alginates on ghrelin could be possibly explained by its mechanical effect of the stomach mucosa, and thus on the ghrelin secretion.

T1:PO.097

Links between insulin sensitivity indices and adipocyte expression of adrenergic receptor subtypes in humans

Gabriella Garruti¹, Arianna Rotondo¹, Christian Napoli², Vittorio Giusti³, Christian Darimont⁴, Valentina Ricchiuti¹, Chantal Verdumo³, Susanna Cotecchia⁵, Francesco Giorgino⁶

¹Section of Internal Medicine, Endocrinology, Andrology and Metabolic Diseases, D.E.T.O., University of Bari "Aldo Moro", Italy

²Section of Hygiene D.I.M.O., University of Bari "Aldo Moro", Italy

³Dept. of Internal Medicine, CHUV, Lausanne, Switzerland

⁴Nestlé Research Center, Lausanne, Switzerland

⁵Departments of Pharmacology and Toxicology, University of Lausanne

⁶Section of Internal Medicine, Endocrinology, Andrology and Metabolic Diseases, D.E.T.O., University of Bari "Aldo Moro", Italy

Introduction: In human subcutaneous (HSAT) and visceral fat (HVAT) biopsies taken from severely obese subjects and in a human pre-adipocyte cell line we analyzed the expression levels of different adrenergic receptor (AR) subtypes (α 1A-, α 1B-, α 1D, α 2A-, β 1-, β 2-, β 3-AR) and their correlations with anthropometric and metabolic indexes including the Visceral Adiposity index (VAI), a sex-specific mathematical index that correlates with insulin resistance.

Methods: The expression levels of AR subtypes and two adipocyte differentiation markers (adipocyte fatty acid binding protein and adipisin) were assessed and quantified by real-time RT-PCR.

Results: In human pre-adipocytes, all AR subtypes except for β 3-AR were expressed from day 6 of differentiation. At day 17, β 3-AR appeared in both non-stimulated and rosiglitazone-treated pre-adipocytes. At day

17, the expression of adipocyte differentiation markers and a robust increase in β 2-AR expression were observed in rosiglitazone-treated cells only. In fat biopsies, both β 2- and α 2A-AR were expressed at higher levels in HSAT than HVAT, but other AR subtypes were expressed at similar levels in both fat depots. VAI showed a positive linear correlation with the expression levels of α 1A-AR in HSAT only.

Conclusion: Adipocyte differentiation markers appear simultaneously with the increase in β 2-AR. The balance between the pro-lipolytic β 2-AR and anti-lipolytic α 2A-AR may play a regulatory role either in fat accumulation or adipocyte differentiation. The correlation between VAI and α 1A-AR expression levels in HSAT suggests an inverse link between the latter and insulin sensitivity.

T1:PO.098

Serum TSH levels and nutritional status in elderly population – the results from PolSenior substudy

Katarzyna Wyskida¹, Wojciech Krupa², Patrycja Obirek², Aleksander Owczarek³, Ewa Bar-Andziak⁴, Andrzej Milewicz⁵, Diana Jędrzejuk⁵, Anna Arkowska⁵, Urszula Mieszczanowska⁵, Barbara Krzyżanowska-Świniarska⁶, Andrzej Więcek⁷, Magdalena Olszanecka-Glinianowicz¹, Jerzy Chudek⁸

¹Health Promotion and Obesity Management Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

²Student Scientific Association, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

³Division of Statistics, Department of Instrumental Analysis, Medical University of Silesia, Katowice, Poland

⁴Department of Internal Diseases and Endocrinology, Warsaw Medical University, Warszawa, Poland

⁵Department of Endocrinology, Diabetology and Isotope Therapy, Medical University in Wrocław, Poland

⁶Department of Hypertensiology and Internal Disease, Pomeranian Medical University, Szczecin, Poland

⁷Department of Nephrology, Endocrinology and Metabolic Diseases, Medical University of Silesia, Katowice, Poland

⁸Pathophysiology Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

Introduction: The results of published studies indicate that adipokines, especially leptin, stimulates TSH release in the pituitary gland and may be the cause of subclinical hypothyroidism overdiagnosis. Therefore, the aim of the study was to assess the TSH and fT4 levels depending to nutritional status in a large population-based elderly cohort.

Methods: The analysis included 3092 (513 aged 55–59 yrs. and 2579 aged 65 yrs. and over) participants of PolSenior study. Subjects diagnosed with heart failure, chronic kidney disease (4 and 5 stage), cancers, malnutrition and underweight (BMI <18.5 kg/m²) were excluded. Serum TSH and fT4 were measured, and nutritional status was assessed.

Results: Serum TSH but not fT4 levels were dependent on nutritional status. Serum TSH concentrations increase slightly but statistically with increasing BMI [1.92 (1.79–2.06) in normal weight, 2.25 (2.01–2.48) in overweight, 2.28 (2.11–2.44) in obese and 2.55 (2.06–3.04) μ U/ml in morbid obesity]. However, correlation between BMI and TSH levels was not statistically significant (r = 0.32; p = 0.08).

Conclusion: Overweight and obesity (excluding morbid obesity) slightly influence on circulating TSH levels in elderly subjects.

T1:PO.99

The effects of alginates on appetite and weight in obese rats

Handjieva-Darlenska, Boyadjieva

Department of pharmacology and toxicology, Medical Faculty, Medical University, Sofia, Bulgaria

Introduction: Obesity continues to grow steadily despite of the numerous efforts to prevent and fight it. Food supplements containing alginate acid is an approved pharmacological treatment of obesity. However, the

effect of such supplements on the appetite regulation and metabolism is still unknown. Thus, the aim of our study was to investigate possible effect of alginates on appetite hormones such as ghrelin and leptin in obese male rats.

Methods: Male Wistar rats (n = 30) were randomly assigned to two different groups: 1st group – control (on a chow food) and 2nd group – experimental (on a high-fat diet). The nutritional period consisted of 2 months. Diet-induced obesity was developed. Then, the obese rats were put either on a food supplement with alginate acid or only on a high-fat diet. At the end of the study, rats were anaesthetized and decapitated. Blood specimens were taken for further biochemical analyses. Plasma ghrelin and leptin concentrations were examined by ELISA methodology.

Results: High-fat diet led to the development of obesity in male Wistar rats. The group treated with alginate acid showed a significant reduction of body weight and adiposity. Moreover, there were changes in the blood levels of ghrelin and leptin between those treated with/ without alginates.

Conclusion: Food supplements containing alginate acid have beneficial effect on weight and reduce adiposity. Their possible effect on appetite hormone ghrelin could be explained by their mechanical effect on the stomach mucosa, and thus on its secretion.

T1:PO.100

Plasma irisin depletion under energy restriction is associated with improvements in lipid profile in metabolic syndrome patients

Rocio de la Iglesia¹, Patricia Lopez-Legarrea¹, Ana Belen Crujeiras², Maria Pardo³, M Angeles Zulet⁴, J Alfredo Martinez⁴, Felipe Casanueva³

¹Department of Nutrition, Food Science and Physiology, University of Navarra, Pamplona, Spain

²CIBERobn, Carlos III Health Institute, Madrid, Spain Laboratory of Molecular and Cellular Endocrinology, Complejo Hospitalario Universitario de Santiago and Santiago de Compostela University. Cancer Epigenetics and Biology Program, Barcelona, Spain

³CIBERobn, Carlos III Health Institute, Madrid, Spain Laboratory of Molecular and Cellular Endocrinology, Complejo Hospitalario Universitario de Santiago and Santiago de Compostela University, Spain

⁴Department of Nutrition, Food Science and Physiology, University of Navarra, Pamplona, Spain CIBERobn, Physiopathology of Obesity and Nutrition. Carlos III Health Institute, Madrid, Spain

Introduction: Irisin is a novel myokine that has received much attention because it has been hypothesized to have an important role in fuel metabolism. The aim of the current research was to study the relationships between the lipid profile of patients with Metabolic Syndrome (MetS) under an energy-restricted programme and plasma levels of this hormone.

Methods: MetS subjects (n = 84, 49 ± 10 y.o, BMI 36.1 ± 4.6 kg/m², 56% men) who followed an 8-week hypocaloric regimen (–30% of the energy requirements), were enrolled in the present study. Anthropometric, biochemical and plasma irisin data were assessed using validated procedures at the beginning and at the end of the dietary intervention.

Results: Most anthropometric and biochemical parameters were improved at the end of the study. Plasma irisin levels were significantly lowered (–20.0%, p < 0.001) paralleling the weight loss (–7.0 ± 3.0 kg) after the nutritional intervention. The irisin reduction positively correlated with the variation of some lipid profile variables, such as total cholesterol (p = 0.018), total cholesterol/high density lipoprotein-cholesterol ratio (p = 0.036), low density lipoprotein-cholesterol (p = 0.037) and apolipoprotein B (p = 0.002), regardless the weight loss.

Conclusion: This study revealed important relationships between the decrease in irisin levels and the reductions in atherogenic-related variables in patients with MetS following a controlled hypocaloric diet.

T1:PO.101

Corticosterone promotes weight gain in mice KO for CBG and a trend to weight loss in WT whereas both experience a parallel increase in food intake

Ledda, Gulfo, Esteve, Grasa

Department of Nutrition and Food Sciences, Faculty of Biology, University of Barcelona CIBER Obesity and Nutrition, ISCIII, Spain

Introduction: Glucocorticoids are implicated in the etiology of obesity and participate in the body weight regulation. Recent scientific evidences suggest that corticosteroid-binding globulin (CBG), the corticosteroid-carrier in blood, may have an active role modulating the action of glucocorticoids. Our aim was to compare the effects of corticosterone in mice KO for CBG in order to unravel the CBG role modulating corticosterone action.

Methods: Pellets containing 10mg of corticosterone (treated) or not (control) were implanted subcutaneously to 6 months old male mice KO for CBG and WT. Body weight and food intake were recorded. After 20 days, mice were sacrificed, tissues weighted and blood collected. Three days before, an oral glucose tolerance test was performed.

Results: Body weight of treated KO was higher than the weight of KO control and WT treated mice. No differences were observed between KO and WT control. A trend to diminish body weight was observed in WT-treated when comparing with control. Both treated groups of mice shared similar food intake levels that were higher in overall than those observed in both control groups. As a consequence, efficiency was negative in WT and positive in KO-treated mice. All adipose depots showed a trend to diminish in WT-treated mice and to maintain or increase in KO-treated. KO mice were more resistant to insulin than WT, without differences due to corticosterone treatment.

Conclusion: Lack of CBG didn't alter the increase of food intake elicited by corticosterone but entailed an increase in body weight not observed in presence of CBG.

T1:PO.102

Correlation of energetic status and glucose metabolism in an obese Gottingen minipig

Idoia Díaz-Güemes Martín-Portugués¹, Laura Hernández Hurtado¹, Francisco Sánchez-Margallo¹, Juan Maestre-Antequera¹, Javier Casado¹, Ana María Matos-Azevedo¹, Jose Luis De la Cruz Vigo²

¹Minimally Invasive Surgery Centre Jesús Usón. (Cáceres. Spain)

²Clinica San Francisco (León. Spain)

Introduction: The objective is to evaluate the associations between variables representing energy state and glucose metabolism in obese Gottingen minipig.

Methods: 13 obese Gottingen minipigs were included in this study. The obesity was developed after 9 months of feeding with high-fat diet. Then their energetic status was assessed by measuring subcutaneous (SAT), visceral (VAT) and total (TAT) fat by MRI in two anatomic sites (T13-L2 and L4-L5). In addition, body weight and body circumferences, and fasting plasmatic concentration of glucose, insulin, leptin, cholesterol (total and fractions) and triglycerids were obtained. Pearson's correlation coefficient was calculated for each pair of variables.

Results: The two sampling areas for SAT (r=896, p = 0.001) and TAT (r=896, p = 0.001) were highly correlated, but not for VAT (r = 0.060, p = 0.845). When these variables were compared with the rest, only fasting glucose was highly correlated with VAT at anatomic sites L4-L5 (r = 0.751, p = 0.005). Leptin was correlated negatively with body weight (r = – 0.773, p = 0.002), and neck (r = – 0.684, p = 0.010) and abdominal circumference (r = – 0.689, p = 0.009) whereas adiponectin was not associated with any of the studied variables.

Conclusion: Both study areas (lumbar or thoracic) seemed to be interchangeable to quantify SAT and TAT, but not for VAT. In addition, considering the positive correlation observed in the lumbar area of study between fasting glucose and VAT, we would recommend measuring the VAT from this area, instead of thoracic area.

T1:PO.103

Gut microbiota, zonulin and incretin axis activity in obese and normal weight subjects

Piotr Kocelak¹, Agnieszka Żak-Gołąb², Małgorzata Aptekorz³, Maria Zientara³, Gayane Martirosian³, Jerzy Chudek², Magdalena Olszanecka-Glinianowicz¹

¹Health Promotion and Obesity Management Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland, University of Silesia, Katowice, Poland

²Pathophysiology Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland, University of Silesia, Katowice, Poland

³Department of Medical Microbiology, Medical University of Silesia, Katowice, Poland University of Silesia, Katowice, Poland

Introduction: Dysfunction of incretin axis in obese is considered as the important cause of decreased postprandial insulin secretion and satiety sensation. Changes of gut microbiota composition and the local inflammation are potential factors that impairs incretin axis activity. The aim of the study was an assessment of circulating glucagon-like peptide-1 (GLP-1) and gastric inhibitory peptide (GIP) in relation to gut microbiota composition and zonulin (marker of intestinal permeability) in obese and normal weight subjects.

Methods: Fasting circulating GLP-1, GIP and zonulin levels were measured in addition to semi-quantitative analysis of gut microbiota composition in 50 obese and 30 normal weight subjects without concomitant diseases.

Results: A bacterial colony count did not differ between groups. Higher plasma zonulin levels were found in the obese subjects [8.2 (7.1–8.4) vs. 5.4 (4.8–6.8) pg/ml]. There were no differences in fasting GLP-1 and GIP between obese and normal weight groups [1.2 (1.0–1.4) vs. 1.2 (1.0–1.4) and 3.0 (2.4–4.0) vs. 3.3 (2.7–3.9), respectively]. No correlation between GLP-1 or GIP and zonulin levels and gut microbiota composition was shown.

Conclusion: Fasting levels of incretin axis hormones are not associated with gut microbiota composition and zonulin levels.

T1:PO.104

Adipokines in the regulation of carbohydrate and lipid metabolism in patients with obesity

Tatyana Sentsova, Olga Kirillova, Ilya Vorozhko, Kamilla Gapparova, Yulya Chekhonina

Institute of Nutrition RAMS

Introduction: Has been argued that obesity revealed an imbalance in the synthesis of adipokines, which exacerbates metabolic disorders.

Methods: The study involved 90 patients aged 18 to 66 years. Diagnosis of obesity was based on body mass index (BMI). Thirty-one patients had 1st grade of obesity (BMI=30–35 kg/m²), 25 patients – 2nd grade (BMI=36–40 kg/m²), and 34 patients had 3rd grade of obesity (BMI>40 kg/m²). The content of adipokines and oxidized low-density lipoprotein (oxLDL) examined by ELISA. Serum lipid and carbohydrate status was examined by turbidimetric method on spectrophotometer analyzer Kon-elab 60i.

Results: We identified that obese patients have imbalance in the content of adipokines. Patients with 1st obese had statistically significant ($p < 0.05$) decrease of adiponectin ($5,94 \pm 0,90$ mkg/ml vs $15,34 \pm 0,45$ mkg/ml) and ghrelin ($215,50 \pm 10,45$ pg/ml vs $540,67 \pm 0,76$ pg/ml) in serum compared with the control group, the content of resistin was above normal values ($7,34 \pm 0,12$ ng/ml vs $5,12 \pm 0,22$ ng/ml, $p < 0,05$). There was an inverse correlation between the content of adiponectin, ghrelin and BMI in overweight patients. The study of character the relationship between the concentrations of adipokines and lipids have shown an inverse correlation of adiponectin concentration and triglyceride levels, low-density lipoprotein (LDL), cholesterol, oxLDL. Adipokines Induce of insulin resistance that exercise as increasing concentrations of glucose, insulin in obese patients rather than in the control group.

Conclusion: Integrated approach to the assessment of metabolic abnormalities and synthesis of adipokines in obesity can optimize diagnosis of insulin resistance and cardiovascular diseases as well as personalize diet therapy.

TRACK 5 – Clinical Management and Translation

T5 – Guided Posters

T5:PO.001

Bioactive components of *Camellia sinensis* fruit peel ameliorates obesity induced by high-fat diet in rats

Jyoti Bhardwaj¹, Narendra Chaudhary¹, Hyo Jin Seo¹, Min Yong KIM², Tai Sun Shin³, Jong Deog KIM⁴

¹Department of Biotechnology, Chonnam National University, Yeosu, Korea, South

²Research center on Anti-Obesity and Health Care, Chonnam National University, Yeosu, Korea, South

³Department of Food Science and Nutrition, Chonnam National University, Yeosu, Korea, South

⁴Department of Biotechnology, Research center on Anti-Obesity and Health Care, Chonnam National University, Yeosu, Korea, South

Introduction: Tea fruit peel is the main by-product of tea manufacturing industry that contains phenols with high antioxidant activities. The present study was conducted to examine the bioactive components of green tea fruit peel extract (PE) against angiogenesis and obesity.

Methods: Tea fruit peel extract was fractionated by preparative HPLC to investigate the bioactive constituents of PE on the basis of angiogenesis assay. Further, we investigated the effect of PE on adipogenesis, gene expression levels in 3T3-L1 adipocyte and on body weight gain and adiposity in rats fed high-fat diet.

Results: Bioactive components of PE that contributed to significant anti-angiogenesis and anti-adipogenesis effect were epigallocatechin gallate (EGCG), epigallocatechin (EGC) and saponin glycosides. Administration of PE (100 mg/kg/d) significantly decreased the body weight in rats fed high-fat diet (HFD) whereas the food intakes between HFD and PE treatment groups were not significantly different. White adipose tissue fat-pad weights were markedly reduced in rats fed HFD plus PE compared to those in HFD group. Tea fruit peel significantly lowered serum cholesterol and expression of PPAR γ , CEBP α and SREBP, the key transcription factors in adipogenesis and lipogenesis.

Conclusion: These results showed the potential of green tea fruit peel extract in preventing angiogenesis and obesity.

T5:PO.002

Effect of alpha-lipoic acid supplementation on anthropometric indices, food intake, hs-CRP, IL-6, and hypertension in male patients with spinal cord injury

Shahryar Eghtesadi¹, Vida Mohammadi², Shima jazayeri³, Hooshang Saberi⁴, Mahmoud Reza Gohari⁵, Mohamad Khalili¹, Maryam Eghtesadi⁶

¹Iran University of Medical Sciences, School of Public Health, Tehran, Iran

²Iran University of Medical Sciences, School of Public Health, Tehran, Iran

³Iran University of Medical Sciences, School of Public Health, Tehran, Iran

⁴Tehran University of Medical Sciences, Brain and Spinal Injury Research Center, Tehran, Iran

⁵Iran University of Medical Sciences, School of Management and Bioinformatics, Tehran, Iran

⁶Azad University, School of Medicine, Tehran, Iran

Introduction: Weight gain, changes in body composition and the increasing risk of chronic diseases are the complications of the spinal cord injury.

Present study investigated the effects of supplementation with alpha – lipoic acid on anthropometric parameters, dietary intake, blood pressure, hs-CRP and IL6 in men with chronic spinal cord injury.

Methods: This study is a randomized, double-blind, placebo-controlled clinical trial. Following approval by University Ethics Committee for Human Studies fifty-eight men with chronic spinal cord injury were divided into two groups who received 600 mg of supplemental alpha – lipoic acid (n = 28) or placebo (n = 30). The duration of intervention was 12 weeks. At the beginning and the end of the study, IL-6 and hs-CRP were measured by ELISA and turbidimetry methods, respectively. Weight, height, knee height and waist circumference were measured. Food intakes were collected by 24 h food recall. Dietary intakes and other data were processed by N4 and SPSS16 softwares respectively.

Results: At the end of the study no significant changes were observed in IL-6 and hs-CRP levels. Significant changes were observed in mean weight, BMI, waist circumference, systolic and diastolic blood pressure, energy, carbohydrate, protein and fat intakes (P < 0.05). No significant changes were observed in micronutrients intake (vitamins E, C, A., selenium and zinc).

Conclusions: Alpha-lipoic acid supplementation reduces anthropometric indices, blood pressure and dietary intake in male patients with chronic spinal cord injury. .

T5:PO.003

Molecular mechanisms underlying the anti-hyperlipidemic and fat pad lowering effect of saponin from *Camellia sinensis* in mice fed high-fat and high-carbohydrate diet

Narendra Chaudhary¹, Jyoti Bhardwaj¹, Hyo Jin Seo¹, Min Yong KIM², Tai Sun Shin³, Jong Deog KIM⁴

¹Department of Biotechnology, Chonnam National University, Yeosu, Korea, South

²Research center on Anti-Obesity and Health Care, Chonnam National University, Yeosu, Korea, South

³Department of Food Science and Nutrition, Chonnam National University, Yeosu, Korea, South

⁴Department of Biotechnology, Research center on Anti-Obesity and Health Care, Chonnam National University, Yeosu, Korea, South

Introduction: Obesity is a complex, multi-factorial metabolic disorder that requires long term management. Obesity results from the excessive growth and expansion of adipose tissue due to an imbalance between energy intake and expenditure.

Methods: ICR mice were fed with high-fat diet and high-carbohydrate diet and saponin was administered orally for 10 weeks. After completion of treatment period, changes in serum biochemical parameters, cytokine levels and expression levels of genes related to adipogenesis and lipogenesis were measured.

Results: Saponin significantly lowered the body weight gain, body fat-pad weights, blood lipid, glucose, insulin, and leptin levels of mice fed high-fat diet and high-carbohydrate diet. Saponin suppressed the expression of important adipogenic genes (PPAR γ , C/EBP α , SREBP, LPL, aP2 and leptin) and lipid metabolism genes (ACC, GPAT, FAS and MLYCD). Furthermore, saponin induced the levels of adiponectin in serum and adipose tissue, as well as AMP-activated protein kinase (AMPK) in liver tissue.

Conclusion: Our finding demonstrated that saponins are beneficial for suppressing excessive body weight gain prevalence to diets, improving hyperlipidemia and hyperglycemia and reducing the expression levels of genes related to adipogenesis and lipogenesis.

T5:PO.004

Predictors for mortality following Roux-en-Y Gastric Bypass Surgery

Sigrid Bjerge Gribsholt¹, Reimar Wernich Thomsen Thomsen², Elisabeth Svensson², Bjørn Richelsen¹, Henrik Toft Sørensen²

¹Aarhus University Hospital, Department of Endocrinology and Internal Medicine

²Aarhus University Hospital, Department of Clinical Epidemiology

Introduction: Roux-en-Y gastric bypass (RYGB) results in pronounced weight loss in severely obese people but may also be associated with various complications and mortality. Population-based follow-up data on this issue are sparse. We therefore examined age, gender, baseline comorbidity, and calendar year of surgery as predictors of mortality within the first 2–3 years following RYGB.

Methods: We conducted a nationwide cohort study of all RYGB surgery patients in Denmark from 2006 through 2010 (N=9,855 patients). Data on age, gender, surgical procedure, preoperative comorbidity level assessed by the Charlson Comorbidity Index (CCI), and mortality were obtained from the Danish National Registry of Patients covering all Danish hospitals and the Danish Civil Registration System.

Results: After 2–3 years of follow-up, 75 patients had died, corresponding to 0.76% cumulative mortality. The hazard ratio was higher for men compared with women: 1.52 (95% confidence interval (CI): 0.93; 2.49). The 2–3-year hazard ratio of death for patients undergoing RYGB with a CCI score of 1–2, compared with those with a CCI score of 0, was 2.16 (95% CI: 1.31; 3.58). For patients with a CCI score >3, the hazard ratio was highly increased at 4.92 (95% CI: 2.16; 11.21). The hazard ratio of death for patients undergoing surgery earlier in the study period (2006–2007), compared with the most recent year (2010), was 2.64 (95% CI: 1.34; 5.19).

Conclusion: Our population-based data show that male gender, baseline comorbidity, and surgery early in the the study period predicted increased mortality in a large nationwide Danish cohort of patients undergoing RYGB.

T5:PO.005

Noninsulinoma Pancreatogenous Hypoglycemia Syndrome: A Rare Complication Of Roux-en-Y Gastric Bypass

Luís Cardoso¹, Dírcea Rodrigues², Paulo Donato³, Patricia Oliveira¹, Luisa Ruas¹, Joana Saraiva¹, Carolina Moreno¹, Daniela Guelho¹, Rosa Dantas⁴, Nuno Vicente¹, Francisco Carrilho¹

¹Department of Endocrinology, Diabetes and Metabolism, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

²Department of Endocrinology, Diabetes and Metabolism, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal and Faculty of Medicine, University of Coimbra, Coimbra, Portugal

³Department of Radiology, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal and Faculty of Medicine, University of Coimbra, Coimbra, Portugal

⁴Department of Endocrinology, Centro Hospitalar do Baixo Vouga, Aveiro, Portugal

Introduction: Noninsulinoma Pancreatogenous Hypoglycemia Syndrome (NIPHS) is a late complication of Roux-en-Y gastric bypass (RYGB). Its rarity and diagnostic dilemma impose a major clinical challenge.

Case Report: A 36-year-old Caucasian woman reported hypoglycemic episodes, with neuroglycopenic symptoms, mostly postprandial, 18 months after undergoing RYGB for class III obesity. Three of these episodes culminated with loss of consciousness. Dietary modifications didn't decrease the frequency or severity of hypoglycemic episodes. Fasting GLP-1 was 14.7 pmol/L (2.8–10.5). 72-hour fast was negative. Prolonged 75-g oral glucose tolerance test (OGTT) revealed glucose nadir of 34 mg/dL at 90 minutes, with corresponding insulin of 10 μ UI/mL (<30) and

C peptide of 4 ng/dL (1.0–7.6). Hematocrit and heart rate during OGTT weren't suggestive of dumping syndrome; there were no increase higher than 3% at OGTT 30-minutes, neither 10 bpm at OGTT 60-minutes, respectively. Abdominal CT was normal. Selective intra-arterial calcium stimulation with hepatic venous sampling (ASVS) was positive in the splenic artery (insulin concentration increased 2.4-fold from basal level). ASVS brought a definite insight about hypoglycemia etiology and regionalization of potentially hyperfunctioning beta cells (body and/or tail). Postprandial hyperinsulinemic hypoglycemia, negative 72-hour fast, negative imaging studies and positive ASVS are suggestive of NIHPS diagnosis. No severe hypoglycemic episodes occurred after diazoxide treatment being introduced.

Conclusion: Differential diagnosis between late dumping syndrome and NIHPS is challenging. ASVS contributes to their distinction and may provide topographical guidance for surgical therapy. The abnormal secretion of intestinal peptides accompanied by beta cell dysfunction may be responsible for the pathogenesis of NIHPS.

T5:PO.006

GLP-1 response during mixed test meal before and after gastric bypass surgery in obese patients

Dragan Micic¹, Snezana Polovina¹, Danko Jeremic¹, Dusan Micic², Mirjana Sumarac-Dumanovic¹

¹Clinic for Endocrinology, Diabetes and Diseases of Metabolism, Clinical Center of Serbia

²Emergency Center, Clinical Center of Serbia

Introduction: Gastric bypass surgery in obese patients results in weight loss, changes in gastrointestinal and pancreatic hormones and improvement of insulin sensitivity.

Methods: GLP-1 response was determined after test meal (Fresub-in drink a 200 ml; 200 kcal, 15% protein, 30% fat and 55% carbohydrate) before (day 0) and 5, 90 and 180 days after gastric bypass surgery. Glycaemia (mmol/l; glucose oxidase) and GLP-1 (Active 7–36) (pM/l; ELISA, ALPCO diagnostics) were determined in 49 obese patients (age: 37.8 ± 1.6; BMI: 43.45 ± 0.77 kg/m²) in four separate days in 0, 15, 30, 45, 60, 90 and 120 min.

Results: There were significant difference between area under the glucose curve (X ± SD): 679.12 ± 31.25 mmol/l x min⁻¹ (day 0) vs 638.77 ± 29.27 (day 5) vs 658.53 ± 38.64 (day 90) and no difference in day 180 (623.37 ± 28.56). There was significant increase in area under the GLP-1 curve in days 5 (980.12 ± 114.09 pmol/l x min⁻¹), days 90 (682.92 ± 141.39) and days 180 (778.71 ± 210.78) in comparison with day 0 (287.74 ± 118.72) (p < 0.05). There were no significant differences between basal glucose and GLP-1 levels, while there was significant increase in peak GLP-1 levels in day 5 (16.920 ± 2.371), day 90 (14.566 ± 2.914) and day 180 (17.258 ± 3.172) in comparison with day 0 (3.719 ± 1.023) (p < 0.05).

Conclusion: GLP-1 response after mixed test meal is significantly increased up to six months after gastric bypass surgery. The improvement in GLP-1 response after test meal after gastric bypass may be responsible for the beneficial metabolic effects of bariatric surgery.

T5:PO.007

Gottingen minipig as animal model for metabolic diseases

Idoia Díaz-Güemes Martín-Portuqués¹, Laura Hernández-Hurtado¹, Francisco Sánchez-Margallo¹, Javier Casado¹, Ana María Matos-Azevedo¹, José Luis De la Cruz Vigo²

¹Minimally Invasive Surgery Centre Jesús Usón. (Cáceres. Spain)

²Clinica San Francisco (León. Spain)

Introduction: The objective of the study was to assess the energetic status and glucose metabolism on an animal model frequently used to study human metabolic diseases, as it is the Gottingen minipig.

Methods: 17 male adult Gottingen minipigs (28.89 ± 2.30 kg) were included in the study. After 15 days of acclimation, a central venous catheter was placed under general anesthesia. At that moment, body weight, neck circumference, abdominal girth, and visceral and subcutaneous adipose tissues were gauge, the latter by MRI. Three days later, blood samples were obtained from conscious pigs at fasting, 60 and 120 minutes counted from the completion of the food intake. Tryglicerids, total cholesterol and glucose levels were obtained with colorimetric methods, whereas fasting plasmatic concentrations of leptin, GLP-1, glucagon, adiponectin and insulin were measured with a pig-specific ELISA kit. A paired Student's t test and Person's correlation were used for comparison between time points and for finding association between variables, respectively.

Results: Neck circumference (r= 0.637; p= 0.006) and abdominal girth (r= 0.524, p= 0.031) were positively correlated with body weight. The first was also correlated with fasting glucose (r = 0.684, p = 0.003) and insulin 120 (r= 0.604, p= 0.010).

Conclusion: The causes of unexpected and contradictory results with the previous literature may be due to a bias in the methodology or due to the intrinsic characteristics of the species used. So when extrapolating results from animal models to humans we should be very careful and have a thorough prior knowledge of the physiology of the animal model used.

T5:PO.008

The effect of bariatric surgery on the lipid profile of morbidly obese patients

Filipe Cunha¹, Joana Oliveira¹, Ana Saavedra², Maria Manuel Costa², Eva Lau¹, Cláudia Nogueira¹, Sandra Belo¹, Flora Correia³, Joana Queirós², Paula Freitas¹, Ana Varela¹, Davide Carvalho¹

¹Department of Endocrinology, Diabetes and Metabolism Centro Hospitalar de São João EPE, Porto, Portugal; Faculty of Medicine, University of Porto, Porto, Portugal

²Department of Endocrinology, Diabetes and Metabolism Centro Hospitalar de São João EPE, Porto, Portugal

³Faculty of Nutrition and Food Sciences, University of Porto, Porto, Portugal

Introduction: Bariatric surgery (BS) induced weight loss can lead to changes in serum lipids. We studied the role of the type of BS in total cholesterol (TC), LDL, HDL and triglycerides (TG) values.

Methods: We retrospectively studied all morbidly obese patients who underwent adjustable gastric band (AGB) or Roux-en-Y gastric bypass (RYGB) between 2010–11. Follow-up 12 months. The proportion of patients with improvement in the lipid profile was calculated and in them, the magnitude of variation was compared between the two types of surgery. A multivariate logistic regression model was used to access the impact of the type of surgery on the lipid profile.

Results: A total of 378 patients were included: 201 AGB and 117 RYGB. At 12 months, TC, LDL and TG increased in 35.5%, 28.5% and 26.3%, respectively; HDL decreased in 28.8%. RYBG (vs AGB) patients had a greater number of favorable responses: decreased TC in 76.1% of patients (vs 54.2%, p < 0.001); LDL in 84.0% (vs 60.5%, p < 0.001) and TG in 84.1% (vs 64.5%, p < 0.001). HDL increased in 75.5% (vs 67.2%, p < 0.001). In patients with improvement, its magnitude was greater in those submitted to RYGB (vs AGB): a decrease of TC by 19.0 ± 10.4% (vs 13.9 ± 10.6%, p < 0.001); LDL by 26.1 ± 12.3% (vs 19.1 ± 14.3%, p < 0.001); HDL increase of 22.0% (12.0–34.2) [vs 16.0% (9.4–27.3), p = 0.04]. There was an independent association between surgery type (RYGB vs AGB) and TC and LDL decrease.

Conclusion: Not all patients submitted to BS have an improvement on lipid profile. RYGB associates with a better overall response.

T5:PO.009

Body composition changes in patients who failed to meet weight loss targets at the Rotherham Institute for Obesity

Luke Walker, Alicia Kaill, Caroline Steele, Matthew Capehorn

Rotherham Institute for Obesity

Introduction: The Rotherham Institute for Obesity (RIO) is specialist centre for weight management, with a multi-disciplinary team approach, based in a primary care setting. This study set out to look at whether patients who did not reach commissioned weight loss targets had beneficial improvements in body composition.

Methods: A retrospective analysis of adult data, from Sept 2009 to Dec 2012 was performed, to identify those patients who had completed the 6m RIO weight loss programme but failed to hit the minimum 5% weight loss target. The body composition data from baseline and at 6m was compared.

Results: 253 adults had completed the 6m programme but had failed to reach targets.

However, 141 (56%) of these adults lost fat, at an average of 5.25 kg.

40 of these 141 (28%) gained more muscle than they lost in fat and had gained weight.

In total, 87 (34%) of all these adult completers gained muscle, at an average of 2.3 kg.

185 out of 253 (73%) either lost fat or gained muscle.

Conclusion: By the nature of Key Performance Indicators (KPIs) based on weight loss targets, patients attending RIO who do not reach a minimum of 5% weight loss at 6m are considered 'failures' by commissioners. This analysis shows that many of these patients actually demonstrate positive changes in body composition that may convey health benefits, suggesting alternative KPIs should be considered when assessing 'success'.

T5:PO.010

Evaluation of the efficacy and safety of IQP-VV-102, a novel combination for weight reduction

Barbara Grube¹, Regina Busch², Jass Liew³, Yong Mun Hin³, Chong Pee Win³

¹Principal Investigator of Study

²Investigator of Study

³InQpharm Europe Ltd

Introduction: A proprietary product, IQP-VV-102 has been shown to reduce the activity of enzymes involved in carbohydrate digestion in in vitro and animal studies previously. This study evaluated the efficacy and safety of IQP-VV-102 in body weight reduction. 1,2.

Methods: 120 overweight and obese subjects participated in this randomized, double-blind, placebo-controlled trial. For 12 weeks, subjects consumed either 2 tablets of IQP-VV-102 or placebo twice daily and were counseled to maintain a 20% calorie-deficit diet (55% energy from carbohydrates) and on physical activity.

Results: 117 subjects were included in the final analysis. Body weight and body fat mass were similar in both groups at baseline. After 12 weeks, subjects on IQP-VV-102 experienced a statistically significant greater reduction in mean body weight compared to subjects on placebo (3.29 ± 2.30 kg versus 0.83 ± 2.00 kg, $p < 0.001$). Body fat mass change favored the IQP-VV-102 group (decrease of 2.14 ± 3.42 kg versus 0.56 ± 2.43 kg, $p < 0.001$). Statistically significant reduction in waist circumference was also observed at the end of the study. No serious or product-related adverse events were reported.

Conclusion: IQP-VV-102 has shown to be effective in body weight reduction with a good safety profile.

InQpharm Group. (2010). Evaluation of the anti-obesity effects of the IQP-VV-101, orally administered at three doses, in adult female sprague dawley rats fed with a high fat diet. Unpublished manuscript.

Data on file, In-vitro (laboratory) test report of IQP-VV-102.

T5:PO.011

The impact of speed of weight loss on body composition and compensatory mechanisms activated during weight reduction

Coutinho¹, With², Kulseng¹, Truby³, Martins¹

¹Obesity Research Group, Department of Cancer Research and Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway Centre for Obesity, Department of Surgery, St. Olav Hospital—Trondheim University Hospital

²Obesity Research Group, Department of Cancer Research and Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway

³Nutrition & Dietetics Department, Monash University, Melbourne, Australia

Introduction: The effect of the speed of weight loss (WL) on body composition and compensatory mechanisms activated during weight reduction remains unknown. The aims of this study were to assess the impact of rapid versus gradual WL on the above mentioned mechanisms in obese individuals.

Methods: 35 obese adult sedentary individuals were randomized to lose a similar weight (diets matched for macronutrient composition), either rapidly (4 weeks) or gradually (8 weeks). Body weight, composition (BodPod), RMR (indirect calorimetry), exercise efficiency and subjective appetite feelings (VAS) were measured before and after intervention.

Results: Changes in body weight (9%) and composition were similar in both groups. A significant reduction in RMR ($p < 0.0001$) was observed in the rapid, but not gradual WL group, and differences between groups were significant ($p < 0.05$). Exercise efficiency increased significantly in the rapid ($p < 0.01$), but not gradual WL group at 10 and 25watts, and differences between groups were significant ($p < 0.01$). Fasting hunger and desire to eat increased significantly with gradual ($p < 0.05$) but not rapid WL, and differences between groups were significant ($p < 0.05$) (for prospective food consumption the opposite was observed). AUC for hunger, desire to eat and prospective food consumption decreased significantly (and fullness increased significantly) ($p < 0.05$) with rapid, but not gradual WL, and differences between groups were significant.

Conclusion: A similar WL achieved rapidly or slowly induces the same body composition changes. Although gradual WL prevented the reduction in RMR and the increase in exercise efficiency observed with rapid WL, changes in appetite were more favorable in the rapid WL group.

T5:PO.012

Long term results from a commercial and multidisciplinary weight loss program

Teresa Branco¹, Sandra Martins², Diana Baião¹

¹Instituto Teresa Branco

²Universidade Lusófona

Introduction: The primary objective of the present study was to evaluate the overall weight loss efficacy of a 12-month weight loss program, based on a multidisciplinary approach, with personalized interventions and lifestyle group sessions. It was also our purpose to investigate weight changes two years after the end of the program.

Methods: The multidisciplinary team comprised a physician, a nutritionist, a psychologist and an exercise physiologist. All the participants attended lifestyle weight loss group sessions. The sample comprised 82 overweight and obese adults (39.7 ± 11.1 yr; 29.8 ± 5.2 kg/m²). Weight was assessed at baseline, 12-months, and 2 years after the end of the program with an electronic scale (SECA, Hamburg, Germany).

Results: 72.1% of the baseline sample concluded the 12-month weight loss program, with a 27.9% attrition. At 12-month, participants lost, on average, 7.3 kg \pm 5.2 kg ($p < .001$) of initial body weight (range: 3,1Kg-19,0Kg loss), with no differences between genders ($p > .05$). Two years after the end of the program, 40.7% of the 59 participants lost more weight, 17% maintained weight loss, and 42.3% regained weight. A great diversity was found among weight regainers, with 6.8% of the participants increas-

ing from 2,1–4%, 10,2% regained 4,1 to 6%, 12,2% increased 6,1–10%, 3,4% regained 10,1–12% and 1,7% between 16,1–18%. No correlation was found between baseline body weight and weight loss at 12-month ($p > .05$).

Conclusion: A commercial multidisciplinary 12-month weight loss program, promoted clinical relevant weight loss, and these results were improved or maintained by the majority of the participants during the two years follow-up, suggesting the efficacy of this tailored intervention on the treatment of overweight and obesity.

T5 – Alternative treatments

T5:PO.013

Anthropometric parameters in 46 hypogonadal men with obesity grade III improve upon long-term treatment with testosterone undecanoate injections: observational data from two registry studies

Farid Saad¹, Ahmad Haider², Aksam Yassin³, Gheorghe Doros⁴, Abdulmaged Traish⁵

¹Global Medical Affairs, Bayer Pharma AG, Berlin, Germany, and Gulf Medical University School of Medicine, Ajman, UAE

²Private Urology Practice, Bremerhaven, Germany

³Institute of Urology and Andrology, Segeberger Kliniken, Norderstedt, Germany, and Dresden International University, Dresden, Germany

⁴Department of Epidemiology and Statistics, Boston University School of Public Health, Boston, MA, USA

⁵Department of Biochemistry and Department of Urology, Boston University School of Medicine, Boston, MA, USA

Introduction There is a robust inverse association between testosterone and obesity. Only few testosterone replacement therapy (TRT) studies in hypogonadal men focus on effects on anthropometry.

Methods From two cumulative, prospective, registry studies of 561 hypogonadal men, 46 men with obesity grade III were selected. All men received parenteral testosterone undecanoate 1000 mg/12 weeks for up to 6 years.

Results At the end of the observation period, mean weight (kg) decreased from 129.02 ± 5.67 to 103.33 ± 4.17. This decrease was statistically significant vs baseline ($p < 0.0001$) and each year compared to previous year ($p < 0.0001$). Mean change from baseline was -27.15 ± 0.74 kg.

Percent change from baseline was -2.77 ± 1.77% after one year, -7.26 ± 3.04% after two, -10.85 ± 3.26% after three, -13.88 ± 3.16% after four, -17.43 ± 3.09% after five, and -20.99 ± 3.16% after six years. Waist circumference (cm) decreased from 118.41 ± 5.69 to 106.48 ± 4.91. This decrease was statistically significant vs baseline ($p < 0.0001$) and each year compared to previous year ($p < 0.0001$) with the exception of year 6 which had a p-value of 0.0132 vs year 5. The mean change from baseline was 12.44 ± 0.36 cm.

Body mass index (BMI; kg/m²) decreased from 41.93 ± 1.5 to 33.62 ± 1.58. The mean change from baseline was 8.79 ± 0.23 kg/m².

There were no drop-outs.

Conclusion All changes were progressive and remained statistically significant each year compared to previous year for the full observation period. TRT seems to be an effective approach to achieve sustained weight loss in excessively obese hypogonadal men.

Patients with a BMI ≥ 40 are candidates for metabolic surgery. In hypogonadal men, TRT may provide a non-invasive alternative.

T5:PO.014

Metabolic parameters in 46 hypogonadal men with obesity grade III improve upon long-term treatment with testosterone undecanoate injections: observational data from two registry studies

Farid Saad¹, Ahmad Haider², Aksam Yassin³, Gheorghe Doros⁴, Abdulmaged Traish⁵

¹Global Medical Affairs Men's Healthcare, Bayer Pharma, Berlin, Germany, and Gulf Medical University School of Medicine, Ajman, UAE

²Private Urology Practice, Bremerhaven, Germany

³Institute of Urology and Andrology, Segeberger Kliniken, Norderstedt, Germany, and Dresden International University, Dresden, Germany

⁴Department of Epidemiology and Statistics, Boston University School of Public Health, Boston, MA, USA

⁵Departments of Biochemistry and Urology, Boston University School of Medicine, Boston, MA, USA

Introduction: There are inverse associations between testosterone and all components of the metabolic syndrome.

Methods: From two cumulative, prospective, registry studies of 561 hypogonadal men, 46 men with obesity grade III were selected. All men received parenteral testosterone undecanoate 1000 mg/12 weeks for up to 6 years. 46 men were followed for two years, 43 for three years, 37 for four years, 34 for five years, and 24 for six years. Declining numbers are result of the registry design.

Results: The mean age was 60.28 ± 5.39 (min 43; max 69).

Mean fasting glucose (mg/dl) decreased from 115.48 ± 23.85 to 96.54 ± 2.9 ($p < 0.0001$). Mean change from baseline was -18.48 ± 2.96 mg/dl. HbA1c (%) decreased from 7.57 ± 1.38 to 6.08 ± 0.5. Mean change from baseline was -1.61 ± 0.13%.

Total cholesterol (mg/dl) decreased from 306.76 ± 43.03 to 192.23 ± 9.17 ($p < 0.0001$). LDL (mg/dl) decreased from 190.57 ± 36.6 to 136.24 ± 28.07 ($p < 0.0001$). Triglycerides (mg/dl) decreased from 326.87 ± 60.21 to 194.4 ± 12.59 ($p < 0.0001$). HDL (mg/dl) increased from 62.76 ± 18.7 to 72.55 ± 13.34 ($p < 0.0001$). The ratio of total cholesterol : HDL declined from 5.47 ± 2.57 to 2.75 ± 0.59 ($p < 0.0001$).

Systolic blood pressure (mmHg) decreased from 161.04 ± 14.3 to 142.05 ± 9.57, diastolic blood pressure from 97.07 ± 10.91 to 80.89 ± 6.76.

Liver enzymes AST and ALT (U/L) decreased from 42.39 ± 17.84 to 20.33 ± 1.9 and from 43.52 ± 20.68 to 20.43 ± 2.75, respectively ($p < 0.0001$ for both), suggesting reductions in liver fat content.

C-reactive protein (CRP, mg/L) declined from 3.96 ± 4.31 to 0.57 ± 0.59 ($p < 0.0001$).

Conclusion: Testosterone replacement therapy in excessively obese hypogonadal men resulted in significant and sustained improvements in all features of the metabolic syndrome, consistent with the changes in anthropometry observed in the same cohort.

T5:PO.015

Comparable weight loss in hypogonadal men with obesity grades II and III under long-term treatment with testosterone undecanoate injections: observational data from two registry studies

Farid Saad¹, Ahmad Haider², Aksam Yassin³, Gheorghe Doros⁴, Abdulmaged Traish⁵

¹Global Medical Affairs Men's Healthcare, Bayer Pharma, Berlin, Germany, and Gulf Medical University School of Medicine, Ajman, UAE

²Private Urology Practice, Bremerhaven, Germany

³Institute of Urology and Andrology, Segeberger Kliniken, Norderstedt, Germany, and Dresden International University, Dresden, Germany

⁴Department of Epidemiology and Statistics, Boston University School of Public Health, Boston, MA, USA

⁵Departments of Biochemistry and Urology, Boston University School of Medicine, Boston, MA, USA

Introduction: In a bi-directional relationship, testosterone deficiency may cause obesity, and obesity may cause hypogonadism. In epidemiological studies, an up to 52% prevalence of hypogonadism in obese men has been reported.

Methods: From two registry studies of hypogonadal men, 131 men with obesity grade II (Group A) and 46 men with obesity grade III (Group B) were selected. All men were treated with three-monthly testosterone undecanoate injections for up to 6 years.

Results: Mean weight (kg) decreased from 117.02 ± 6.99 to 96.78 ± 7.47 in Group A and 129.02 ± 5.67 to 103.33 ± 4.17 in Group B. Mean change from baseline was -20.67 ± 0.51 and -27.15 ± 0.74 kg, resp. In both groups, the decrease was statistically significant vs baseline and each year compared to previous year ($p < 0.0001$).

Percent change from baseline at the end of the observation time was $-17.03 \pm 5.02\%$ in Group A and $-20.99 \pm 3.16\%$ in Group B.

Waist circumference (cm) decreased from 114.23 ± 7.51 to 102.52 ± 6.5 in Group A and from 118.41 ± 5.69 to 106.48 ± 4.91 in Group B. This decrease was statistically significant vs baseline and each year compared to previous year in both groups. The mean change from baseline was 12.29 ± 0.33 cm in Group A and 12.44 ± 0.36 cm in Group B.

Body mass index (BMI; kg/m^2) decreased from 37.39 ± 1.46 to 31.05 ± 2.02 in Group A and from 41.93 ± 1.5 to 33.62 ± 1.58 in Group B. The mean change from baseline was 6.58 ± 0.16 and 8.79 ± 0.23 kg/m^2 , respectively.

No patient gained weight.

Conclusion: Testosterone replacement therapy in hypogonadal men with obesity grade II and III resulted in meaningful and sustained weight loss.

T5:PO.016

156 hypogonadal men with obesity and type 2 diabetes achieve weight loss and improved glycaemic control upon treatment with testosterone undecanoate up to 6 years: A subgroup analysis from two observational registry studies

Farid Saad¹, Ahmad Haider², Aksam Yassin³, Gheorghe Doros⁴, Abdulmageed Traish⁵

¹Global Medical Affairs Men's Healthcare, Bayer Pharma, Berlin, Germany, and Gulf Medical University School of Medicine, Ajman, UAE

²Private Urology Practice, Bremerhaven, Germany

³Institute of Urology and Andrology, Segeberger Kliniken, Norderstedt, Germany, and Dresden International University, Dresden, Germany

⁴Department of Epidemiology and Statistics, Boston University School of Public Health, Boston, MA, USA

⁵Departments of Biochemistry and Urology, Boston University School of Medicine, Boston, MA, USA

Introduction: Obesity is a major risk factor for type 2 diabetes (T2D). In men, both diseases have a high prevalence of testosterone deficiency.

Methods: Cumulative, prospective, observational registry studies of 561 hypogonadal men from two urological centers. Obese men with T2D were selected for subgroup analysis. Patients received testosterone injections for up to six years. All men were treated for their T2D by their family physicians.

Results: 156 men (mean age 61.2 ± 6.2 years) met our criteria. Weight (kg) decreased from 113.56 ± 11.53 to 97.18 ± 9.04 ($p < 0.0001$). Mean change from baseline was -17.49 ± 0.58 kg. Mean per cent weight loss (%) was 15.04 ± 0.48 .

Waist circumference (cm) declined from 114 ± 8.69 to 102.52 ± 7.93 ($p < 0.0001$). Mean change from baseline was -11.56 ± 0.34 cm.

BMI (kg/m^2) decreased from 36.31 ± 3.51 to 31.19 ± 2.6 ($p < 0.0001$). Mean change from baseline was -5.59 ± 0.18 kg/m^2 .

Fasting glucose (mg/dl) decreased from 128.37 ± 31.63 to 101.55 ± 17.02 ($p < 0.0001$). Mean change from baseline was -27.14 ± 2.48 mg/dl.

HbA1c decreased from 8.08 ± 0.9 to $6.14 \pm 0.71\%$ ($p < 0.0001$ vs. baseline, significant for the first 5 years vs. previous year and approaching

significance from year 6 to year 5 at $p = 0.0635$). The mean change from baseline was $-1.93 \pm 0.06\%$.

At baseline, 25 (16%) of all patients had $\text{HbA1c} \leq 7.0\%$ and 12 (7.7%) $\text{HbA1c} \leq 6.5\%$. At the end of the observation, 128 (82.05%) had reached HbA1c target of $\leq 7.0\%$ and 106 (67.95%) HbA1c target of $\leq 6.5\%$.

Conclusion: Correcting hypogonadism with testosterone undecanoate injections in obese hypogonadal men with T2D resulted in sustained improvements in weight, waist circumference, and glycaemic control over the full 6 years of the study.

T5:PO.017

Tea saponin inhibits adipogenesis and induces lipolysis and apoptosis in 3T3-L1 adipocytes

Jong Deog KIM¹, Narendra Chaudhary², Hyo Jin Seo², Min Yong KIM³, Tai Sun Shin⁴

¹Department of Biotechnology, Research center on Anti-Obesity and Health Care, Chonnam National University, Yeosu, Chonnam, Korea, South

²Department of Biotechnology, Chonnam National University, Yeosu, Chonnam, Korea, South

³Research center on Anti-Obesity and Health Care, Chonnam National University, Yeosu, Chonnam, Korea, South

⁴Department of Food Science and Nutrition, Chonnam National University, Yeosu, Chonnam, Korea, South

Introduction: Adipose tissue is crucial for energy storage and lipid homeostasis but the growth and expansion of adipose tissue leads to obesity. Obesity is a multi-factorial disorder resulting from various causes, including genetic, medicinal, metabolic rate, endocrine function, nutritional and other environmental factors.

Methods: We investigated the effect of tea saponin on adipocyte differentiation and gene expression involved in lipid and energy metabolism in 3T3-L1 adipocytes and apoptosis and lipolysis in mature adipocytes.

Results: At the molecular level, tea saponin suppressed adipogenesis by downregulating SREBP, CEBP α and PPAR γ gene expression. Also, the gene expression levels of acetyl-CoA carboxylase (ACC), fatty acid synthase and lipoprotein lipase (LPL) were downregulated. In mature adipocytes, tea saponin induces apoptosis and lipolysis via upregulation of TNF- α .

Conclusion: The suppression of adipogenesis and induction of apoptosis and lipolysis in mature adipocytes by tea saponin may have potential effect in lowering body fat gain.

T5:PO.018

Predictors of body weight loss in response to a 3-month ketogenic diet in the setting of general practice

Cicero¹, Brancaleoni¹, Brancaleoni², Lignaform Study Group²

¹University of Bologna

²General Practice

Introduction: Beyond the knowledge that ketogenic diets could have a short-term effect on weight loss and other metabolic parameters in obese patients, there are less data on the predictors of its efficacy in general practice. The aim of our study was to evaluate the predictors of efficacy of a 3-month ketogenic diet when prescribed in the setting of general practice.

Methods: We consecutively recruited 377 subjects (M: 22%, W: 78%; mean age: 46 ± 10 years, mean BMI: 31 ± 3). They were instructed to follow a 3-month ketogenic diet, and then to gradually recover to a balanced diet with a follow-up visit at 6 and 12 months. The main predictors of weight loss were detected by application of a step-wise multiple regression analysis.

Results: The short-term body weight loss was quicker in men, higher in those subjects experiencing a ketonuria in the first period of diet, and was directly related to the baseline body weight and BMI, and inversely to

patient age, while the long term body weight loss was higher in those subjects experiencing a ketonuria in the first period of diet, and was directly related to the baseline body fat mass (evaluated by impedentiometry) and inversely to the patient age.

Conclusion: The body weight lowering effect of a 3-month ketogenic diet prescribed in the setting of general practice is mainly conditioned by the baseline body weight, % of body fat, age and the experience of ketonuria in the ketogenic phase of the diet.

T5:PO.019

Long-term treatment with testosterone undecanoate injections leads to sustained weight loss independent of age: Observational data from two registry studies

Farid Saad¹, Ahmad Haider², Aksam Yassin³, Gheorghe Doros⁴, Abdulmageed Traish⁵

¹Global Medical Affairs Men's Healthcare, Bayer Pharma, Berlin, Germany, and Gulf Medical University School of Medicine, Ajman, UAE

²Private Urology Practice, Bremerhaven, Germany

³Institute of Urology and Andrology, Segeberger Kliniken, Norderstedt, Germany, and Dresden International University, Dresden, Germany

⁴Department of Epidemiology and Statistics, Boston University School of Public Health, Boston, MA, USA

⁵Departments of Biochemistry and Urology, Boston University School of Medicine, Boston, MA, USA

Introduction: Reductions of body weight and waist circumference have been reported by two independent groups from their registry studies (Saad F et al., *Obes* 2013, 21:1975–1981; Yassin and Doros, *Clin Obes* 2013, 3:73–83).

Methods: 561 hypogonadal men from both registry studies were divided according to age groups: ≤ 65 years (Group A, $n = 450$) and > 65 years (Group B, $n = 111$) were selected. The majority of patients were obese with less than 5% in the normal weight range. All men were treated with three-monthly testosterone undecanoate injections for up to 6 years.

Results: Mean weight (kg) decreased from 102.52 ± 15.56 to 90.15 ± 9.69 in Group A and from 102.83 ± 15.64 to 95.35 ± 9.03 in Group B. Model-adjusted mean change from baseline was -14.78 ± 0.35 and -15.14 ± 0.71 kg, resp. In both groups, the decrease was statistically significant vs baseline and each year compared to previous year.

Percent change from baseline was $-13.56 \pm 7.56\%$ in Group A and $-13.28 \pm 7.14\%$ in Group B.

Waist circumference (cm) decreased from 106.54 ± 9.03 to 98.26 ± 7.1 in Group A and from 108.95 ± 10.75 to 100.72 ± 9.45 in Group B. This decrease was statistically significant vs baseline and each year compared to previous year in both groups. The mean change from baseline was 9.34 ± 0.2 cm in Group A and 10.45 ± 0.47 cm in Group B.

Body mass index (BMI; kg/m^2) decreased from 32.58 ± 5.08 to 29.02 ± 3.01 in Group A and from 32.84 ± 4.86 to 30.35 ± 2.61 in Group B. The mean change from baseline was -4.72 ± 0.11 and -4.81 ± 0.22 kg/m^2 , respectively.

Conclusion: Testosterone replacement therapy in hypogonadal men resulted in meaningful and sustained weight loss independent of age.

T5:PO.020

Short and long-term effect of a 3-month ketogenic diet on anthropometric, metabolic and safety parameters in general practice

Cicero¹, Brancaleoni¹, Brancaleoni², Lignaform Study Group²

¹University of Bologna, Italy

²General Medicine group

Introduction: Ketogenic diets have been shown in the short-term to promote weight loss, decrease intrahepatic triglyceride content, and improve metabolic parameters of patients with obesity, in highly specialized obesi-

ty clinics. Our aim was to test the short and long-term efficacy and safety of a 3-month ketogenic diet in the setting of general practice.

Methods: We consecutively recruited 377 subjects (M: 22%, W: 78%; mean age: 46 ± 10 years, mean BMI: 31 ± 3). They were instructed to follow a 3-month ketogenic diet, and then to gradually recover to a balanced diet with a follow-up visit at 6 and 12 months. Changes in studied parameters was evaluated by ANOVA for repeated measures.

Results: After three months, there was a significant improvement in body weight, BMI, Waist circumference, Index of Central Obesity, and % of fat (all, $p < 0.01$), that further improved at 6 months ($p < 0.05$), and then remained constant till 12 months. FPG, HbA1c, LDL-C, TG, gGT and BP improved after 3 months and the stabilized till 12 months. HDL-C, AST, ALT, and SUA only improved after 6 months ($p < 0.05$) and then stabilized till the end of the study. No significant change in renal parameters or electrolytes changes was observed beyond a mild by significant decrease in calcemia ($p < 0.05$).

Conclusion: A 3-month ketogenic diet safely improve a large number of anthropometric and cardiometabolic parameters in the setting of family medicine practice and these effects seems to be maintained on the long-term after diet normalization.

T5 – Bariatric/metabolic surgery

T5:PO.021

The effect of omega-loop-gastric bypass surgery on vitamin D metabolism in bariatric patients

Maria Luger¹, Renate Kruschitz², Felix Langer³, Gerhard Prager³, Karin Schindler², Friedrich Hoppichler⁴, Bernhard Ludvik²

¹Division of Endocrinology and Metabolism, Department of Internal Medicine III, Medical University Vienna, Waehringer Guertel 18–20, 1090 Vienna; Special Institute for Preventive Cardiology And Nutrition – SIPCAN save your life, Salzburg

²Division of Endocrinology and Metabolism, Department of Internal Medicine III, Medical University Vienna, Waehringer Guertel 18–20, 1090 Vienna

³Division of General Surgery, Department of Surgery, Medical University Vienna, Waehringer Guertel 18–20, 1090 Vienna

⁴Special Institute for Preventive Cardiology And Nutrition – SIPCAN save your life, Salzburg

Introduction: Bariatric patients often suffer from nutrient deficiencies. Little is known about the effect of omega-loop gastric bypass surgery (OLGB) on vitamin D metabolism. We evaluated parameters of vitamin D metabolism preoperatively and during the first postoperative year.

Methods: In this prospective cohort study we evaluated calcium, inorganic phosphate, alkaline phosphatase, parathyroid hormone (PTH), 25-hydroxy-vitamin D (25-OHD), C-telopeptide, and osteocalcin preoperatively, and 1, 3, 6, and 12 months postoperatively in patients with OLGB. Subjects received individual vitamin D supplementation postoperatively (95% CI 200–3000 IU/day).

Results: In the patients ($N=50$; age $46(15)$ years, mean(SD); 12 male, 38 female) BMI was $45.4(6.6)$ kg/m^2 preoperatively and decreased to $28.9(3.9)$ kg/m^2 after 12 months, corresponding to a total body weight loss of 37%. Frequency of patients in pre- vs. postoperative levels (12 months) outside the optimal range were for 25-OHD: 96% vs. 65%, PTH: 30% vs. 19%, calcium: 12% vs. 14%, inorganic phosphate: 16% vs. 11%, alkaline phosphatase: 18% vs. 30%, C-telopeptide: 20% vs. 96%, and osteocalcin: 4% vs. 63%. BMI was the strongest predictor of postoperative 25-OHD levels ($r = -0.604, p = 0.004$). In patients with preoperative BMI > 45 vs. < 45 kg/m^2 , the risk for vitamin D deficiency increases by 13% ($OR=1.13; 95\% CI 1.04-1.23$).

Conclusion: Nearly all bariatric patients have suboptimal vitamin D levels and those with higher BMI are at greatest risk for vitamin D deficiency. Standard postsurgical supplementation with vitamin D has not been

adequate to restore 25-OHD status. Morbidly obese patients should be screened preoperatively and sufficiently treated for vitamin D deficiency.

T5:PO.022

Effect of bariatric surgery on plasma osteopontin concentrations: Comparative effects of gastric bypass and sleeve gastrectomy

Andoni Lancha¹, Rafael Moncada², Víctor Valentí³, Amaia Rodríguez¹, Victoria Catalán¹, Sara Becerril¹, Beatriz Ramírez¹, Leire Méndez-Giménez¹, María J Gil⁴, Fernando Rotellar⁵, Secundino Fernández⁵, Javier Salvador⁶, Gema Frühbeck⁷, Javier Gómez-Ambrosi¹

¹Metabolic Research Laboratory, Clínica Universidad de Navarra, 31008 Pamplona, Spain. CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain.

²Department of Anesthesia, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

³CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain. Department of Surgery, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

⁴Department of Biochemistry, Clínica Universidad de Navarra, 31008 Pamplona, Spain. CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain.

⁵Department of Otorhinolaryngology, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

⁶CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain. Department of Endocrinology & Nutrition, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

⁷Metabolic Research Laboratory, Clínica Universidad de Navarra, 31008 Pamplona, Spain. CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain. Department of Endocrinology & Nutrition, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

Introduction: Bariatric surgery (BS) has proven to be effective for obesity treatment. Osteopontin (OPN) is a proinflammatory cytokine involved in the development of obesity. Our aim was to determine the effect of weight loss following BS on circulating levels of OPN.

Methods: Body adiposity, circulating concentrations of OPN and markers of bone metabolism were determined in obese patients undergoing Roux-en-Y gastric bypass (RYGB; n = 40) or sleeve gastrectomy (SG; n = 11).

Results: Patients undergoing RYGB or SG showed decreased body weight ($P < 0.001$) and body fat percentage ($P < 0.001$) as well as improved insulin sensitivity. Interestingly, plasma OPN levels were significantly increased after RYGB ($P < 0.001$) and remained unaltered following SG ($P = 0.152$). Patients undergoing RYGB also showed significantly increased C-terminal telopeptide of type-I collagen (ICTP) ($P < 0.01$) and osteocalcin ($P < 0.001$) while bone mineral density (BMD) tended to decrease ($P = 0.086$). Moreover, OPN concentrations were positively correlated with the bone resorption marker ICTP after surgery. On the other hand, patients undergoing SG showed significantly increased ICTP levels ($P < 0.05$), and the change in OPN was positively correlated with the change in ICTP and negatively with the change in vitamin D after surgery ($P < 0.05$).

Conclusion: RYGB increased circulating OPN levels, while it remained unchanged after SG. The increase in OPN levels after RYGB could be related to the increased bone resorption in relation to the well-known effects on bone of this malabsorptive procedure in comparison to the merely restrictive SG.

T5:PO.023

Majority of participants in intensive lifestyle intervention for severe obesity had undergone bariatric surgery by 6 years

John Roger Andersen¹, Ronette L. Kolotkin², Villy Våge³

¹Department of Research, Førde Central Hospital. Førde, Norway. Faculty of Health Studies, Sogn og Fjordane University College. Førde, Norway.

²Faculty of Health Studies, Sogn og Fjordane University College. Førde, Norway. Department of Research, Førde Central Hospital. Førde, Norway. Obesity and Quality of Life Consulting. Durham, NC, US. Duke University School of Medicine. Durham, NC, US.

³Department of Research, Førde Central Hospital. Førde, Norway.

Introduction: There is little robust long-term evidence relating to the efficacy of multidisciplinary non-surgical weight loss programs for severe obesity. Thus, the aims of this study were to assess (1) treatment status (undergone bariatric surgery or not) and (2) percent weight loss 6 years after a residential intensive lifestyle intervention (ILI) programme for severe obesity.

Methods: Participants were 18 adult men and 30 women from Norway, with a body mass index ≥ 40 or ≥ 35 with at least 1 comorbidity, who participated in a 40-week residential ILI programme, which included daily physical activity, healthy diet and emotional support. A sustained weight loss $\geq 10\%$ without surgery was defined as the lower limit for adequate goal achievement.

Results: During the ILI programme, 95% of the patients had $\geq 10\%$ weight loss. After 6-years, data were available in 38 of 48 patients (79%). We found that 25 of 38 patients (66%) had undergone bariatric surgery. Of the 13 non-operated patients, 5 had applied and 3 were considering bariatric surgery. An initial history of joint pain predicted being operated (OR = 17.2; $P = 0.021$). We found that 8 of 38 patients (21%) had achieved a $\geq 10\%$ weight loss, while 4 of 38 patients (11%) had $\geq 20\%$ weight loss after 6 years without bariatric surgery.

Conclusion: Despite enrollment in a 40-week intensive, residential lifestyle intervention, at 6 years the majority (79%) had underwent/sought bariatric surgery. Long-term weight loss maintenance without bariatric surgery was observed in a minority of the patients.

T5:PO.024

Laparoscopic Roux-en-Y gastric bypass effect on glucose homeostasis. Experimental study on obese Gottingen minipig

Idoia Díaz-Güemes Martín-Portugués¹, Laura Hernández-Hurtado¹, Francisco Sánchez-Margallo¹, J Maestre Antequera¹, Ana María Matos-Azevedo¹, José Luis De la Cruz Vigo²

¹Minimally Invasive Surgery Centre Jesús Usón. (Cáceres. Spain)

²Clinica San Francisco. (León, Spain)

Introduction: The aim of this study is to assess the changes on glucose metabolism after a laparoscopic roux en Y gastric bypass (LRYGBP) in an obese Gottingen minipig, after a medium-term postoperative period wherein weight loss changes were minimum.

Methods: 9 male obese Gottingen minipigs were enrolled in the study. To induce obesity they were fed during 9 months with a high-fat diet. After these months, they were subjected to a laparoscopic Roux en Y gastric bypass (LRYGBP).

In order to estimate the adipose tissue distribution (visceral and subcutaneous adipose tissue), MRI scan was performed. In addition, fasting plasmatic concentration of GLP, glucose and insulin were obtained. All of these variables were recorded prior to (T0) and four months after (T1) surgery. Comparative studies were performed with Student t test.

Results: As expected body weight was maintained between T0 (5.40 ± 6.27 Kg) and T1 (5.147 ± 5.38 Kg). Leptin (1.95 ± 1.12 vs 1.32 ± 0.72 ng/ml) and total cholesterol (92.89 ± 9.73 vs 76.22 ± 13.05 mg/dl) decreased slightly. On the contrary, glucose ($p = 0.02$) and insulin ($p = 0.001$) showed a significant decrease after surgery. The same happen

to visceral adipose tissue. Conversely, SAT increased not significantly (1032.92 ± 387.33 vs 1360.44 ± 492.26).

Conclusion: In accordance with the literature, bariatric surgery seems to improve glucose metabolism among obese patients. With this study we go further as it has been demonstrated that the reduction of body weight is not the crucial factor implied on this improvement, but the change in the adipose tissue distribution.

T5:PO.025

Serum calcium, PTH and vitamin D two years after bariatric surgery in morbidly obese patients

Sneyana Polovina¹, Dragan Micic¹, Mirjana Sumarac-Dumanovic¹, Svetlana Zoric¹, Goran Cvijovic¹, Danica PejkoVIC-Stamenkovic¹, Dusan Micic², Jelena Gligorjevic³, Danka Jeremic¹, Ana Gligic¹

¹Clinic for Endocrinology, Diabetes and Diseases of Metabolism, Clinical Center of Serbia

²Emergency center, Clinical Center of Serbia

³Nutritive unit, Clinical Center of Serbia

Introduction: After bariatric procedures the patients might experienced damaged resorption of calcium and vitamin D and stimulation of PTH secretion due to decreasing gastric secretion.

Methods: We have measured serum calcium, D vitamin and PTH in patients ($n = 100$, 33 males and 67 females 38.6 ± 12.6 years, with BMI $43 \pm 9.2 \text{ kg/m}^2$, before and one and two years after R en Y gastric bypass. All patients were supplemented with 1250mg of calcium carbonate and 400IU of vitamin D in the first two months after surgery, and 600mg of calcium citrate and 200IU of vitamin D from the 3rd month after gastric bypass, under the recommendations from European guideline for bariatric surgery.

Results: Two years after gastric bypass the mean BMI was $29.2 \pm 4.4 \text{ kg/m}^2$. Before surgery serum calcium was $2.43 \pm 0.84 \text{ mmol/l}$, after 1 year $2.42 \pm 0.94 \text{ mmol/l}$, after 2 years $2.40 \pm 0.12 \text{ mmol/l}$ ($p = 0.87$ and $p = 0.83$). The serum vitamin D was under the normal range before surgery, $52.79 \pm 24.60 \text{ ng/ml}$, and remain low after 1 year, $50.5 \pm 16.82 \text{ ng/ml}$ and 2 years after surgery, $46.5 \pm 14.82 \text{ ng/ml}$ ($p = 1.34$ and $p = 0.43$). The mean PTH was $56.288 \pm 25.42 \text{ pg/ml}$ before surgery, with no significant change after 1 year, $58.93 \pm 26.33 \text{ pg/ml}$ but became significantly higher 2 years after surgery, $71.06 \pm 35.4 \text{ pg/ml}$ ($p = 0.94$ and $p = 0.02$).

Conclusion: These results suggest two possibilities. The first one is that recommended supplementation of calcium and vitamin D is not enough during long time period after bariatric surgery and the second one is that compliance for supplementation after more than one year after bariatric surgery becomes lower.

T5:PO.026

Endoscopic gastric plication for the treatment of morbid obesity: Effect on food intake and desire to eat after one year

Paulus¹, Avesaat, van², Conchillo², Masclee², Nicole Bouvy¹

¹Department of General Surgery, Maastricht University Medical Center, the Netherlands

²Division of Gastroenterology and Hepatology, Department of Internal Medicine, Maastricht University Medical Center, the Netherlands

Introduction: In a first explorative study with a novel endoscopic gastric plicating device we tried to provide more information about the potential efficacy and mechanism of weight loss of this procedure

Methods: This prospective study was performed in 9 morbidly obese patients (4 women, mean age 41 ± 10 years, mean BMI $39.6 \pm 2.8 \text{ kg/m}^2$). Patients were studied prior to, one month and one year after the operation. Gastric emptying and desire to eat were measured at different time points before and after the intake of a standardized breakfast. Food intake was assessed by offering an ad libitum meal. Repeated measures ANOVA and repeated measures 2-way ANOVA were used where appropriate.

Results: The included patients showed $41.6 \pm 6.1\%$ excess BMI loss one year postoperatively. Significant differences in desire to eat were found ($P < 0.005$). Ad libitum food intake decreased significantly one month after the procedure (824.7 ± 100.2 to $442.0 \pm 47.8 \text{ kcal}$, $P < 0.05$). One year after the procedure mean energy intake was $579.2 \pm 66.9 \text{ kcal}$ although this was not significantly different to baseline or one month follow up. No differences were observed in gastric emptying half time (137.1 ± 6.6 versus 129.6 ± 37.0 versus 146.7 ± 18.2 minutes).

Conclusion: The significant reduction in food intake observed one month after the procedure, was not found after one year. However since weight loss is continuously seen after 1 year of follow-up, daily caloric intake seems not to exceed energy expenditure. The reduction in desire to eat is probably one of the contributing factors. Furthermore, we emphasize that an alteration in the release of gastrointestinal peptides could be another contributor.

T5:PO.027

Hypoglycaemia one-year after laparoscopic sleeve gastrectomy: Experience of Padua Bariatric Unit

Anna Belligoli¹, Eva Zabeo¹, Roberto Serra¹, Marta Sanna¹, Scilla Conci¹, Luca Prevedello², Mirto Foletto², Luca Busetto¹, Anna Chiara Frigo³, Gabriella Milan¹, Roberto Vettor¹

¹Department of Medicine, University of Padova, Italy

²Department of Oncological, Surgical and Gastroenterological Sciences, University of Padova, Italy

³Department of Cardiological, Thoracic and Vascular Sciences, University of Padova, Italy

Introduction: It's known that after Roux-en-x-en-Y gastric bypass (RYGB) about 30% of patients experienced post-prandial hyperinsulinemic hypoglycaemia following surgery. There are very few data about development of post-prandial hypoglycaemia after laparoscopic sleeve gastrectomy (LSG).

Methods: We analyzed 39 non-diabetic morbidly obese patients, undergoing LSG. All patients were submitted to 3-hour OGTT for glucose (BG) and insulin plasma level measurement before surgery and one-year after LSG. The HOMA index was also calculated. Hypoglycaemia was defined as $\text{BG} \leq 3.3 \text{ mmol/L}$ and severe hypoglycaemia as $\text{BG} \leq 2.7 \text{ mmol/L}$.

Results: After LSG 21 patients (53.8%) experienced at least one asymptomatic hypoglycaemia provoked by OGTT and 10 patients (25.6%) had at least one severe hypoglycaemia episode. Hypoglycaemic events occurred from 120' to 180' and the highest frequency was observed at 150' in 16 subjects (41%). Severe hypoglycaemia occurred only from 150' on. Homa index (HOMA-IR) significantly decreased 1-year after LSG either in patients with or without hypoglycaemia. The insulin AUC 1-year after LSG was statistically higher ($p < 0,0002$) in patients with hypoglycaemia.

Conclusion: These findings confirm the high incidence of post-prandial hypoglycaemia 1-year after LSG emphasising also in this population the high frequency of late severe hypoglycemia. A normalization of HOMA-IR occurred in all patients thus suggesting an improvement of insulin sensitivity. The persistent insulin hyper response to an oral glucose load after surgery in most of the patients with hypoglycaemia explains, at least in part, the phenomenon.

T5:PO.028

Prevalence of liver function abnormalities in obese patients undergoing bariatric surgery

Ana Saavedra¹, Sandra Belo², Maria Costa¹, Cláudia Nogueira², Joana Oliveira², Filipe Cunha², Eva Lau², Ana Santos³, Paula Freitas², Ana Varela², Joana Queirós², Flora Correia⁴, Davide Carvalho¹, et al.

¹Department of Endocrinology, Diabetes and Metabolism – Hospital of St. John, Oporto, Portugal

²Department of Endocrinology, Diabetes and Metabolism – Hospital of St. John, Oporto, Portugal Faculty of Medicine, Oporto University, Portugal

³Department of Clinical Epidemiology, Predictive Medicine and Public Health, Portugal Faculty of Medicine, Oporto University, Portugal

⁴Department of Endocrinology, Diabetes and Metabolism – Hospital of St. John, Oporto, Portugal Faculty of Nutrition and Food Sciences, Oporto University, Portugal

Introduction: Obesity is associated with a higher prevalence of non-alcoholic fatty liver disease. Weight loss and exercise are the first line therapeutic measures. Objective: To evaluate the prevalence of liver abnormalities in patients with morbid obesity and the impact of bariatric surgery (BS) on liver function.

Methods: Retrospective cross-sectional study of obese patients undergoing BS. Demographic, anthropometric and analytical parameters before and 12 months after BS were evaluated.

Results: We included 387 patients, 88.6% women, mean age of 42.8 ± 10.4 years and body mass index (BMI) of 44.5 ± 4.8 kg/m². 56.1% patients were submitted to gastric banding and 41.1% patients to gastric bypass and 2.8% to sleeve gastrectomy. At the preoperative evaluation 18.3% of patients presented increased aspartate aminotransferase (AST), 28.4% of the alanine aminotransferase (ALT) and 35.1% of the gamma-glutamyl transpeptidase (G-GT). No differences were found in liver function parameters according to preoperative BMI. After surgery there was a reduction in AST (25.3 ± 12.7 vs. 20.7 ± 6.2 U/L), ALT (29.2 ± 18.0 vs. 22.0 ± 13.8 U/L) and G-GT (35.8 ± 34.8 vs. 24.4 ± 25.4 U/L) but an elevation of alkaline phosphatase levels (71.1 ± 20.0 vs. 76.6 ± 24.8 U/L). A reduction in the prevalence of elevated AST (6.7%), ALT (11.9%) and G-GT (14.5%) was also observed. There were no differences in the magnitude of reduction of the different parameters of liver function according to surgical procedure except for G-GT levels that presented higher reductions in patients undergoing sleeve.

Conclusion: Bariatric surgery presents an overall positive impact on liver function. This effect seems to be independent of the surgical procedure.

T5:PO.029

Effect of two preoperative low energy diets on liver volume in bariatric patients: A randomized trial

Tatjana Schütz¹, Veronika Peter¹, Nikita Garnov², Alexander Schaudinn², Nicolas Linder², Harald Busse³, Shang Edward⁴, David Petroff⁵, Arne Dietrich⁶

¹Leipzig University Medical Center, IFB AdiposityDiseases, Leipzig, Germany

²Leipzig University Hospital, Department of Diagnostic and Interventional Radiology, Leipzig, Germany Leipzig University Medical Center, IFB AdiposityDiseases, Leipzig, Germany

³Leipzig University Hospital, Department of Diagnostic and Interventional Radiology, Leipzig, Germany

⁴Klinik Dr. Rinecker, Munich, Germany

⁵Leipzig University, Coordination Centre for Clinical Trials, Leipzig, Germany

⁶Leipzig University Hospital, Clinic of Visceral, Transplantation, Thoracic and Vascular Surgery, Section of Bariatric Surgery, Leipzig, Germany

Introduction: It is known that a preoperative low energy diet (LED) can effectively reduce liver volume (LV). In a prospective, randomized intervention study, we compared two LED-products (high protein / low carbohydrate vs. high carbohydrate) concerning their effect on LV, body weight and anthropometric parameters.

Methods: 70 patients scheduled for bariatric surgery were randomized to receive LED1 (75 g protein, 28 g fat, 80 g carbohydrates) or LED2 (58 g protein, 19 g fat, 111 g carbohydrates) and 200 g vegetables daily for two weeks. Pre- and post-interventionally LV (MRI, 1.5 T) and body weight, hip-, waist-, neck- and upper arm circumferences were measured. Compliance and energy intake were verified by a nutrition diary.

Results: Age and BMI were similar between groups (LED1: n = 34; 22 f, age 47.2 years, BMI 47.5 kg/m²; LED2: n = 36; 25 f, age 46.3 years, BMI 47.5 kg/m²). Patients had comparable average energy consumption (LED1: 901 ± 148 kcal/d; LED2: 872 ± 120 kcal/d) and lost 8.5% ± 3.3% (LED1) and 7.9% ± 3.6% (LED2) of their excess weight during the intervention. LV decreased dramatically in both groups (LED1 -471 ± 358 ml; LED2 -340 ± 258 ml), without a significant difference between diets. There was a strong association between the change in LV and liver size at baseline. Hip-, waist- and neck circumferences decreased without a significant difference between groups.

Conclusion: All patients had good adherence to the two-week low energy diets. Both diets resulted in a significant liver volume reduction previous to bariatric surgery.

T5:PO.030

Evaluation of TSH levels in euthyroid obese patients – are there any differences due to treatment with metformin?

Costa¹, Nunes², Nogueira², Oliveira², Lau², Cunha², Belo², Saavedra¹, Queirós², Varela², Freitas², Carvalho²

¹Department of Endocrinology, Centro Hospitalar São João, Porto, Portugal

²Department of Endocrinology, Centro Hospitalar São João, Porto, Portugal Faculty of Medicine, University of Porto, Portugal

Introduction: Evidence shows that metformin may decrease TSH levels, an effect that has been documented in diabetic patients with hypothyroidism.

Objective: Evaluation of TSH levels in euthyroid obese patients.

Methods: Retrospective study of patients who underwent bariatric surgery between January 2010 and December 2011 without evidence of thyroid disease. Demographic, anthropometric and analytical data were collected. For statistical analysis, the *Student's t-test* and chi-square test were applied. Results are presented as mean ± standard deviation.

Results: 410 patients were included, with mean age of 42.0 ± 10.5 years, weight 115.6 ± 16.9 kg and BMI 44.5 ± 4.8 kg/m². On the first evaluation, 97 patients were treated with metformin [2 were normoglycemic, 12 had pre-diabetes and 83 had type 2 diabetes mellitus (T2DM)]. In patients not treated with metformin, 194 were normoglycemic, 95 were pre-diabetic and 14 had T2DM. Although the treated group was significantly older than the non-treated group (48.9 ± 9.5 vs. 39.8 ± 9.9 years, p < 0.001), there were no differences with respect to weight, BMI, waist and hip circumference. Metformin treated patients had TSH levels of 1.84 ± 0.90 uIU/ml, free T3 (FT3) 3.02 ± 0.51 ng/dL, free T4 (FT4) 1.09 ± 0.18 ng/dL and T3L/T4L 2.85 ± 0.61. Untreated patients showed TSH 1.92 ± 0.91 uIU/ml, FT3 3.13 ± 0.51 ng/dL, FT4 1.07 ± 0.25 ng/dL and T3L/T4L 3.00 ± 0.59. Although the treated group showed a tendency to have lower TSH levels, there were no statistically significant differences between groups.

Discussion: In this study, treatment with metformin was not associated with lower levels of TSH. The evaluation of glycemic groups with different profiles can be a limitation of this review.

T5:PO.031

Laparoscopic Banded Roux-en-Y Gastric Bypass Using a Silk Ring for Morbid Obese Patients: An Inexpensive and Feasible Surgical Technique

Cunchuan Wang, Wah Yang, Jingge Yang

First Affiliated Hospital of Jinan University

Introduction: Various devices and materials of banded gastric bypass were introduced to improve unsatisfactory surgical outcomes of gastric bypass due to gastric pouch dilation. However, the required devices and materials were expensive, and complications occurred. We herein propose an inexpensive and practicable surgical method that involves replacement of expensive devices and materials with a silk ring.

Methods: Laparoscopic banded Roux-en-Y gastric bypass using a silk ring (LRYGB-SR) was performed in 16 consecutive patients. Clinical data were kept prospectively.

Results: LRYGB-SR was performed in 16 patients undergoing gastric bypass surgery. The mean BMI was 58.1 kg/m². Creation of the silk ring took an average within 1 minute. The mean %EWL in nine months follow up was 65.3%. There were no silk ring related complications observed during the follow-up. The outcomes in terms of weight loss and resolution of comorbidities were similar to those previously reported for banded gastric bypass.

Conclusion: LRYGB-SR is safe, feasible, and shows good efficacy in this preliminary study with short follow-up. It is easy to operate and requires no extra expenditures. Therefore, this technique deserves to be popularized. Further study is needed to verify its long-term outcomes.

T5:PO.033

Weight loss at one year after sleeve gastrectomy compared to gastric banding

Amali Abeyssekera, Mourad Labib

Department of Clinical Biochemistry, Russells Hall Hospital, Dudley, West Midlands, DY2HQ, United Kingdom

Introduction: NICE guidelines in UK recommend bariatric surgery for people with BMI \geq 40 kg/m² or BMI \geq 35 kg/m² with co-morbidities with the aim of reducing their BMI to <35 kg/m². The most common types of bariatric surgery are gastric banding (GB) and gastric bypass (GBP).

However, sleeve gastrectomy (SG) has recently emerged as a procedure for patients at high surgical risk, those with lower BMI, and as a first stage for subsequent GBP in those with BMI $>$ 55 kg/m².

Methods: We audited the outcome in 22 patients (15 male and 7 female) who underwent SG and 22 age-matched patients (9 male and 13 female) who underwent GB in order to assess weight loss at one year between the two groups.

Results: The mean initial BMI in SG patients was 50.6 \pm 8.9 kg/m² and 36.7 \pm 6.3 kg/m² post-SG. The mean initial BMI in GB patients was 45.7 \pm 7.0 kg/m² and 37.9 \pm 5.2 kg/m² post-GBP. The mean % loss of EBW at one year was 55.6 \pm 14.4% in SG and 37.8 \pm 13.8% in GB patients ($p < 0.0001$).

Conclusion: Our audit showed that patients who had SG achieved significantly more weight loss than those who had GB. We recommend SG as the restrictive procedure of choice compared to GB in those who are unsuitable to have GBP.

Reference:

1 Baltasar A, Serra C & Pérez N. Laparoscopic Sleeve Gastrectomy: A Multi-purpose Bariatric Operation. *Obesity Surgery*, 2005;15(8):1124–1128.

T5:PO.034

Body adiposity rather than body mass index should be considered for bariatric surgery eligibility

Javier Gómez-Ambrosi¹, Rafael Moncada², Víctor Valentí³, Fernando Rotellar³, Camilo Silva⁴, Beatriz Ramírez¹, Victoria Catalán¹, Amaia Rodríguez¹, Juan C. Galofré⁵, Javier Escalada⁵, Neus Vila⁵, Patricia Ibáñez⁵, Sonia Romero⁵, María J. Gil⁶, Javier Salvador⁴, Gema Frühbeck⁷

¹Metabolic Research Laboratory, Clínica Universidad de Navarra, 31008 Pamplona, Spain. CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain.

²Department of Anaesthesiology, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

³CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain. Department of Surgery, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

⁴CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain. Department of Endocrinology & Nutrition, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

⁵Department of Endocrinology & Nutrition, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

⁶CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain. Department of Biochemistry, Clínica Universidad de Navarra, 31008 Pamplona, Spain.

⁷Metabolic Research Laboratory, Clínica Universidad de Navarra, 31008 Pamplona, Spain. CIBER Fisiopatología de la Obesidad y Nutrición (CIBERObn), ISCIII, 31008 Pamplona, Spain. Department of Endocrinology & Nutrition, Clínica Universidad de Navarra, 310

Introduction: Eligibility criteria for bariatric surgery (BS) are based on BMI and the presence of major comorbidities. Our aim was to analyse the usefulness of body adiposity determination in establishing the indication of BS.

Methods: In order to study the cardiometabolic risk depending on eligibility criteria for BS four groups were analysed. Morbidly obese patients with BMI $>$ 40 kg/m² (n = 360), and obese subjects with BMI $>$ 35 kg/m² and at least one comorbidity (n = 431), represented two groups of patients meeting classical criteria for BS. A third group included patients with a BMI $<$ 35 kg/m² and a high BF% (HF), or individuals exhibiting a BMI $>$ 35 kg/m² without comorbidities and a BF% within the obesity range ($>$ 35% in women and $>$ 25% in men) (n = 266). Lean subjects by BMI were the reference group (n = 140). BMI, BF% and markers of cardiometabolic risk were measured.

Results: Individuals from the “BMI $<$ 35 HF” group exhibited decreased insulin sensitivity evidenced by a significant reduction in QUICKI ($P < 0.001$). Triglyceride concentrations were similarly increased ($P < 0.05$) in the three obese groups. Uric acid levels were elevated ($P < 0.01$) to a similar extent in the obese groups. Furthermore, concentrations of the inflammatory marker CRP and hepatic enzymes were significantly increased in the three obese groups.

Conclusion: These data provide evidence for the existence of a similar adverse cardiometabolic profile in subjects with a BMI $<$ 35 kg/m² but exhibiting a highly increased adiposity compared to morbid obese patients. It is concluded that body composition analysis yields valuable information to be incorporated into the BS selection algorithms.

T5:PO.034

Changes in body weight, risk factors and comorbidities 5 years after bariatric surgery or three lifestyle interventions in the morbidly obese.

Øvebro¹, Strømme², Kulseng³, Martins³

¹Department of Cancer Research and Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway

²Centre for Obesity, Department of Surgery, St. Olav Hospital—Trondheim University Hospital, Trondheim, Norway Department of Neuroscience, Faculty of Medicine, Norwegian University of Technology and Science, Trondheim, Norway

³Obesity Research Group, Department of Cancer Research and Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway Centre for Obesity, Department of Surgery, St. Olav Hospital—Trondheim University Hospital

Introduction: Not all morbidly obese patients want, or are eligible for bariatric surgery, and therefore, depend on effective lifestyle interventions. This study aimed to compare changes in body weight (BW), risk factors and comorbidities 5 years after Roux-en-Y gastric bypass (RYGB) or three lifestyle interventions in morbidly obese. Methods 209 morbidly obese adult patients were non-randomly allocated to: 1) RYGB (n = 58), 2) 21-week commercial weight loss camp (n = 30), 3) residential intermittent program (n = 64), or 4) hospital outpatient program (n = 57). BW, risk factors and comorbidities were assessed at baseline, 1 and 5 years.

Results: Analysis of completers (85.6% and 54.1% at 1 and 5-years, respectively) yielded a significant overall reduction in BW of 18% (24 kg) at 1 year ($p < 0.0001$), followed by a significant regain of 10% (11 kg) from 1 to 5 years ($p < 0.0001$). Significant overall reduction in BW of 10% (13.5 kg) was observed comparing baseline with 5 year follow-up, with the RYGB group losing significantly more weight than the lifestyle groups ($p < 0.0001$), and with no difference amongst the latter. Compared to the other groups, glucose, HDL-C and LDL-C was significantly better in the RYGB group at 5 years ($p < 0.05$). In the RYGB group, more subjects experienced reversal of hypertension compared with all lifestyle groups combined ($p = 0.02$).

Conclusion: Even though a significant weight loss can be achieved with lifestyle interventions in the long-term, RYGB is associated with a greater weight loss, healthier glucose and blood lipids, and a larger proportion with reversed hypertension, after 5 years.

T5:PO.035

Impact of laparoscopic sleeve gastrectomy on metabolism and liver structure

Lidia Santarpià, Concetta Del Piano, Valeria Amato, Maurizio Marra, Carmela De Caprio, Eliana De Rosa, Franco Contaldo, Fabrizio Pisanisi

Department of Clinical Medicine and Surgery, Federico II University, Naples

Introduction: To assess the metabolic effects of Laparoscopic Sleeve Gastrectomy (LSG), 17 obese (OB; 10 M – 7 F, 38 ± 12 years, 45,7 ± 7,4 kg/m²) and 20 patients with LSG (7 M – 13F, 39 ± 9 years, 35,9 ± 8,4 kg/m²) 1 year after surgery were studied.

Methods: Calorie and nutrient intake were evaluated with a 2 week food record and dietary inquiry; Basal Metabolic Rate (BMR) with indirect calorimetry and liver structure with ultrasonography were evaluated.

Results: The two patients' groups were statistically different as far as weight (98,2 ± 26,6 in LSG vs 127,9 ± 23,8 kg; $p = 0.001$) and BMI ($p = 0.001$), serum triglycerides ($p = 0.005$), HDL Chol ($p = 0.001$), AST ($p = 0.030$), ALT ($p = 0.001$), GGT ($p = 0.049$), Hb ($p = 0.015$), Hct ($p = 0.010$), and butyrylcholinesterase ($p < 0.0001$). Basal Metabolic Rate (1911 ± 399 vs 2211 ± 281 kcal/day; $p = 0.015$), insulin (7,3 ± 3,7 vs 23,4 ± 3,4 μU/ml; $p = 0.012$) and leptin levels (15,9 ± 11,7 vs 23,5 ± 7,7 $p = 0.05$) were significantly lower in LSG. Serum GLP1, IGF1, ghrelin, cholecystokinin, NPY, TNFα, IL6 levels, as well as fecal Short Chain Fat-

ty Acids were not significantly influenced by LSG. Prevalence of liver steatosis was 46% in OB (10% slight, 30% moderate, 6% severe) and 45% in LSG (35% slight, 10% moderate).

Total calorie intakes were not significantly different in the two groups, whilst protein ($p = 0,01$), disaccharides ($p = 0,007$) and total fiber ($p = 0,024$) intakes were.

Conclusion: LSG produced positive effects on metabolic parameters and fatty liver disease severity. The above changes alleviated symptoms of metabolic syndrome, obesity related co-morbidities and risks.

T5:PO.036

Does BMI Influence Metabolic Responses following Surgery

Surendra Ugale, et al.

Kirloskar Hospital, Hyderabad, India

Introduction: Metabolic responses to surgery are reviewed to assess the influence of BMI

Methods: Comparison of meta-analysis for BMI <35 versus >35, show higher incidence of micro-vascular problems at lower BMI, while hypertension and coronary disease is more with higher BMI. The HbA1c reduction and remission rates for diabetes are compared; as also the effects on hypertension, dyslipidemia and microalbuminuria.

Results: In spite of lesser weightloss (–5.5 BMI change of 17.7%), reduction in HbA1c is similar in both groups; –2.8% vs –2.7% (30% change). With BMI>35, mean BMI change is –13.9 (reduction of 28.3%). Remission rates of diabetes are 60% in lower BMI, compared to 76.8%. With bariatric procedures (RYGB or BPD-DS), the remission rates drop as BMI becomes lower (from 80–90% to about 40%); while with Ileal Interposition with duodeno-jejunal exclusion, the efficacy was quite similar across all weight ranges, conveying that weight loss is not very essential for its efficacy. The total insulin secretion is reduced post-op in all BMI groups, while the total insulin output is increased in lower BMI (insulinopenia); in BMI>35 there is very little change. With even lower BMI ≤ 27, metabolic response is lower, as compared with higher BMI. Lean Indian diabetics have good B-cell reserve for insulin, which ensures a good metabolic response.

Conclusion: Metabolic responses are better than expected even at lower BMI levels; primary metabolic procedures do better than bariatric ones

T5:PO.037

Psychopathology following bariatric surgery: A pilot study on feasibility, acceptability, and effectiveness of a cognitive-behavioral therapy

Almut Rudolph, Anja Hilbert

Leipzig University Medical Center, IFB AdiposityDiseases

Introduction: Bariatric surgery significantly minimizes medical comorbidities and maximizes long-term weight loss and psychosocial functioning. However, a significant proportion of patients experience poor weight loss outcome and weight regain over time. Significant predictors for less post-operative weight loss were post-operative eating disorders (ED) and major depressive disorders (MDD). Although first evidence suggests that post-operative behavioral management had a positive effect on post-operative outcome, neither study comprehensively addressed psychopathology following bariatric surgery.

Methods: We developed a modular short-term cognitive behavioral therapy (CBT) that comprises 15 individual sessions based on evidence-based manuals for ED and MDD adapted to post-operative weight loss management. We piloted the manual in an uncontrolled proof-of-concept study with a total of eight patients. Questionnaires, interviews and anthropometric data were assessed before, at the end and six month after end of treatment.

Results: All patients (age: 48.38 ± 9.27 years; BMI: 41.73 ± 4.30 kg/m²) had undergone bariatric surgery (RYGB or LAGB) at least six months before treatment. Most of the patients showed improvements in eating disorder or depressive disorder symptoms, self-esteem, quality of life, and social functioning between beginning and six months following intervention. Acceptance and compliance was good.

Conclusion: We documented feasibility, acceptability, and effectiveness of a CBT for patients with ED or MDD following bariatric surgery. Adaptations of the manual and the procedure for the proof of efficacy in randomized-controlled studies will be discussed.

T5:PO.038

Prevalence of anemia and related deficiencies 10 years after gastric bypass. A retrospective study

Christos Karefylakis¹, Ingmar Näslund², David Edholm³, Magnus Sundbom³, F. Anders Karlsson⁴, Eva Rask⁵

¹Division of Internal Medicine, Department of Endocrinology, Örebro University Hospital

²Division of Surgery, Örebro University Hospital

³Department of Surgical Sciences, Uppsala University

⁴Institute of Medical Sciences, Uppsala University

⁵Centre for Health Care Sciences, Örebro University Hospital

Introduction: Bariatric surgery has gained wide acceptance as a treatment for severe obesity and is associated with decreased overall mortality. Roux-en-Y gastric bypass (RYGB) is known to be one of the most effective procedures. The aim of this study was to evaluate the prevalence of anemia and related deficiencies long term after RYGB.

Methods: All 745 patients who underwent RYGB between 1993 and 2003 at either Örebro or Uppsala University Hospital, and who were living in Sweden were invited to participate by providing a fasting blood sample and completing a questionnaire about their health status. Full blood count, serum iron, transferrin, vitamin B12 and folate were determined.

Results: Follow up was completed in 431 patients (58%), of which 85% were female with ages of 51.3 ± 10 years. Of all patients, 27.4% had anemia postoperatively, 19.8% iron deficiency, 2.2% vitamin B12 deficiency and 12.2 folate deficiency. There was no statistically significant correlation between anemia and gender, follow up time, 25-OH vitamin D pre-operative BMI or postoperative BMI. Anemia was correlated with iron deficiency and folate deficiency but not with vitamin B12 deficiency. A statistically significant inverse correlation was found between anemia and regular medical check-ups concerning gastric bypass surgery.

Conclusion: We found that 27.4% of patients had anemia more than 10 years after RYGB. Anemia does not seem to progress with time after surgery. Anemia was less common in patients with regular medical check-ups. Thus, improved long-term follow up is needed.

T5:PO.039

Effect of diet and bariatric surgery on body and tissue weight in sprague-dawley rats

Peinado-Onsurbe¹, Rossell¹, Oller¹, Viñas¹, Pardina¹, Ricart-Jané¹, Piñol², González², Mestres², Baena-Fustegueras²

¹Dpt. Bioquímica i Biologia Molecular. Facultat Biologia. Universitat Barcelona, Spain

²Hospital Universitari Arnau de Vilanova, Lleida, Spain

Introduction: Study of effect on body and tissue weight of both diet (high fat versus chow diet) and bariatric surgery on rats.

Methods: Seven control (C) groups were fed with chow diet, while 7 groups were fed with DIO diet (60% fat). A group control and another DIO were sacrificed every 2 weeks during the 3 following months. At week nr 8, the remaining 5 groups underwent a *sleeve*, similar to the bariatric surgery performed in humans.

After surgery, one of the remaining DIO groups continued with chow diet and was sacrificed at week nr 12. After each sacrifice, tissues were removed, weighted and frozen.

Results: DIO diet increased significantly not only body weight or Adipose Tissues (AT), such as Brown AT (BAT), Epididymal AT (EAT) and Perirenal AT (PAT), but also peripheral tissues (lung, heart, adrenal glands, etc). Surgery effect in rats continuing with DIO diet after intervention show a decrease in DIO-12 in body weight and in other tissues (liver, spleen, heart, EAT,...). Surgery effect was astonishingly different in DIO-group fed with chow diet, showing a very significant decrease in both body and several tissue weights

Conclusion: DIO diet caused significant changes not only on body and adipose tissue weight, but also in other non-expected organs as well (spleen, heart, thymus, etc.). *Sleeve* surgery caused a direct weight reduction, but the strongest decrease is seen in DIO group fed with chow diet after surgery, suggesting the importance of diet.

T5:PO.040

The first case of Posterior Periventricular Heterotopia associated to obesity and its bariatric surgical treatment

Valeria Guglielmi¹, Francesco Brancati², Francesco Garaci³, Monica D'Adamo¹, Silvio Costa¹, Giuliano Albergo¹, Roberto Floris³, Giuseppe Novelli⁴, Paolo Sbraccia¹

¹Department of Systems Medicine, Obesity Center (EASO accredited COM), University of Rome "Tor Vergata", Italy

²Medical Genetics Unit, Policlinico Tor Vergata, Rome, Italy

³Department of Diagnostic and Interventional Radiology, Molecular Imaging and Radiation Therapy, University of Rome "Tor Vergata", Italy

⁴Medical Genetics Unit, Policlinico Tor Vergata, Rome Department of Biomedicine, University of Rome "Tor Vergata", Italy

We describe the case of an Italian girl with early-onset obesity associated with extensive disturbance in cortical development.

She was only child of non-consanguineous parents. Her birth weight was 3.17 Kg.

At the time of our first examination she was three-year-old and her BMI, height and weight were 45.9 Kg/m², 122cm (SDS-height 6.77) and 68 Kg (SDS-weight 34.6), respectively.

Encephalic MRI showed developmental abnormalities consisting of bilateral nodules of grey matter lining lateral ventricles, restricted to temporal and occipital horns, malrotated hippocampi, cerebellar asymmetry and vermis hypoplasia. On the basis of these findings we diagnosed posterior periventricular nodular heterotopia (PNH), whose genetic cause remains unknown. This syndrome was never associated with obesity.

Cognitive function was normal and, apart from severe insulin-resistance with acanthosis nigricans and steatohepatitis, no further clinical and anatomical abnormalities were detected.

She progressively developed further weight gain and she had premature menarche at eight years of age. When she was nine-year-old, her BMI was 60.4 Kg/m² and hyperphagia was demonstrated by an 1980 kcal energy intake in an ad libitum meal test.

Given her massive obesity and hepatosteatitis not responding to any dietary interventions, we opted for biliopancreatic diversion. The post-operative course was uneventful, although she developed mild vitamin deficiencies. At 1-year follow-up her BMI was 34.7 Kg/m² with improvement of liver function and insulin-sensitivity.

In conclusion, we report the first case of posterior-PNH associated to obesity and its bariatric surgical treatment. Reports of surgical treatment hypotalamic obesity help in defining the role of surgery in these rare conditions.

T5:PO.041

Leptin and Acyl-ghrelin changes after bariatric surgery correlate to changes in feeding behaviour

Julian Emmanuel¹, Mohamed Elkallay², Majid Hashemi², Marco Adamo², Alberic Fiennes², Rachel Batterham³

¹Barts And The London NHS Trust- Metabolic unit

²UCLH- 3- Bariatric surgery unit, University College London Hospital NHS Foundation Trust

³Centre for Obesity Research, Department of Medicine, University College London

Cognitive factors of restraint and disinhibition are disordered in obesity. The three factor eating questionnaire (TFEQ) is designed to measure tendency to restrict food intake to control body weight (dietary restraint), and disinhibition of control of eating. TFEQ has been utilized as a psychometric instrument for the study of eating behaviours.

We conducted a prospective parallel group study in 17 patients with a BMI of 45.9 ± 1.1 to examine changes in TFEQ scores, and plasma Leptin, acyl-ghrelin concentrations at 6 and 12 weeks following bariatric surgery.

There was a significant increase in cognitive restraint after bariatric surgery ($p = 0.004$), significant increase at 6 ($p < 0.05$) and 12 ($p < 0.01$) weeks. Disinhibition was significantly ($p < 0.0001$) decreased after bariatric surgery, significant decrease at 6 ($p < 0.001$) and 12 ($p < 0.001$) weeks. Cognitive restraint at 12 weeks after surgery did show a positive correlation ($p = 0.081$, $r = 0.19$) to excess weight loss. There was a negative correlation between excess weight loss and Disinhibition at 12 weeks ($p = 0.037$, $r = 0.26$). Plasma leptin did display negative correlation ($p = 0.0015$, $r = 0.19$) to cognitive restraint, and a positive correlation ($p < 0.0001$, $r = 0.36$) to disinhibition. Cognitive restraint does show positive correlation ($p = 0.017$, $r = 0.64$) with the decrease in meal stimulated acyl-ghrelin AUC at 12 weeks. The decrease in disinhibition does also show a negative correlation ($p = 0.01$, $r = 0.34$) with decrease in acyl-ghrelin AUC at 12 weeks.

The correlations between leptin/ acyl-ghrelin and cognitive restraint/ disinhibition are not able to answer the question of causality or consequence; however, endocrine changes may mediate some of the favourable feeding behaviour changes after surgery.

T5:PO.042

Evolution of body mass index of women undergoing bariatric surgery in the pre- and pos-operative period – a retrospective study

Carvalho, D.P.¹, Póinhos, R.¹, Fernandes, A.², Costa, J.², Pereira, M.², Correia, F.^{1,3}

¹Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, Porto

²Hospital de Braga

³Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, Porto Centro Hospitalar de São João, E.P.E.

Introduction: In recent years, there has been an increased interest in surgical treatment of morbid obesity in concomitance with the epidemic of obesity. The bariatric surgery has proven to be an effective treatment that helps the adherence to the eating plan, and, consequently, the ponderal loss.

Methods: This study consisted of analyzing data from 191 obese women, who were followed in the Nutrition consultant in the Service of Endocrinology, in the Hospital of Braga, and submitted to the adjustable gastric banding (AGB) and to the gastric sleeve (GS).

This information has been evaluated in clinical processes of participants in certain time points.

Results: In both methods, there was a gradual decrease of the BMI among the time of surgery and the 6th month after.

Patients submitted to adjustable gastric banding had best results of BMI between the moment of the surgery and 15 days after the surgery, while

women submitted to gastric sleeve had worse results of BMI between the 3 and 6 months after the surgery. Over half of the patients submitted to the adjustable gastric banding had grade I or grade II obesity after 12 months and most submitted to the gastric sleeve had pre-obesity or grade I obesity.

Conclusion: Differences were found between the 2 types of surgical methods. The grade I obesity was the final classification more predominant, at the end of the 12 months after, but the bariatric surgery allowed a higher decrease of the BMI with better results to gastric sleeve.

T5:PO.043

Sleeve Gastrectomy: University Hospital Experience

Sousa, Preto

Faculty of Medicine University of Oporto

Introduction: Bariatric surgery is becoming an increasingly popular treatment in obese patients producing long-term and considerable changes in body weight. Nowadays laparoscopic sleeve gastrectomy (LSG) is considered to be a stand-alone bariatric procedure with increasing indication and major advantages. We present our experience with this technic, evaluating at three and six months the reduction of excessive body weight while reversing obesity related comorbidities such as, insulin-resistance, high blood pressure and hyperlipidemia.

Methods: We retrospectively analyzed the records of our first consecutive 119 patients. The aim was to analyze baseline demographics, comorbidities, operative outcomes, complications and weight loss.

Results: A total of 93 female and 26 male patients underwent LSG over the study period. There was no mortality. Intra-operative complications occurred in 2.4% of the patients. Mean body mass index (BMI) declined considerably from the initial 44.8 kg/m^2 to 37.8 kg/m^2 , and 34.6 kg/m^2 , at three and six months. Mean percentage of excess weight loss (%EWL) gradually increased from 36.3% at three months to 51.3% at six months. At six months follow-up, studied comorbidities (hypertension, hyperlipidemia and insulin-resistance) as well as the number of prescribed medications were all significantly reduced.

Conclusion: Results from our series indicate LSG to be safe and efficient as a stand-alone bariatric procedure. At six months follow-up, sustained weight loss and reduction in the associated comorbidities were detected. Whether these good results will be maintained will require prolonged follow-up with special attention to unwanted regained weight.

T5:PO.044

Laparoscopic sleeve gastrectomy for morbid obesity: Our preliminary results

Gokhan Selcuk Ozbalci, Kagan Karabulut, Ayfer Kamali Polat, Serdar Senol, Hamza Cinar, Kenan Erzurumlu

19 Mayıs University Faculty of Medicine Department of General Surgery

Introduction: Laparoscopic sleeve gastrectomy (LSG) became a favorite option for morbid obesity treatment in last years. The aim of this study is to present our initial experience about this bariatric technique.

Methods: Seventy-five obese patients (57 females and 18 males) underwent LSG between September 2012 and December 2013. Of those, forty-three patients who completed minimum 6 months postoperative follow up, were evaluated for preliminary results. The safety and short-term efficacy of LSG were examined. Data collected were age, weight, body mass index(BMI), operative time, postoperative complications, length of hospital stay and degree of weight reduction.

Results: For the first 43 patients, mean age was 41.75 years (range 23–57) and mean preoperative weight and BMI were 139.2 kg (range 98–214) and 51.4 kg/m^2 (range 40–79.8), respectively. There was one mortality occurred due to pulmonary embolism. Mean operative time was 1.5 hours (range 1–3). Median hospital stay was 6.5 days (range 4–12). Average excess weight loss (EWL) and BMI were 48.6% and 37.9 kg/m^2 at 6 months and 61.7% and 34.3 kg/m^2 at 1 year respectively.

Conclusion: According to our preliminary results, LSG is a safe and effective treatment option for the morbid obese and super morbid obese patients. However, long-term follow-up would be necessary to evaluate results more accurately.

Reference:

- 1 Ufford E, Nease B, Canterbury T. Laparoscopic sleeve gastrectomy with comparable weight loss in all obese groups: a VA hospital experience. *Am Surg* 2013 Jul;79(7):739–42.

T5:PO.045

Management of staple line leak after laparoscopic sleeve gastrectomy with covered stent. Our first experience

Gokhan Selcuk Ozbalci¹, Ibrahim Goren², Ayfer Kamali Polat¹, Bulent Gungor¹, Kagan Karabulut¹, Kenan Erzurumlu¹

¹19 Mayıs university faculty of medicine department of general surgery
²19 Mayıs university faculty of medicine department of gastroenterology

Introduction: Laparoscopic sleeve gastrectomy (LSG) is popular surgical treatment option for morbid obesity. But gastric leak is the most fearful complication. We report our experience of staple line leak, which was managed successfully with covered stent.

Methods: *Case History:* The patient was 23 years old, male, who has 132 kg weight and his body mass index (BMI) was 45.6 kg/m². Sleeve gastrectomy performed as a bariatric surgical procedure. We've recognized staple line leak in the fourth day after surgery with tachycardia and the observation of gastric fluid and saliva in the drain content. Then endoscopic covered stent was applied for control of leakage. Application of the stent was successful and no migration occurred.

The patient was discharged five days after application of the stent. The stent was kept placed during 21 days.

Results: The leakage was healed successfully, and stent was removed by endoscope. The patient was discharged four days after stent removal without any complication.

He is currently five months and thirteen days of follow up after surgery. The patient's weight is 85 kg, BMI is 29.4 kg/m² and he has no feeding and health problem.

Conclusion: Endoscopic stent application is a safe and effective therapeutic option for management of staple line leak after LSG.

References:

- 1 Gagner M et al.: Laparoscopic sleeve gastrectomy for the super-super-obese (body mass index >60 kg/m(2)). *Surg Today* 2008;38(5):399–403.
- 2 Knapps J et al.: A systematic review of staple-line reinforcement in laparoscopic sleeve gastrectomy. *JLS* 2013 Jul-Sep;17(3):390–399.

T5:PO.046

Type 2 Diabetes Influences Weight Loss After Bariatric Surgery?

Luís Cardoso¹, Dírcea Rodrigues², Patrícia Oliveira¹, Luisa Ruas¹, Joana Saraiva¹, Carolina Moreno¹, Daniela Guelho¹, Rosa Dantas³, Nuno Vicente¹, Francisco Carrilho¹

¹Department of Endocrinology, Diabetes and Metabolism, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal

²Department of Endocrinology, Diabetes and Metabolism, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal and Faculty of Medicine, University of Coimbra, Coimbra, Portugal

³Department of Endocrinology, Centro Hospitalar do Baixo Vouga, Aveiro, Portugal

Introduction: Obese patients have a risk of developing type 2 diabetes (T2D) 7.28-fold higher than non-obese. Bariatric surgery is the most effective treatment for obesity, with long-lasting effects on weight loss and T2D remission. Our objective was to evaluate the effect of T2D on the weight loss after bariatric surgery.

Methods: Retrospective, case-control study matched for body mass index (BMI). 77 patients who underwent bariatric surgery were included: 33 T2D patients (30 women, mean age 49.42 ± 7.59 years, pre-surgery BMI of

47.66 ± 8.02 kg/m²) and 44 normoglycemic patients (39 women, mean age 39.93 ± 9.53 years, pre-surgery BMI of 46.96 ± 7.93 kg/m²). Patients were assessed preoperatively, at six months, one, two, three, four, five and six years after surgery. Patients with intermediate hyperglycemia were excluded.

Results: T2D patients had higher BMI than normoglycemic patients during follow-up period. Statistical significance was observed in the first (35.30 ± 7.22 vs 31.37 ± 5.51 kg/m², p = 0.025) and third years (36.04 ± 3.96 vs 31.13 ± 2.49 kg/m², p = 0.016). In the T2D arm maximum weight loss occurred at two years (percent excess weight loss [%EWL] 51.65 ± 18.19%), in controls occurred at three years (%EWL of 61.37 ± 11.25%, p = 0.007). Normoglycemic patients were 2.57 times (CI 95%: 0.69–9.49) as likely to achieve non-obese BMI than patients with T2D at two years and 6 times (95% CI: 0.81–44.35) as likely at three years.

Conclusion: Patients with T2D had lower %EWL and reached maximum %EWL earlier than normoglycemic patients. Weight loss appears to be influenced by T2D, though more studies are needed to establish the best timing for bariatric surgery in T2D patients.

T5:PO.047

Weight loss at one year after sleeve gastrectomy compared to gastric bypass

Amali Abeysekera, Alison Head, Mourad Labib

Department of Clinical Biochemistry, Russells Hall Hospital, Dudley, West Midlands, DY12HQ, United Kingdom

Introduction: NICE guidelines in UK recommend bariatric surgery for people with BMI ≥ 40 kg/m² or BMI ≥ 35 kg/m² with co-morbidities with the aim of reducing their BMI to < 35 kg/m². The most common types of bariatric surgery are gastric banding (GB) and gastric bypass (GBP). However, sleeve gastrectomy (SG) has recently become popular for staging in patients with BMI > 55 kg/m², for those at high surgical risk, for lower BMI patients, and for patients with gastrointestinal conditions preventing them from having GBP.

Methods: We audited the outcome at one year in 22 patients who underwent SG and 22 patients (matched for age and gender) who underwent GBP in order to assess weight loss and % of patients who achieved BMI < 35 kg/m².

Results: The mean initial BMI in SG was 50.6 ± 8.9 kg/m² and 36.7 ± 6.3 kg/m² post-SG. Nine patients (40.9%) achieved target BMI < 35 kg/m². The mean initial BMI in GBP was 48.9 ± 9.4 kg/m² and 31.9 ± 7.1 kg/m² post-GBP. Twenty patients (90.9%) achieved target BMI < 35 kg/m². The mean % loss of EBW at one year was 55.6 ± 14.4% in SG and 74.6 ± 15.9% in GBP (p < 0.0001).

Conclusion: Our audit showed that GBP was more effective than SG in achieving more weight loss and the target BMI. However, SG resulted in significant weight loss of around 50% of EBW and should be considered as an effective alternative for patients who are not suitable to have GBP.

Reference:

- 1 Baltasar A, Serra C & Pérez N. Laparoscopic Sleeve Gastrectomy: A Multi-purpose Bariatric Operation. *Obesity Surgery*, 2005;15(8):1124–1128

T5:PO.048

Laparoscopic adjustable gastric banding (LAGB) in French adolescents. A single centre experience

François Pattou, Iva Gueorguieva, Estelle Aubry, Marie Pigeyre
Lille University Hospital

Introduction: Bariatric surgery approach for severely obese adolescents is under evaluation in four university hospitals in France. In Lille University hospital, we started this treatment in 2011.

We performed LAGB in adolescents older than 14 years who have failed to lose weight after at least one year of "classical" approach including dietary, lifestyle and behavioural coaching.

Methods: Results To date we have included 17 adolescents, 4 males and 13 females; mean age was 16.5 years (range 14y9mo to 17y3mo). Mean

BMI before surgery was 43.3 ± 7.8 (range 36 to 60). Mean weight loss (BMI) was 5.4 (range 1.7 to 8.5) for a period of mean follow-up of 13.8 months. We do not have any side effect or complication except one gastric band's port infection which was resolved after removal of the port (but not of the gastric band) and antibiotherapy.

Conclusion Our pilot experience shows that LAGB in adolescents is safe and efficient. We have lower complication rates than previously described by other teams in similar populations.

T5:PO.049

Significant reductions in the cardiovascular risk factors C3 and C4 as well as other inflammatory markers achieved by lifestyle changes followed by bariatric surgery

Torunn Kristin Nestvold¹, Erik Waage Nielsen², Knut Tore Lappegård³

¹Department of Surgery, Nordland Hospital Regional centre of Treatment for Severe Obesity, Nordland Hospital University of Tromsø

²Department of Anesthesia, Nordland Hospital University of Tromsø University og Nordland

³Department of Medicine, Nordland Hospital University of Tromsø

Introduction: Morbidly obese patients have a high risk of developing cardiovascular disease and type II diabetes mellitus. In this prospective study we measured the levels of inflammatory, haemostatic and endothelial markers before and after bariatric surgery.

Methods: 98 morbidly obese patients aged 26–61 years were included. Weight, body mass index (BMI) and blood samples were obtained at baseline, prior to surgery and one year after surgery. Waist circumference was measured at baseline and one year after surgery. The patients underwent lifestyle changes for a period of 3 months prior to bariatric surgery. 17 individuals (BMI < 25) served as a control group, with only baseline measurements.

Results: In the patient group there was a statistically significant reduction in C3, C4, Hs-CRP, fibrinogen, D-Dimer and asymmetric dimethylarginine (ADMA) ($p < 0.0001$) from baseline to one year after bariatric surgery. The patient group had significantly higher levels of all markers at baseline compared to the control group, whereas no difference was observed one year after surgery. For other inflammatory markers including TNF α , IL-6, IL-12 and IL-18, no differences between patients and the control group were observed.

Conclusion: Morbidly obese patients have higher levels of several inflammatory markers associated with development of cardiovascular disease as compared to normal weight individuals. After a period of lifestyle changes followed by bariatric surgery these differences were no longer present.

T5:PO.050

The impact of preoperative psychopathology on the outcome of bariatric surgery

Ruairi Page, Amali Abeysekera, Pamela Cansdale, Angela Haddon, Helen Ashby, Mourad Labib

The Dudley Group NHS Foundation Trust

Introduction: Morbid obesity is associated with high rates of psychopathology, e.g. depression and eating disorders, and the prevalence of these is higher in bariatric surgery candidates than in controls. Several studies have found no impact of these disorders on postoperative weight loss, whereas some reported that individuals with two or more psychiatric disorders lost less weight after bariatric surgery.

Methods: We have retrospectively audited the prevalence of preoperative depression and eating disorders in 9 patients who lost <25% EBW at one year (suboptimal group) compared to 9 patients (matched for age, gender and surgical procedure) who lost >40% EBW (control group). In each group, there were 5 women and 4 men (mean age: 40.1 ± 7.5 years). Seven patients had gastric banding and 2 had gastric bypass.

Results: In the suboptimal group, 8 of the 9 patients had depression and 5 of those also had eating disorders. In the control group, 5 patients had depression but none had an eating disorder. The mean %EBW loss at one year was $14.8 \pm 6.2\%$ (0.0–21.7%) in the suboptimal group compared to $57.4 \pm 16.7\%$ (40.5–85.2%) in the control group ($p < 0001$).

Conclusion: Our audit showed that the presence of a psychopathological disorder plays a major role in determining the success of bariatric surgery. We recommend that formal psychological assessment should be an integral part of preoperative assessment of patients being considered for bariatric surgery.

Reference:

1 Z Pataky, et al. Psychological factors and weight loss after bariatric surgery. *Current Opinion in Gastroenterology*, 2011;27:167–173.

T5:PO.051

Patients' Strategies for Eating after Gastric Bypass Surgery: A Qualitative Study

Hillersdal, Christensen, Holm

Department of Food and Resource Economics, Copenhagen University

Introduction: There are large individual variations in weight loss following bariatric surgery, notably in medium-to-long-term outcomes. Furthermore the evaluation of results after surgery continues to be a subject of controversy. Weight loss is the common measure to classify success or failure, occasionally contextualised by measures of health-related quality of life or improvement in comorbidities. This study explores whether and how patients' conceptions of success or failure may inform analysis of variation in weight loss.

Methods: The study is based on qualitative interviews with 32 men and women in Denmark diagnosed with morbid obesity and treated with Roux-en-Y gastric bypass surgery. The interviews were transcribed, coded and analysed according to grounded analysis oriented methodology.

Results: Good as well as poor weight loss after gastric bypass may be related to patients' eating behaviour post-surgery. Three patient strategies were identified. 1: In "surgery as a time-out" patients will use surgery as a facilitator to change ordinary habits and accomplish a genuine lifestyle modification. 2: In "new stomach as solution" patients will expect the smaller stomach to hinder excess food intake. 3: "abstaining" is adopted by patients who are afraid to experience side effects or 'destroy' the operation. Individual experienced satisfaction with treatment appear to correlate with these strategies, as some patients experience surgery as a tool for self-regulation which makes them capable of managing themselves, while others maintain emotional and disordered eating.

Conclusion: Qualitative approaches including patients' individual experiences provide a more nuanced and thorough analysis and assessment of treatment results after bariatric surgery.

T5:PO.052

Suboptimal weight loss and significant weight regain after gastric bypass surgery

Amundsen¹, Strommen², Kulseng³, Martins⁴

¹Department of Public Health, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway

²Centre for Obesity, Department of Surgery, St. Olav Hospital—Trondheim University Hospital, Trondheim, Norway Department of Neuroscience, Faculty of Medicine, Norwegian University of Technology and Science, Trondheim, Norway

³Obesity Research Group, Department of Cancer Research and Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway Centre for Obesity, Department of Surgery, St. Olav Hospital—Trondheim University

⁴Obesity Research Group, Department of Cancer Research and Molecular Medicine, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway Centre for Obesity, Department of Surgery, St. Olav Hospital—Trondheim University

Introduction: Few studies have tried to identify factors responsible for suboptimal weight loss (SWL) or significant weight regain (SWR) after gastric bypass surgery (GBP). The present study compared energy intake (EI), physical activity (PA) and eating behaviour, between those experiencing SWL or SWR, and those experiencing an optimal weight loss (OWL) or no SWR after GBP.

Methods: Patients with more than one year follow up after GBS, referred to the Obesity Clinic at St. Olav's Hospital (Norway), took part in this study. They were classified as either experiencing SWL (excess weight loss <50% (n = 12)) or OWL (n = 23) and SWR (weight regain >15% from nadir ((n = 26) or not (n = 9). Pre-operative age, BMI and postoperative follow-up, was similar between the SWL and SWR and their respective control groups. EI was measured using a food frequency questionnaire, PA using Sensewear Armbands, eating behaviour using the Dutch Eating Behavior Questionnaire (DEBQ) and the Three-Factor Eating Questionnaire (TFEQ).

Results: EI was not significantly different between neither of the groups. PA was significantly lower in SWL and SWR groups ($p < 0.0001$) compared with controls. A higher external eating score (DEBQ) was found both in the SWL and SWR groups compared with controls ($p < 0.05$). A higher hunger score (TFEQ) was found only in the SWL group ($p < 0.001$), while a higher restraint score (DEBQ) was found only in the SWR group, compared with controls ($p < 0.05$).

Conclusion: Although EI was similar between groups, differences in PA levels and eating behavior may account for the different weight loss outcomes after GBP.

T5:PO.053

Patients' Strategies for Eating after Gastric Bypass Surgery: A Qualitative Study

Hillersdal, Christensen, Holm

Department of Food and Resource Economics, Copenhagen University

Introduction: There are large individual variations in weight loss following bariatric surgery, notably in medium-to-long-term outcomes. Furthermore the evaluation of results after surgery continues to be a subject of controversy. Weight loss is the common measure to classify success or failure, occasionally contextualised by measures of health-related quality of life or improvement in comorbidities. This study explores whether and how patients' conceptions of success or failure may inform analysis of variation in weight loss.

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Results: Good as well as poor weight loss after gastric bypass may be related to patients' eating behaviour post-surgery. Three patient strategies were identified. 1: In 'surgery as a time-out' patients will use surgery as a facilitator to change ordinary habits and accomplish a genuine lifestyle modification. 2: In 'new stomach as solution' patients will expect the smaller stomach to hinder excess food intake. 3: 'abstaining' is adopted by patients who are afraid to experience side effects or 'destroy' the operation. Individual experienced satisfaction with treatment appear to correlate with these strategies, as some patients experience surgery as a tool for self-regulation which makes them capable of managing themselves, while others maintain emotional and disordered eating.

Conclusion: Qualitative approaches including patients' individual experiences provide a more nuanced and thorough analysis and assessment of treatment results after bariatric surgery.

T5:PO.054

Laparoscopic sleeve gastrectomy for morbid obesity: Our preliminary results

Selcuk Ozbalci, Kagan Karabulut, Ayfer Kamali Polat, Serdar Senol, Hamza Cinar, Kenan Erzurumlu, et al.

19 Mayıs University

Introduction: Laparoscopic sleeve gastrectomy (LSG) became a favorite option for morbid obesity treatment in last years. The aim of this study is to present our initial experience about this bariatric technique.

Methods: Seventy-five obese patients (57 females and 18 males) underwent LSG between September 2012 and December 2013. Of those, forty-three patients who completed minimum 6 months postoperative follow up, were evaluated for preliminary results. The safety and short-term efficacy of LSG were examined. Data collected were age, weight, body mass index(BMI), operative time, postoperative complications, length of hospital stay and degree of weight reduction.

Results: For the first 43 patients, mean age was 41.75 years (range 23–57) and mean preoperative weight and BMI were 139.2 kg (range 98–214) and 51.4 kg/m² (range 40–79.8), respectively. There was one mortality occurred due to pulmonary embolism. Mean operative time was 1.5 hours (range 1–3). Median hospital stay was 6.5 days (range 4–12). Average excess weight loss (EWL) and BMI were 48.6% and 37.9 kg/m² at 6 months and 61.7% and 34.3 kg/m² at 1 year respectively.

Conclusion: According to our preliminary results, LSG is a safe and effective treatment option for the morbid obese and super morbid obese patients. However, long-term follow-up would be necessary to evaluate results more accurately.

T5:PO.055

Does BMI Influence Metabolic Responses following Surgery

Surendra Ugale, et al.

Kirloskar Hospital, Hyderabad, India

Introduction: Metabolic responses to surgery are reviewed to assess the influence of BMI

Methods: Comparison of meta-analysis for BMI <35 versus >35, show higher incidence of micro-vascular problems at lower BMI, while hypertension and coronary disease is more with higher BMI. The HbA1c reduction and remission rates for diabetes are compared; as also the effects on hypertension, dyslipidemia and microalbuminuria.

Results: In spite of lesser weightloss (–5.5 BMI change of 17.7%), reduction in HbA1c is similar in both groups; –2.8% vs –2.7% (30% change). With BMI>35, mean BMI change is –13.9 (reduction of 28.3%). Remission rates of diabetes are 60% in lower BMI, compared to 76.8%. With bariatric procedures (RYGB or BPD-DS), the remission rates drop as BMI becomes lower(from 80–90% to about 40%); while with Ileal Interposition with duodeno-jejunal exclusion, the efficacy was quite similar across all weight ranges, conveying that weight loss is not very essential for its efficacy. The total insulin secretion is reduced post-op in all BMI groups, while the total insulin output is increased in lower BMI (insulinopenia); in BMI>35 there is very little change. With even lower BMI ≤ 27, metabolic response is lower, as compared with higher BMI. Lean Indian diabetics have good B-cell reserve for insulin, which ensures a good metabolic response.

Conclusion: Metabolic responses are better than expected even at lower BMI levels; primary metabolic procedures do better than bariatric ones

T5 – Diet, behaviour and physical activity treatments in adults

T5:PO.056

Carbohydrate quality and incident obesity in a Mediterranean cohort: The SUN Project

Susana Santiago¹, Itziar Zazpe¹, Maira Bes-Rastrollo², Ana Sanchez-Tainta², Carmen Sayon-Orea², Carmen De la Fuente-Arrillaga², Silvia Benito², J.Alfredo Martinez¹, Miguel Angel Martinez-Gonzalez²

¹Department of Nutrition and Food Sciences and Physiology, University of Navarra (Spain)

²Department of Preventive Medicine and Public Health, University of Navarra (Spain)

Introduction: Previous evidence about the role of quality of carbohydrates intake on weight change in adult population is scarce. Our aim was to evaluate the association between a new index of carbohydrate quality (CQI) and the risk of becoming overweight or obese in the SUN cohort.

Methods: After a median of 7.9 years of follow-up, we included 8 741 participants initially free of overweight/obesity (BMI \leq 25 kg/m²). Validated data on diet were collected with a 136-item semi-quantitative FFQ at baseline. We used a new index to evaluate the CQI following 4 criteria: dietary fibre intake, glycemic index, ratio of whole grains to total grains and ratio of solid carbohydrates to total carbohydrates. Subjects were classified into quintiles according to this dietary index. Weight was recorded at baseline and updated every 2 year during follow-up.

Results: We observed 1 862 incident cases of overweight/obesity during follow-up. CQI was significantly associated (p for trend 0.006) with lower risk of becoming overweight/obese (adjusted OR for the 4rd and 5th quintiles of CQI: 0.81; 95% CI: 0.66 to 0.99, and 0.74; 95% CI: 0.59 to 0.92, respectively).

Conclusion: In this Mediterranean prospective cohort of young adults, CQI showed a significant inverse association with the incidence of overweight/obesity. These results highlight that carbohydrate intake guidelines related to obesity prevention should be focused in improving quality by increasing the dietary fibre intake, consumption of whole grains, preferring solid carbohydrates and choosing low GI food.

T5:PO.057

Quercetin glucoside-enriched beverage reduced body fat in obese human

Nakamura Junchi, Yoshimura Makiko, Uchida Masaaki, Fukui Nobuyuki

Suntory Global Innovation Center Limited

Introduction: Quercetin is one of the most well-known polyphenol contained in fruit and vegetables. It has been reported that quercetin induces lipolysis. In this study, we investigated the effect of Quercetin glucoside (QG) –enriched beverage on body fat reduction in obese humans.

Methods: We performed a randomized double-blind, placebo-controlled trial. Eighty subjects with body mass index (BMI) between 25.0 to 30.0 kg/m² were randomly divided into four groups; low dose group (60 mg as isoquercitrin (QG1) / 350 ml / bottle: L group), middle dose group (110 mg as QG1 / 350 ml / bottle: M group), high dose group (160 mg as QG1 / 350 ml / bottle : H group) and placebo group (0 mg as QG1 / 350 ml / bottle : P group). Each subject consumed one bottle a day for 12 weeks. Body Fat was measured by computed tomography scan.

Results: Although total fat area (TFA) did not change in P group and L group, TFA decreased significantly in M group (295.4 cm² to 280.1 cm²) and L group (294.2cm² to 271.9 cm²). In addition, body weight, BMI, and waist circumference were also significantly decreased. No adverse events related to the beverage were observed in all groups.

Conclusion: QG-enriched beverage reduced body fat in obese humans. It was suggested that the dosage of QG which decreases the body fat in obese human is 110 mg as QG1 or more. In conclusion, QG-enriched beverage could be effective for prevention or amelioration of metabolic syndrome.

T5:PO.058

Resting Energy Expenditure in Obese Adults: Comparison between Measured and Estimated Values

Vanessa Poli¹, Amanda Moraes¹, Ricardo Sanches¹, Stephan Garcia², João Fidalgo², Lorenza Carvalho², Cibele Furlan², Danielle Caranti³

¹– Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos (SP), Brazil. ²– Obesity Study Group (GEO), Federal University of São Paulo – UNIFESP – Santos (SP), Brazil.

²²– Obesity Study Group (GEO), Federal University of São Paulo – UNIFESP – Santos (SP), Brazil.

³¹– Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos (SP), Brazil. ²– Obesity Study Group (GEO), Federal University of São Paulo – UNIFESP – Santos (SP), Brazil. ³– Department of Bioscience

Introduction: The increased prevalence of obesity has reached epidemic levels worldwide. To determine reliable resting energy expenditure (REE) measurements is important in order to establish reachable goals for dietary intervention and weight loss. The REE can be objectively and accurately measured through indirect calorimetry or predicted using linear regression equations.

Methods: The population considered on the study was comprised of 51 obese participants (IMC: 34.2 \pm 2.9 kg/m²) aged 40.8 \pm 6 years. REE was calculated using two equations: Harris-Benedict and Dietary Reference Intakes (DRIs, 2002). The values were compared against indirect calorimetry measurements (Fitmate[®], Cosmed). Calculated values within 85% – 115% of measured were defined as accurate.

Results: The Harris-Benedict equation was accurate for 80% of the participants, compared to indirect calorimetry. Predicted REE by DRIs equation was accurate for only 15.7% of the participants. The latter overestimated the measured values by 408–1181 kcal/d (p = 0.001). Results are summarized in Table 1.

Table 1. Description of REE values (mean \pm SD)

Method	REE (Kcal/d)
Fitmate	1768.3 \pm 337.3
Harris-Benedict	1741.1 \pm 228.6
DRIs	2310.7 \pm 317

Conclusion: The Harris-Benedict was the most accurate equation for this population. It is the oldest used in clinical practice and has undergone the most extensive validation. On the other hand, the DRIs, which is also commonly used, significantly over-predicted the measured REE in most of the studied population.

T5:PO.059

Effect of L-arginine supplementation on mineral status and insulin resistance in obese patients.

Pawel Bogdanski¹, Danuta Pupek-Musialik¹, Joanna Suliburska², Monika Szulinska¹

¹Department of Internal Medicine, Metabolic Disorders, and Hypertension, Poznan University of Medical Sciences, Poznan, Poland

²Department of Human Nutrition and Hygiene, Poznan University of Life Sciences, Poznan, Poland

Introduction: The aim of this study is to evaluate the long-term influence of L-arginine intake on mineral concentration in patients with obesity and

to assess the changes in lipid serum levels, fat content, and insulin resistance that result.

Methods: A randomized double-blind placebo-controlled study was conducted. 88 obese patients were randomly assigned to receive either 9 g of L-arginine or placebo daily, for 6 months. At baseline and after 6 months, selected anthropometrical measurements and blood biochemical analyses were performed and mineral levels were assessed. To assess insulin sensitivity, the gold-standard euglycemic clamp methodology was used

Results: A randomized double-blind placebo-controlled study was conducted. 88 obese patients were randomly assigned to receive either 9 g of L-arginine or placebo daily, for 6 months. At baseline and after 6 months, selected anthropometrical measurements and blood biochemical analyses were performed and mineral levels were assessed. To assess insulin sensitivity, the gold-standard euglycemic clamp methodology was used.

Conclusion: L-Arginine supplementation affects zinc status in obese patients. One beneficial influence is related to the improvements in insulin sensitivity.

T5:PO.060

Increased attendance at LighterLife management groups is associated with improved weight maintenance success 1 year after completing a VLCD weight loss programme

Kelly Johnston¹, Catherine Rolland², Susannah Haynes¹, Lee Dyson¹, John Broom¹, Jackie Cox¹, Bar Hewlett¹

¹Lighterlife UK Ltd

²Robert Gordon University

Introduction: LighterLife Total, a commercial weight-loss programme for obese individuals, utilises a tripartite approach consisting of a very-low-calorie diet (VLCD) in conjunction with behavioural-change therapy underpinned by group support. Post-weight loss, the LighterLife Management programme helps clients sustain healthy lifestyle changes and maintain their weight loss.

Methods: Weight records for 4897 individuals who had lost 25.5 ± 11.3 kg from their initial weight of 97.4 ± 15.8 kg on a VLCD+TCBT[®] and who were enrolled in Management for at least one year were analysed to evaluate the relationship between number of attendances at weekly management groups and amount of weight regain at one year. Differences in mean weight regain were analysed using one-way ANCOVA and the relationship between number of group attendances and weight regain was assessed using partial correlation (SPSS 21.0 Chicago, IL, USA).

Results: Mean weight regain observed in clients in the top quartile of weekly group attendances was significantly lower than that observed in the bottom quartile of weekly group attendances (4.6 ± 7.3 kg (n = 1224) vs 7.1 ± 7.7 kg (n = 1225); $p < 0.0001$). A small negative correlation between the number of weekly group attendances and weight regain was also observed ($r = -0.18$, $p < 0.0005$).

Conclusion: An inverse relationship between the number of weekly groups attended and amount of weight regained one year post weight loss following a VLCD was observed. Whilst historical data demonstrate weight regain is common after any weight-loss method, these results indicate that individuals who regularly attended management groups for a year after losing weight, were more likely to sustain their weight loss.

T5:PO.061

Intermittent Fasting – How long is enough?

Andreia Filipa de Castro, Rehana Jawadwala, Steve Fallows
University of Chester

Introduction: Intermittent fasting (IF) has become a popular method to decrease body weight and body fat mass, however, no one to date has studied the optimal time frame of fasting/feeding and the impact it has on total body weight, body composition, resting energy expenditure and

the feeding patterns in response to the reduction of energy intake due to these fasting periods.

Methods: Participants were divided into four different groups: Control group (8 hours of fasting/16 hours of feeding every day), 16-h (16 hours of fasting/8 hours of feeding in alternate days (AD)), 20-h (20 hours of fasting/4 hours of feeding in AD), and 24-h (24 hours of fasting in AD). The intervention was designed to last for 9 weeks and was divided into two phases: first phase- 1 week of control; second phase- 8 weeks of intervention.

Results: A decrease in body weight and in body fat mass were observed in the 16-h ($0.6 \pm 1.2\%$ and 0.64 ± 0.50 kg, respectively), in the 20-h ($5 \pm 2\%$ and 3.53 ± 2.94 kg, respectively) and in the 24-h group ($3.1 \pm 4.6\%$ and 2.70 ± 4.88 kg, respectively). Regarding REE, no significant differences were observed at the end of the study in relation to baseline values.

Conclusion: Findings from this paper suggest that IF regimes characterized by fasting lengths of 20 hours appear to be more effective to achieve reductions in body weight and in body fat mass, while sparing lean tissue.

T5:PO.062

Effect of eight weeks of a milk-based intensive weight management programme on anthropometric and metabolic characteristics of severely obese adults

Robert McGrath¹, Katriona Dullea², Katie Cunningham², Helena Griffin²

¹Bariatric Medicine Service, Galway University Hospitals.

²Bariatric Medicine Service, Galway D

Introduction: Therapeutic options for bariatric patients are limited by restricted access to bariatric surgery and a paucity of safe, effective pharmacotherapy. A relatively inexpensive, straightforward low-energy dietary (LED) regime based on meal replacement with semi-skimmed milk has shown therapeutic promise, but data on its effect size and feasibility are limited. We sought to quantify anthropometric and metabolic changes in this cohort after eight weeks of a milk-based LED.

Methods: This consisted of 2.5 litres/day of semi-skimmed milk, equivalent to approximately 1200 kcal/day, with supplemental micronutrients. Weight, height, body mass index and lipid profiles before and after eight weeks in the programme were compared in per-protocol analyses using a paired t-test.

Results: Of 30 bariatric patients enrolled, 18 completed the first eight weeks of the programme. Mean age was 52 (range 34–66) years. 56% were female. Results in the table are presented as means \pm SD.

Conclusion: Bariatric patients who tolerated a milk-based LED had significant weight loss and metabolic improvements, but attrition from the programme was high. The sustainability of these changes in the medium term remains to be determined, but more formal assessment of this intervention in a randomised controlled trial seems justified.

	Pre-Programme	After 8 weeks	P
Weight (Kg)	147.5 \pm 28.1	130.8 \pm 27	<0.001
BMI (Kg m ⁻²)	54.3 \pm 7.6	48 \pm 7.2	<0.001
Excess body weight (Kg)	79.5 \pm 24.1	62.8 \pm 22.7	<0.001
HbA1c (mmol/mol)	65.8 \pm 21.6	57.8 \pm 15.4	0.2
Total Cholesterol (mmol/l)	4.3 \pm 1.1	3.7 \pm 1.1	0.002
LDL- Cholesterol (mmol/l)	2.2 \pm 1	1.9 \pm 0.9	0.007
HDL- Cholesterol (mmol/l)	1.1 \pm 0.4	1.1 \pm 0.5	0.31
Triglycerides (mmol/l)	2.1 \pm 1	1.6 \pm 0.8	0.02

T5:PO.063

Evaluation of the effect of low calorie diet on level of sexual ability and desire of people who are overweight, fat and obese

Javad Arian

Arian Pooya Obesity Research Institute

Introduction: Obesity (almost) duplicates the incidence of sexual disorder. Sexual concern and sexual dysfunction in society is epidemic. The aim of this study is (the) evaluation (investigation) of the effect of low calorie diet on level of sexual ability and desire of people who are overweight, fat and obese

Material and Method: In this study volunteer (61 women and 10 men) aged between 20 and 25 years old with BMI of 25–47 Kg m^{-2} who had active partner were selected by purposeful sampling. Height, weight, body fat percentage and body mass index of patients; the nutrition status, diet habits and sexual ability and desire were evaluated by Arizona questionnaire. This questionnaire includes 6 questions. The maximum score is 29 for women and men in the optimum condition and the least one is 5. For each person, based on his or her weight, low calorie diet was defined and given to them. Patients were visited (checked) every week for two months, in each visit, weight of patients was measured and according to that, a new program was given. At the end of the low calorie diet program intervention, the Arizona was completed again by patients.

Results: Weight and body mass index in both sex significantly decreased $p < 0.05$. Fat percentage for women also significantly decreased ($p < 0.05$) whereas fat percentage of men body decreased but not significantly. The score of sexual ability in both sexes has not changed.

Conclusion: According to the results, the intervention of the low calorie diet program caused a decrease in weight and BMI but there has been no effect on the score of Arizona questionnaire.

T5:PO.064

Effects of the 'Croi CLANN' structured lifestyle modification programme on anthropometric and metabolic characteristics in severely obese adults

Catherine Crowe¹, Irene Gibson², Katie Cunningham², Caroline Costello², Claire Kerins², Jane Windle², Jenni Jones², Francis Finucane¹

¹Bariatric Medicine Service, Galway University Hospitals, Galway

²Croi, the West of Ireland Cardiac Foundation, Galway

Introduction: Lifestyle modification is fundamental to obesity treatment, but few studies have described the effects of structured lifestyle programmes specifically in bariatric patients. We sought to measure changes in anthropometric and metabolic characteristics in this cohort after participation in a nurse-led, group-based, fully supervised eight week programme, incorporating tailored weekly exercise sessions and educational workshops.

Methods: Weight, height, waist circumference, blood pressure, HbA1c, fasting glucose and lipid profiles as well as functional capacity (Chester Step Test) and questionnaire-based anxiety and depression scores before and after the programme were compared in per-protocol analyses using a paired t-test.

Results: Of 109 bariatric patients enrolled, 100 completed the programme. Mean age was 48.8 ± 11.9 years. 38% were male. Results are shown in the table. Data are presented as means \pm SD. There were no changes in blood pressure, fasting glucose or HbA1c (data not shown).

Conclusion: Bariatric patients completing an eight week, nurse-led structured lifestyle programme had improved adiposity, fitness, lipid profiles and mental health, but not blood pressure or glycaemia. Further assessment of this programme in a pragmatic randomized controlled trial is warranted.

	Pre-Programme	Post-Programme	P
Weight (Kg)	129 \pm 28.8	126.8 \pm 26.5	0.048
BMI (Kg m^{-2})	45.7 \pm 8.5	44.7 \pm 8.7	<0.001
Waist (cm)	134.9 \pm 22.1	131 \pm 20.5	<0.001
Functional Capacity	5.9 \pm 1.9	6.6 \pm 2.4	<0.001
Anxiety Score	8.2 \pm 4.3	7.3 \pm 4.1	0.03
Depression Score	7.7 \pm 3.8	5.5 \pm 4.3	<0.001
Total Cholesterol (mmol/l)	4.6 \pm 1.2	4.4 \pm 1	0.025
LDL- Cholesterol (mmol/l)	2.6 \pm 1.1	2.5 \pm 0.9	0.14
HDL- Cholesterol (mmol/l)	1.19 \pm 0.29	1.16 \pm 0.3	0.049
Triglycerides (mmol/l)	1.73 \pm 1.12	1.56 \pm 0.92	0.048

T5:PO.065

Overweight women with hypothyroidism (hypoTH) achieve the same weight loss as those without hypoTH by following the low calorie diet (LCD) Lighterlife Lite for 12 weeks

Kelly Johnston, Susannah Haynes, Lee Dyson, John Broom, Jackie Cox, Bar Hewlett

Lighterlife UK Ltd

Introduction: For overweight women with hypoTH, there are both real and perceived additional barriers in achieving weight loss, when compared with women without this condition. The use of commercial LCDs in patients diagnosed with hypoTH has not been adequately investigated.

Methods: Data for women with hypoTH ($n = 20$) who had completed at least 12 weeks on an LCD (LighterLife Lite) with group-based behaviour therapy (TCBT[®]) were obtained from the LighterLife database and compared with an equal sized group of age and BMI matched data from clients not diagnosed with hypoTH (controls). Comparisons between baseline and week 12 data within groups, and the total difference in weight loss over the same period between groups were performed using paired t-tests and unpaired t-test respectively (SPSS version 21.0, Chicago, IL, USA).

Results: After 12 weeks of LCD, there was a significant weight reduction for both groups when compared with baseline (mean \pm standard deviation) (hypoTH: 74.7 ± 6.9 kg vs 67.4 ± 6.7 kg, $p < 0.001$ and control: 76.2 ± 4.9 kg vs 67.1 ± 5.8 kg, $p < 0.001$). The total weight change observed for the hypoTH group did not differ significantly from that observed in the control group (-7.3 ± 2.1 kg versus -9.1 ± 3.7 kg, $p > 0.05$ (NS)).

Conclusion: We demonstrate that women receiving medication for hypothyroidism can achieve similar weight reduction to those women without a diagnosed thyroid abnormality after 12 weeks on a commercial LCD with group-based behaviour therapy.

T5:PO.066

Six year follow-up after non-surgical and surgical anti-obesity treatments

Maja Ekman¹, Fredrik Norström¹, Anne-Marie Räihä¹, Maria Klintonberg¹, Martin Ridderstråle²

¹Department of Clinical Sciences Malmö, Clinical Obesity Research, Lund University, Skåne University Hospital, Sweden

²Department of Clinical Sciences Malmö, Clinical Obesity Research, Lund University, Skåne University Hospital, Sweden; Steno Diabetes Center, Gentofte, Denmark

Introduction: Maintenance of weight loss and reduction of co-morbidities such as type 2 diabetes (T2D) are major goals for anti-obesity care.

Methods: We performed a long-term questionnaire-based observational follow-up study after different weight loss treatments. 1,130 subjects were included (group-based behavioral therapy [GT; n = 285]; GT initiated by low-calorie diet [GT-LCD; n = 137]; individual therapy [IT; n = 156]; gastric bypass after attending the center; [GBP; n = 151]). Response rate was 67% and follow-up time 6.1 ± 0.1 years (mean ± SEM).

Results: At follow-up the GBP group had lost most weight; BMI 46.1 ± 0.6 to 32.2 ± 0.6 kg/m², vs. BMI 40.9 ± 0.3 to 38.5 ± 0.3 kg/m² for the non-surgical treatment (NST) subgroups (p < 0.001). Both the largest NST loss and regain of weight was seen in the GT-LCD subgroup; a maintained loss of 3.6, 4.9, and 7.6% for IT, GT, and GT-LCD, respectively (p = 0.006); 57% maintaining a >5% loss of body weight at follow-up in the GT-LCD group. Incident T2D was lower (2.6% [-3.5–5.6] vs. 9.2% [6.6–11.8], [95% CI]; p = 0.02) and remission of T2D greater (52.8% [35.6–69.9] vs. 9.2% [6.5–11.1], [95% CI]; p < 0.001) for GBP vs. NST. T2D remission in the GT-LCD and GT groups specifically were 17.2% (2.6–31.9 [95% CI]; p < 0.001.) and 7.0% (4.7–10.0 [95% CI]; p = 0.04). The increase in T2D prevalence in the NST group was only 5.6% (1.2–10.0 [95% CI]; p = 0.01).

Conclusion: Bariatric surgery fulfills promises from academic trials in clinical practice. However, non-surgical treatments can also have a long-term impact on both weight loss as well as diabetes remission and prevention for those who cannot undergo surgery.

T5:PO.067

Dietary guidance given to patients with diabetes in Burkina Faso and Mali: Content and impact of professional profile

Franck Garant¹, Christian Mesenge¹, Helene Delisle², et al.

¹Universite Senghor d'Alexandrie

²Université de Montreal

Introduction: To assess the recommendations provided by health professionals to persons with diabetes regarding diet, physical activity and weight control, and to examine the relationship between advice given and characteristics of the health professionals

Methods: The cross-sectional study was conducted over three months in 2012 in Ouagadougou (Burkina Faso) and Bamako (Mali). Interviews with closed and open-ended questions were conducted with a total of 78 health professionals involved in the treatment of persons with diabetes in public hospitals and health center. Dietary recommendations pertaining to specific food items, meal and snack patterns, cooking methods and meals away from home were rated. Types of recommendations for physical activity and for body weight were rated in a similar fashion.

Results: Although 24% had no specific training in diabetes management, recommendations focused on foods to avoid, to restrict or to consume ad libitum, and diet sheets were given to patients. Most interviewed practitioners recognized that they did not have enough time or training to provide adequate dietetic guidance. Only 44% gave specific advice to patients on insulin and 20% talked about cooking methods. Overall, advice given to patients was considered 'acceptable' in 65% of respondents for diet, in 70% for control of body weight, and in 95% for physical activity. Dietary and physical activity guidance scores were significantly higher in professionals with specific training, and in MDs compared with other health professionals.

Conclusion: The study highlights the need to improve dietary counseling of patients with diabetes, particularly as regards developing specific dietary plans with individual patients for better compliance. Health professionals specialized in nutrition are becoming a priority in Africa

T5:PO.068

Eating carbohydrate mostly at dinner and at lunch proteins reduces body fat and inflammatory markers in overweight and obese men

Josefina Bressan¹, Fernanda Cristina Oliveira¹, Raquel Alves¹, Pfrimer Karina², Eduardo Ferrioli³

¹Department of Nutrition and Health, Federal University of Viçosa, Brazil

²Department of Nutrition and Metabolism, São Paulo University, Brazil

³Department of Clinical Medicine, São Paulo University, Ribeirão Preto, Brazil.

Introduction: Evidences suggests that the distribution of macronutrients plays an important role in controlling metabolism. In this sense, there is dissociated diet, which proposes not eating in the same meal two macronutrients together, because they would be converted to fat. Therefore, this study aimed to evaluate the effect of dissociated diets in carbohydrates and protein at lunch and dinner on anthropometry, body composition and inflammatory status of obese and overweight men.

Methods: Thirty-one men aged between 26.1 ± 6.0 years and body mass index (BMI) of 29.2 ± 2.5 kg/m², were randomly assigned to three groups: control (CT), diurnal carbohydrate and nocturnal protein (DCNP), and nocturnal carbohydrate and diurnal protein (NCDP). They followed for 8 consecutive weeks in free living conditions a low calorie diet. At the beginning and at the end of the intervention it was evaluated weight, BMI, waist circumference (WC), body composition, C-reactive protein (CRP), tumor necrosis factor-alpha (TNF-α), interleukin-6, leptin, and adiponectin.

Results: All groups showed reduction in weight, BMI and WC (p < 0.05). However, only the groups DCNP and NCDP showed reduction in body fat (p < 0.05). There was no difference in inflammatory markers between groups at baseline and the end (p > 0.05). It is noteworthy that increases in CRP and TNF-α were observed in groups DCNP and CT (p > 0.05).

Conclusion: Thus, it is suggested that the dissociation which recommends eating more carbohydrates at dinner and more protein at lunch (NCDP) should be preferred, because promoted reduction inflammatory mediators ad fat body in obese and overweight men.

T5:PO.069

Changes of bone mineral density after bariatric surgery in Asian obese patients

Wah Yang, Cunchuan Wang, Jingge Yang

First Affiliated Hospital of Jinan University

Introduction: Laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (LSG) were considered as effective surgical procedures for weight loss. Only a few researches were concerning the bone mineral density (BMD) before and after the bariatric surgery. We hereby tried to study the effects of bariatric surgery on BMD in Asian obese patients.

Methods: 48 consecutive patients underwent bariatric surgery (27 LRYGB and 21 LSG). Data on patient demographics, BMI and %EWL were recorded and analyzed during one year follow up. BMD was measured by dual-energy X-ray absorptiometry (DXA) before operations, and 1 month, 6 months, 12 months after the operations.

Results: %EWL was higher in LRYGB than that in LSG. BMD decreased significantly after LRYGB and LSG, and the changes was more significant in LRYGB. BMD in LRYGB decreased below the normal level after one year of operation, but that in LSG was still in normal level.

Conclusion: LRYGB has better weight loss effect in Asian obese patients than that of LSG. But LRYGB seemed more easily lead to osteoporosis. Calcium supplement is recommended for patients after bariatric surgery.

T5:PO.070

Irritable Bowel Syndrome in subjects with morbid obesity – a consequence of vitamin D or calcium deficiency?

Aasbrenn¹, Aaseth², Lydersen³, Farup⁴

¹Innlandet Hospital Trust, Gjøvik, Norway.

²Innlandet Hospital Trust, Kongsvinger, Norway. Hedmark University College, Elverum, Norway

³Norwegian University of Science and Technology, Trondheim, Norway.

⁴Innlandet Hospital Trust, Gjøvik, Norway. Norwegian University of Science and Technology, Trondheim, Norway

Introduction: Subjective health complaints and anomalous blood tests are common in subjects with morbid obesity (MO). This study aimed at finding predictors of Irritable Bowel Syndrome (IBS) in subjects with MO.

Methods: Consecutive subjects with MO were included. Information about demographics and diseases/disorders were recorded and a wide range of tests were taken. IBS was diagnosed according to the Rome III criteria, and abdominal complaints were measured with Irritable Bowel Severity Scoring System (IBSSS) range 0–500. Subjects with and without IBS were compared, and associations between IBSSS and other variables were calculated. Results are given as number and proportion (%), mean (SD), median (range) and Odds ratio (OR) with p-values.

Results: 62 subjects without organic diseases were included. Participants' characteristics: male/female: 18 (29%)/44(71%); age: 43 (10) years; BMI: 42.8 (4.5) kg/m²; IBS: 13 (21%); IBSSS: 73 (0–327). IBS was associated with low Hemoglobin (Hb) (14.0 vs. 14.6 g/dL, p = 0.03), low HbA1C (5.5 vs. 6.1%, p = 0.01), high parathyroid hormone (PTH) (7.3 vs 5.7 pmol/L, p = 0.02), and low CRP (4.7 vs 7.4 mg/L, p = 0.01). Only high PTH (OR 1.45, p = 0.02) and low Hb (OR 0.42, p = 0.03) were independent predictors of IBS, and only high PTH was associated with IBSSS (p = 0.02) in multivariable analyses.

Conclusion: The main finding was the associations between IBS and IBSSS and high PTH-values. MO, IBS and vitamin D deficiency have all been associated with activation of the immune system and changes in the microbiota. The study indicates that vitamin D and/or Ca deficiency might be pathogenic factors for IBS.

T5:PO.071

Patterns of Weight Change in African Americans: Pooled Analysis from Three Behavioral Weight Loss Trials

Knashawn Morales, Shiriki Kumanyika

Department of Biostatistics and Epidemiology, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, U.S.A.

Introduction: African Americans have a high prevalence of obesity and related chronic conditions. Identifying different trajectories of weight loss may help in understanding factors present at enrollment that can predict differential outcomes.

Methods: Secondary, observational analyses were conducted in pooled data for 604 African American, primarily female adults in three completed clinical trials that used similar weight counseling protocols and assessment measures. The analyses modeled weight change over 2 years, using growth mixture models. In addition to controlling for baseline weight and trial, several demographic and personal characteristics were evaluated as predictors of membership in the identified weight loss patterns.

Results: The best fitting model identified three patterns: 1) mean weight loss to about 2 kg below baseline (n = 519); 2) mean weight loss to about 3 kg at 1 year followed by ~ 4 kg regain (n = 61); and 3) mean weight loss to about 20 kg at 1 year followed by ~ 4 kg regain at 2 years (n = 24, of whom 23 were from 1 study). In final multivariate analyses, higher BMI was predictive of having pattern 2 (OR[95% CI] 1.09[1.03, 1.16]) or 3 (OR[95% CI] 1.43[1.25, 1.63]) and higher dietary fat score was predictive of a lower odds of having patterns 2 (OR[95% CI] 0.35[0.16, 0.75]) or 3 (OR[95% CI] 0.21[0.06, 0.72]).

Conclusion: Findings were consistent with moderate, clinically insignificant weight loss as the predominant pattern across all studies. The potential for greater success was reflected in a pattern in which a small number of participants achieved a major, relatively well-maintained weight loss.

T5:PO.072

Interdisciplinary therapy promotes changes on immune system and inflammatory state of obese adults

Ricardo Sanches¹, Stephan Silva², Suzana Rossi², João Pedro Fidalgo², Gustavo Araujo², Amanda Moraes¹, Vanessa Poli¹, Cibele Furlan², Lorenza Carvalho², Marcos Cipullo², Lila Oyama², Ronaldo dos Santos³, Danielle Caranti⁴

¹Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo/UNIFESP – Brazil. Obesity Study Group (GEO) – Federal University of São Paulo/UNIFESP – Brazil.

²Obesity Study Group (GEO) – Federal University of São Paulo/UNIFESP – Brazil.

³Department of Biosciences, Federal University of São Paulo/UNIFESP – Brazil

⁴Department of Biosciences, Federal University of São Paulo/UNIFESP – Brazil. Obesity Study Group (GEO) – Federal University of São Paulo/UNIFESP – Brazil.

Introduction: Obesity is associated with imbalance in cytokine concentrations and therefore low-grade chronic inflammatory status. The concentrations of many cytokines are increase in obesity, such as Leptin and MCP-1. Recent studies show that the interdisciplinary therapy promotes several health benefits in obesity population. The aim of this study was to analyze the effect of interdisciplinary therapy on markers of immune response and inflammation in obese adult women.

Methods: A total of twenty-seven (n = 27) adult women (age 43.3 ± 5.5 years and BMI 35.2 ± 3.0 kg/m²) were enrolled at 20 weeks interdisciplinary therapy consisted of combination exercise training three times a week and nutritional and psychological intervention once a week at Federal University of São Paulo – Brazil.

Results:

Variables	Before	After	Δ%	P
Body weight (kg)	93.7 ± 10.2	88.1 ± 8.3	- 5.9	0.001*
BMI (kg/m ²)	35.2 ± 3.0	33.1 ± 2.7	- 5.9	0.001*
Waist circumference (cm)	108.6 ± 10.1	99.6 ± 7.5	- 8.2	0.001*
Hip circumference (cm)	120.6 ± 8.7	114.9 ± 7.3	- 4.7	0.001*
Leptin (ng/ml)	31.2 ± 17.5	23.2 ± 12.4	-25.7	0.001*
MCP-1 (pg/ml)	297.1 ± 90.6	259.5 ± 89.7	-12.6	0.001*
TNF-α (pg/ml)	7.1 ± 2.7	6.5 ± 2.4	-8.4	0.263
Adiponectin (µg/ml)	6.1 ± 1.7	6.0 ± 3.5	-2.5	0.355

Conclusion: In 20 weeks, interdisciplinary therapy promoted decreased on concentration of leptin and MCP-1 in obese women.

T5:PO.073

295 obese women with hypothyroidism (hypoTH) achieve the same weight loss as those without hypoTH by following the formula-based very low calorie diet (VLCD) Lighterlife Total for 12 weeks

Kelly Johnston, Susannah Haynes, Lee Dyson, John Broom, Jackie Cox, Bar Hewlett

Lighterlife UK Ltd

Introduction: For obese women with hypoTH, there are both real and perceived additional barriers in achieving weight loss, when compared

with women without this condition. The use of commercial VLCDs in patients diagnosed with hypoTH has not been adequately investigated.

Methods: Data for women with hypoTH (n = 295) who had completed at least 12 weeks on a VLCD (LighterLife Total) with group-based behaviour therapy (TCBT[®]) were obtained from the LighterLife database and compared with an equal sized group of age and BMI matched data from clients not diagnosed with hypoTH (controls). Comparisons between baseline and week 12 data within groups, and the total difference in weight loss over the same period between groups were performed using paired t-tests and unpaired t-test respectively (SPSS version 21.0, Chicago, IL, USA).

Results: After 12 weeks of VLCD, there was a significant weight reduction for both groups when compared with baseline (mean \pm standard deviation) (hypoTH: 98.9 \pm 17.1 kg vs 83.2 \pm 15.5 kg, p < 0.001 and control: 98.7 \pm 14.9 kg vs 83.0 \pm 13.3 kg, p < 0.001). The total weight change observed for the hypoTH group did not differ significantly from that observed in the control group (-15.9 \pm 5.4 kg versus -15.7 \pm 5.3 kg, p > 0.05 (NS)).

Conclusion: We demonstrate that women receiving medication for hypothyroidism can achieve similar weight reduction to those women without a diagnosed thyroid abnormality after 12 weeks on a commercial VLCD with group-based behaviour therapy.

T5:PO.074

Facebook-delivered physical activity promotion intervention for overweight and obese adolescents

Heidi Ruotsalainen¹, Maria Kääriäinen¹, Tuija Tammelin², Helvi Kyngäs¹

¹Medical Research Center Oulu, Oulu University Hospital and University of Oulu, Finland

²LIKES- Research Center for Sport and Health Sciences Jyväskylä Finland

Introduction: Many adolescents are not meeting the current health-related physical activity recommendations and obesity is general concern among adolescents. Most of the adolescents have access to Internet and Facebook is frequently used by them. Facebook offers a possibility to deliver health information and social support to adolescents. At this study we developed a Facebook-delivered physical activity promotion intervention. Aim of this study is to evaluate the effectiveness and feasibility of this intervention.

Methods: 46 overweight or obese 13–16 year old adolescents from Northern Finland were randomized to three groups. Two experimental groups (n = 15, n = 16), where those both got Facebook-delivered physical activity counseling and one of the experimental groups got activity watch which showed the daily activity. One of the groups (n = 15) served as a control group. Main outcome was objectively measured physical activity and self-reported physical activity. Statistical analysis will be done by spring 2014. Developed 12-week intervention included 6 themes: 1) general information about healthy lifestyle, 2) sedentary lifestyle, 3) social support, 4) environment and activity possibilities, 5) adolescents physical function and 6) maintaining active lifestyle. Physical therapist and dietitian were tutors and intervention was delivered at Facebook. Adolescents had possibility to post and share experiences, thoughts and media daily in their group and privately chat to each other and to tutors. Parents were also noticed at this study.

Results: 44 adolescents completed the study. Preliminary analysis shows that Facebook-delivered intervention is effective on adolescent's weight maintaining.

Conclusion: Intervention seems to be effective, but further research is needed to evaluate effectiveness with greater amount of adolescents.

T5:PO.075

Analysis of the use of a commercial Low Calorie Liquid Diet at the Rotherham Institute for Obesity

Matthew Capehorn, Matt Bacchus, Dale Carter, Caroline Steele, Lynn Senior

Rotherham Institute for Obesity

Introduction: The Rotherham Institute for Obesity (RIO) is specialist centre for weight management, with a multi-disciplinary team approach, based in a primary care setting. This study set out to analyse the success of using the Cambridge Weight Plan Pro800 Liquid Diet as a weight loss intervention.

Methods: 20 RIO patients were provided with the Pro800 liquid diet for complete meal replacement during a 12 week period, in addition to all other MDT support and resources. The study group had initial and final group sessions, compulsory dietetic and talking therapy sessions, telephone support, and more frequent blood tests and weight/bio-impedance monitoring.

Results: Only 19 patients (7 male, 12 female), with a mean BMI of 50.2, began the study. Of the 19 patients, the mean weight loss was 12.8% (mean 18.9% excess body weight). Of the 10 patients that completed the full 12 weeks, the mean weight loss was 18.9kg (26.9% excess body weight). In the first week, the average weight loss velocity was 3.41kg/week, which fell to an average 0.77kg/week between weeks 4 to 12. Baseline BMI appeared to influence outcomes but without statistical significance. There were improvements in BP and fat composition during the period of the study.

Conclusion: The Pro800 liquid diet was well tolerated and provided significant weight reduction and improvements in BP and body composition, and should be considered as a valuable weight loss intervention.

T5:PO.076

First prospective study evaluating the role of genetic testing in weight management programs

Inge Croux, Rosario Gallina

GenShape

Introduction: Obesity rates in the Western world have escalated in recent decades and present a major public health challenge. The disappointing results of most weight management programs warrant development of novel methods to reach more successful results.

Methods: The genetic contribution to common obesity has been estimated at 40–70%.¹ Evidence for the potential benefit of genetic testing for obesity is until now limited. A qualitative study indicated that genetic test feedback on obesity increased motivation towards healthy lifestyles and relief of self-blame.² A retrospective study demonstrated that individuals following diets matched to their genotype showed statistically significant greater weight loss when compared to individuals on diets not matched to their genotype (5.99 kg versus 2.09 kg at 12 months; p = 0.013).³

Results: The objective of the first prospective study evaluating the role of genetic testing for obesity is to determine whether the test results may help to lose more weight by properly matching diet and exercise to the individual genotypes. All subjects will follow a similar weight management program. Several candidate genes (e.g. FTO, FABP2, ADRB2) will be analyzed. The average weight loss after 12 and 24 weeks will be measured in both study groups (genetically matching diets versus random diets).

Conclusion: The results of this prospective study are expected early 2015.

References:

- 1 Loos RJ. *Br.J.Clin.Pharmacol.* 2009; 68(6):811–829.
- 2 Meisel SF, et al.: *J.Genet.Counsel.* 2013; published online July 2013.
- 3 Nelson MD, et al.: Oral presentation at AHA's Joint Conference EPI/NPAM 2010, March 2–5, 2010, San Francisco, USA.

T5:PO.077

Saudi Obesity Treatment Experience: Success and Aspirations

Reshod Alshgrawi¹, Ismail Alshayeb², Sameeer Johuar²

¹KING SAUD UNIVERSITY

²Word of Nutritional Counseling Center

Introduction: Our activities were launched at the end of 2003 in our Word of Nutritional Counseling Center with the aspiration of contributing in reducing obesity flaring prevalence rates. We share the public and concerned authorities their bothers as Saudi Arabia was recently ranked one of top 3 obese nation in the world, and it is well documented that the main causes of death in Gulf States are the long standing Metabolic Syndrome diseases.

Method: Our service to clients is based on an individualized approach, tailored to the specific needs of the service seeker based on his/her baseline assessment data and goals for losing weight, self satisfaction and confidence. Nutritional assessment was carried using validated tools (AB-CDE).

Body mass index, body composition, intra abdominal adiposity, and waist circumference were measured. We received 5000 clients during 2007–2013, 661 in 2013, of which 250 received counseling only.

A food processor computer program is used to interpret the dietary data collected through an administered 24 hour recall and dietary history questionnaires. Details of biochemical, nutritional and body measurements will be presented.

Results: Overweight/obesity were the most commonly encountered health problems. We have treated around 400 in 2013 in a treatment period of 3 months. Average loss of weight encountered during first 3 months, was 12–15 kg, being higher at first two weeks, and continued but at slower rate.

Conclusion: Low calorie diet, exercise, food behavior modification and follow up/monitoring (a visit each two weeks) have promoted healthy weight loss and weight maintenance.

T5:PO.078

Reducing fat intake has a moderate correlation with the reduction of anxiety in obese adults

Danielle Caranti, et al.

State University Campinas (UNICAMP) Faculty of Food Engineering. (FEA) Doctoral in Department of Food and Nutrition. (DEPAN) DEPAN – FEA – UNICAMP, Monteiro Lobato st., 80, Campinas, SP, 13083–862–Brasil phone 5519 3521–4078; fax 5519 3521–4060

Introduction: Anxiety is the most prevalent type of mental disorder and a significant health concern. Symptoms of anxiety were examined in relation to obesity and a positive association between obesity and anxiety has been observed.

Methods: The sample consisted of 28 volunteers of different genders with BMI between 30–40 kg/m² (baseline 35 + 3.02). The volunteers received a diet for weight loss according to the anamnesis performed. A multidisciplinary intervention took place once a week with the team of nutrition and psychology and three times a week with the team of physical education. The multidisciplinary therapy lasted 6 months.

The questionnaires on frequency of consumption of three days, and the Beck Anxiety Inventory (BAI) were applied at the beginning of the intervention and after 6 months.

The Pearson correlation coefficient was used between two variables measuring range: percentages of total lipids ingested and BAI.

Results: We found a moderate correlation between the reduction of total lipids ingested and reduction of anxiety in volunteers ($p = 0,003$; $r = 0,5475$) at the end of the multidisciplinary therapy.

Conclusion: There appears to be no strong evidence to indicate that diet-induced weight loss (reduction of lipid ingested) has a beneficial effect on anxiety. However, none of the diet-induced weight loss studies assessed had a detrimental effect on anxiety.

T5 – Miscellaneous

T5:PO.079

Orally active fixed dose combination of memantine and baclofen for the treatment of obesity

Tamás Kitka, Péter Kovács, Balázs Varga, Csilla Horváth, Csongor Csekő, Krisztina Kordás, Istvánné Kis-Varga, Sándor Farkas

Gedeon Richter Plc.

Introduction: Recently approved and late stage development anti-obesity drugs still have efficacy and/or safety/tolerability issues warranting the quest for novel and better pharmacotherapies. Here the preclinical findings with the combination of two registered drugs: memantine (an NMDA receptor antagonist) and baclofen (a GABAB agonist) are presented.

Methods: The anti-obesity effects of memantine and baclofen alone and in combination were investigated in the diet-induced obesity test (in association with the conditioned taste aversion test) in mice. Their side effects were assessed with regards to respiration by whole-body plethysmography and with regards to muscle relaxation and CNS functions using the LABORAS automated animal behaviour analysis system and the rotarod test.

Results: While the individual effects of memantine and baclofen on body weight are modest (in both humans and rodents), their combination showed a markedly increased efficacy in the mouse diet-induced obesity test. The aversion-free dose of 2+3 mg/kg, b.i.d. memantine+baclofen produced a mean body weight loss of 6.6 to 9.7% over 14 to 28 days. This is similar to the effect of human-equivalent dose of Qsymia (high dose) in this model. No motor depressant or respiratory adverse effects have been seen at the significant weight reducing dose levels of the combination of memantine and baclofen.

Conclusion: These data suggest that the combination of memantine and baclofen may be non-inferior to Qsymia in humans in terms of efficacy, but might have a better safety and tolerability profile. The clinical feasibility of the concept is currently being tested (RGH-917).

T5:PO.080

Social Networking and Bariatric Surgery: Support or Sabotage

Catherine Homer, Angela Tod

Sheffield Hallam University

Introduction: Social networking (SN) applications to support weight loss are becoming increasingly available. Sustained weight loss following bariatric surgery requires long term behaviour change. Following years of weight-cycling patients require additional support to prepare for and manage the behaviour change necessary for successful surgery outcomes. Bariatric surgery patient support groups set up by multi-disciplinary teams (MDTs) provide opportunities for additional support for patients. SN may also provide additional networking and support between patients. This paper present qualitative findings indicating how SN can support or sabotage bariatric surgery patients weight loss outcomes.

Methods: A longitudinal qualitative study using in-depth semi-structured interviews and Framework Analysis techniques. 16 participants interviewed pre and post bariatric surgery.

Results: In the lead up to surgery, SN sites provided a seemingly positive platform of support for patients to share concerns with their peers about the surgery. However following surgery the use of SN forums focussed on comparing weight loss, diet and exercise behaviours between members. In some instances patients reported unhelpful competition between patients, inaccurate medical advice and bullying. Smaller SN support groups were described as cliques. Patients who had previously been socially isolated because of their weight, reported feeling bullied by new SN peers.

Conclusion: SN is attractive to patients prior to surgery but created challenges to patients and MDT's regarding weight management. The apparent lack of control in the information disseminated and behaviour of forum members may be destructive and enforce incorrect behaviours impacting on long term weight loss maintenance

T5:PO.081

Fasting and postprandial levels of GIP in healthy and obese subjects (The BIOCLAIMS Study)

Malczewska-Malec¹, Goralska¹, Razny¹, Stancel-Mozwillo¹, Wnek¹, Polus¹, Kieć-Klimczak², Zdzienicka¹, Gruca¹, Hubalewska-Dydejczyk²

¹Department of Clinical Biochemistry, Jagiellonian University Medical College

²Department of Endocrinology, Jagiellonian University Medical College

Introduction: Glucose-dependent insulinotropic polypeptide (GIP) is implicated in the pathogenesis of obesity and T2DM. The aim was to assess the differences in GIP release after glucose and fats loads in healthy subjects and patients with obesity.

Methods: Oral glucose tolerance test (OGTT) and oral lipids tolerance test (OLTT) were performed in patients with BMI= 30–40 kg/m² and healthy controls (BMI<27 kg/m²) aged 25–65 yrs. Blood concentrations of glucose, insulin and GIP were analysed from samples obtained in the fasting state and during OGTT and OLTT.

Results: In 115 obese patients (BMI= 34,5 kg/m²) fasting GIP levels were significantly higher than in 15 healthy controls (32,2 pg/ml vs 24,1 pg/ml, $p < 0,05$). We found increased postprandial GIP secretion in obese patients (OLTT AUC_{total} – 48546,7) compared to controls (OLTT AUC_{total} – 27129,5), $p < 0,01$. The most marked increase of GIP levels were detected at 2hr of OLTT (368,0 pg/ml in obese and 247,2 pg/ml in controls). By contrast, plasma GIP value at 2hr of OGTT was significantly lower (155,3 pg/ml in obese and 135,6 pg/ml in healthy subjects), $p < 0,01$. Fasting insulin levels were 17,3 mIU/ml in obese and 9,22 mIU/ml in controls. GIP and insulin levels were elevated in parallel in the postprandial state.

Conclusion: Obese patients revealed significantly higher GIP concentrations both fasting and during postprandial state compared to controls. The ingestion of fatty meal can strongly stimulate GIP release.

T5:PO.082

Improvements in metabolite levels during an oral glucose tolerance test in obese individuals after sustained weight loss

Nina Geidenstam¹, Anders Danielsson¹, Maja Ekman², Martin Ridderstråle³

¹Lund University, Clinical Obesity, Malmö, Sweden.

²Lund University, Clinical Obesity, Malmö, Sweden. Skåne University Hospital, Malmö, Sweden.

³Steno Diabetes Center A/S, Gentofte, Denmark. Skåne University Hospital, Malmö, Sweden.

Introduction: We investigated potential improvements in the metabolite response during an oral glucose tolerance test (OGTT) in obese subjects that were weight stable after substantial weight loss by non-surgical means.

Methods: Serum samples were collected from 14 obese individuals (BMI 44 ± 2 kg/m², mean \pm SEM) at 0, 30, and 120 minutes during a 75g OGTT at baseline, after a low-calorie diet assisted weight loss (BMI 36 ± 2 kg/m²), and after a six-month weight maintenance phase supported by group sessions (BMI 35 ± 2 kg/m²). Metabolites were detected by gas chromatography/mass spectrometry. Metabolite profiles at baseline were compared to a lean reference group ($n = 6$) with a BMI 22 ± 2 kg/m².

Results: The dynamic OGTT profiles of 59 metabolites, mainly amino acids (AAs) and free fatty acids (FFAs), were analyzed. In addition to

glucose and insulin, nineteen AAs and FFAs showed an altered profile at baseline compared to the lean group, where nine metabolite profiles later improved with the weight loss program. Interestingly, the AA tyrosine improved during weight loss whereas AAs such as glutamate and glutamine as well as several FFAs improved during weight maintenance. Ten metabolite profiles showed no improvement during the weight loss and remained altered after weight maintenance.

Conclusion: The OGTT profiles of several AAs and FFAs improve in obese glucose intolerant subjects as they lose weight and maintain weight loss. The metabolite changes occur either early or late in this process, mirroring the immediate improvement in hepatic insulin resistance during weight loss and the peripheral insulin sensitivity during weight maintenance.

T5:PO.083

Experience of a mHealth device for weight loss in diabetes: A user perspective

Ruth Bacigalupo, Peter Cudd, Olubukola Oguntuase, Jackie Elliott, Liz Williams

University of Sheffield

Introduction: Self-monitoring of diet and physical activity with the aid of mHealth technology is a promising approach to achieving weight loss in the overweight or obese diabetes population. A motivational digital device was used by participants in a three-arm mixed methods feasibility study to measure physical activity, keep a log of diet, calculate energy balance and provide feedback.

Methods: Eighteen adults (BMI=33.4+4.0) used the device to monitor diet and exercise for 16 weeks after being trained. Six males and three females took part in focus groups and interviews developed from the Technology Acceptance Model, which were recorded and transcribed (age range: 34 to 60). A framework analysis was used to analyse the qualitative data and identify common themes. This involved a systematic process of sifting, charting and sorting material according to key issues and sub themes.

Results: Using the completers in the analysis, there was a mean weight loss of 3.13kg after 16 weeks. Adherence to the device was above 80% at week 12 and during the weight maintenance period. Five key themes with sub-themes were identified: ease of adoption, ease of use, value of technology to users, truthfulness and support. The device was perceived as impressive in general terms and easy to use although some practical problems were identified. Recommendations for improvement were made by the participants.

Conclusion: Participants with diabetes found the mHealth device useful not only in terms of weight loss but also for motivation and behaviour change. Longer term pilot and extended trials are warranted.

T5:PO.084

The effect of n-3 PUFA supplementation on postprandial triglycerides and insulin in obesity. The BIOCLAIMS study

Razny¹, Polus¹, Wnek¹, Kieć-Wilk², Sliwa¹, Zdzienicka¹, Gruca¹, Malecki², Malczewska-Malec¹

¹Department of Clinical Biochemistry, Jagiellonian University Medical College, Cracow, Poland

²Department of Metabolic Diseases, Jagiellonian University, Medical College, Cracow, Poland

Introduction: Supplementation with n-3 PUFA improves some of obesity-associated complications. Incretins protecting beta-cells from gluco-lipotoxicity may participate in this effect. The aim of the study was to examine whether n-3 PUFAs supplementation has additional effects on insulin sensitivity and incretin hormone GIP output after oral lipid and glucose tolerance tests.

Methods: The study groups comprise of subjects aged 25–65 years with BMI>30–40 kg/m² assigned to two groups with: n-3 PUFA supplement-

tation (1,8 g DHA/EPA (5:1)) per day for 3 months or with placebo supplementation (corn oil) in frame of randomized BIOCLAIMS study. All patients before and after 3 months of n-3 PUFA / placebo supplementation undergone the 2h oral glucose tolerance test (OGTT) and 8h oral lipid tolerance test (OLTT). The triglycerides (TG), GIP, glucose and insulin sensitivity markers (HOMA) were measured.

Results: Supplementation with n-3 PUFA significantly decrease the TG, glucose and insulin levels during OGTT, however insulin sensitivity index (HOMA) did not significantly differ between the placebo and PUFA groups. Lower GIP release was observed in patients during OGTT. Supplementation with EPAX also decreased the insulin level after OLTT.

Conclusion: Three months supplementation with n-3 PUFA (DHA/EPA 5:1) decreased the lipid (TG) level pointing to the postprandial beneficial response after glucose overload. The lower GIP release after n-3 PUFA supplementation may point on this effect.

T5:PO.085

The role of Phototherapy *plus* Exercise on improvement of Metabolic Syndrome parameters in Obese Women

Marcela Sene-Fiorense¹, Fernanda Duarte², Antônio Aquino Junior³, Lian Tock⁴, Deborah Masquiro⁵, Raquel Munhoz⁵, Ana Dâmasoa⁵, Nivaldo Parizotto², Vanderlei Bagnto¹

¹University of São Paulo- São Carlos Institute of Physics

²Federal University of São Carlos – Physiotherapy Department

³Federal University of São Carlos– Programa de Pós Graduação em Biotecnologia

⁴Weight Science

⁵Federal University of São Paulo – Paulista Medicine School

Introduction: Obesity is a chronic disease of increasing prevalence, being currently considered a global epidemic associated to many diseases and metabolic syndrome. Therefore, new therapeutic strategies are claimed. Experimental evidence shows that the use of laser therapy combined with exercise may provide metabolic amelioration in experimental studies. To investigate the effects of therapeutic laser on metabolic syndrome parameters in obese women engaged in multidisciplinary weight loss therapy. To investigate the effects of therapeutic laser on metabolic syndrome parameters in obese women engaged in multidisciplinary weight loss therapy.

Methods: The study population was consisting of women aged 20–40 years (BMI \geq 30 kg/m²), which was divided into 2 groups: Phototherapy (P) and Sham (S). The study protocol was consisting of 16 weeks of aerobic *plus* resistance applied after each exercise session (16 minutes, infrared laser, wavelength 830nm, frequency continuous output, and potency 100mW, energy delivery 50 Joules). The metabolic syndrome parameters were measured.

Results:

	GROUPS					
	Sham			Phototherapy		
	Baseline	After intervention	% variation	Baseline	After intervention	% variation
Body Mass (kg)	94,99 \pm 12,76	89,91 \pm 12,94 [#]	-5,43	93,55 \pm 13,18	89,11 \pm 12,02 [#]	-4,58
Cholesterol Total (mg/dl)	205,90 \pm 24,16	187,24 \pm 23,49 [#]	-8,65	211,29 \pm 24,74	181,64 \pm 23,24 [#]	-13,81
TG (mg/dl)	135,76 \pm 46,62	107,09 \pm 42,51 [#]	-17,66	130,11 \pm 35,24	95,76 \pm 34,23 [#]	-24,42
HDL (mg/dl)	61,38 \pm 11,60	57,38 \pm 14,71 [#]	-6,94	58,11 \pm 12,58	52,17 \pm 9,71 [#]	-9,18
LDL (mg/dl)	116,62 \pm 29,34	107,43 \pm 19,72	-3,53	126 \pm 21,49	109,41 \pm 17,55 [#]	-12,51
HOMA	4,15 \pm 1,76	3,31 \pm 1,61 [#]	-18,28	3,99 \pm 1,46	2,49 \pm 0,89 [#]	-36,66 *

Baseline versus after intervention $p < 0,0001$; * S versus P, $p < 0,01$ (test t student and mann-whitney)

Conclusion: The phototherapy associated to exercise improved metabolic syndrome parameters in obese women, suggesting that this kind of treatment can be useful as a new strategy to control obesity and comorbidities.

T5:PO.086

Long term results from a commercial and multidisciplinary weight loss program

Teresa Branco¹, Sandra Martins², Diana Baião¹

¹Instituto Teresa Branco

²Universidade Lusófona

Introduction: The primary objective of the present study was to evaluate the overall weight loss efficacy of a 12- month weight loss program, based on a multidisciplinary approach, with personalized interventions and lifestyle group sessions. It was also our purpose to investigate weight changes two years after the end of the program.

Methods: The multidisciplinary team comprised a physician, a nutritionist, a psychologist and an exercise physiologist. All the participants attended lifestyle weight loss group sessions. The sample comprised 82 overweight and obese adults (39.7 \pm 11.1yr; 29.8 \pm 5.2kg/m²). Weight was assessed at baseline, 12-months, and 2 years after the end of the program with an electronic scale (SECA, Hamburg, Germany).

Results: 72,1% of the baseline sample concluded the 12-month weight loss program, with a 27.9% attrition. At 12-month, participants lost, on average, 7.3kg \pm 5.2kg ($p < .001$) of initial body weight (range: 3,1 kg–19,0Kg loss), with no differences between genders ($p > .05$). Two years after the end of the program, 40,7% of the 59 participants lost more weight, 17% maintained weight loss, and 42.3% regained weight. A great diversity was found among weight regainers, with 6.8% of the participants increasing from 2,1–4%, 10,2% regained 4,1 to 6%, 12,2% increased 6,1–10%, 3,4% regained 10,1–12% and 1,7% between 16,1–18%. No correlation was found between baseline body weight and weight loss at 12-month ($p > .05$).

Conclusion: A commercial multidisciplinary 12-month weight loss program, promoted clinical relevant weight loss, and these results were improved or maintained by the majority of the participants during the two years follow-up, suggesting the efficacy of this tailored intervention on the treatment of overweight and obesity.

T5:PO.087

Dietary compliance and weight reduction in obese patients

Fotiadou, Gounitsioti, Iliadis, Dimitroula, Pasiakou, Giannoulaki, Savopoulos, Hatzitolios

Obesity & Metabolism Outpatient Clinic*, 1st Propedeutic Department of Internal Medicine, AHEPA University Hospital of Thessaloniki, Greece

Introduction: To assess the compliance to dietary intervention by trained dietitians provided to obese subjects at a Obesity & Metabolism Outpatient Clinic in a University hospital.

Methods: The study group included 36 obese patients (mean BMI 39.4 \pm 8.3). Medical and nutrition history was taken during the first visit as well as anthropometric measurements (weight, height, waist and hip

circumference, triceps skinfold, midarm circumference) at baseline and after one month of intervention with a personalised hypocaloric diet (1500–2400 kcal, 600 ± 275 kcal less than those for weight maintenance). Patients' compliance was assessed by questioning them whether they followed the dietary plan as instructed and if they felt satisfied with their effort regarding their weight loss. Additionally compliance was assessed by comparing the anthropometric measurements at both visits.

Results: After one month of hypocaloric dietary intervention the anthropometric measurements showed statistically significant decrease (weight $p < 0.0001$, BMI $p < 0.0001$, waist/hip ratio $p = 0.002$) Furthermore, patients ($n = 14$) who strictly followed the provided dietary plan appeared to adhere more to it. There was a strong positive correlation between the patients who were self-satisfied with their weight loss and the actual loss percentage ($p < 0.0001$), body weight difference ($p = 0.004$) and BMI difference ($p = 0.003$). According to the self-reported diet adherence degree compliant patients achieved greater body weight reduction ($4.55\% \pm 2.09$) than non ($2.43\% \pm 2.18$) or partially ($3.01\% \pm 2.80$) compliant patients.

Conclusion: In this study successful weight loss and patients' self satisfaction for it were associated with greater compliance to hypocaloric dietary plan.

T5:PO.088

Comparing Tanita BC 532 and DXA (DEXA) in evaluating body composition in healthy men and women

Alexandra Koulouri, Nikolaos Rodopoulos, George Vlachavas, Maria Chasapidou

Alexander Technological Educational Institute of Thessaloniki

Introduction: Prevalence of obesity is increasing worldwide. Quantification of body fat is important in evaluating body composition and the effectiveness of a range of interventions and therapies. We present here preliminary results for 99 participants from a total of 400 estimated to finally participate in the study. The purpose is to compare two methods for evaluating body composition: Tanita BC 532 and DXA (DEXA) (Lunar DPX Bravo, GE Healthcare).

Methods: 99 healthy adults (31 men and 68 women) aged 18–69 y (mean 33.3 ± 15.5) and BMI 17.8 – 35.3 Kg/m² (mean 25.4 ± 4.3) participated in the study. Body weight, height, WHR and body fat by TanitaBC532 and DXA (Precision $< 1\%$ CV) were measured. The estimation of body composition by DXA is based upon both Spine and Femur analysis.

Results: A moderate level of relative agreement was found between the measurement of % BF with the two methods ($r = 0.654$, $p < 0.001$). The mean difference of the methods was -5.4 ($p < 0.001$). The difference in men was lower in contrast to women but still significant ($p < 0.001$ in both sexes).

Conclusion: The absolute agreement between the two methods was poor, with large bias. Body fat is significantly underestimated by Tanita BC 532 in all subjects. Since the sample size is small further study is needed.

T5:PO.089

Bright light as a component in the complex treatment of obesity

Boris Pinkhasov, Vera Selyatitskaya, Ani Karapetyan, Natalya Dobrovol'skaya, Oksana Dvurechenskaya

Scientific Centre of Clinical and Experimental Medicine, Novosibirsk, Russia

Introduction: The purpose of this study was to analyze the effectiveness of measures aimed at correcting obesity in women which included bright light exposure during aerobic exercises combined with a restrictive diet.

Methods: The study involved 80 obese women aged 20 to 58 years. All the women were distributed into three groups according to the set of applied treatments. In Group 1, women were on a restrictive diet; in Group

2, the restrictive diet was accompanied with daily aerobic exercises; in Group 3, women were exposed to bright light during exercises. Before and after the treatment course (3 weeks), body weight, waist and hip circumferences were measured; fat amount was determined by the impedance methods, and oxygen consumption was determined by indirect calorimetry.

Results: Women in Group 1 had reduced body weight, waist and hip circumferences, fat mass, what was associated with decreased oxygen consumption. Similar changes were identified in women of Group 2, but weight loss was greater, and the level of oxygen consumption increased comparatively to the baseline. In women of Group 3 weight loss was more pronounced than in those of Groups 1 and 2. That was combined with the most significant augmentation of oxygen consumption.

Conclusion: Thus, full-spectrum bright-light exposure increase energy metabolism and enhance the utility of exercises, despite prolonged food restriction, what is one of the mechanisms improving the efficiency of obesity treatment.

T5:PO.090

Is there a role for enteral nutrition in obesity? Protein sparing modified fasting by tube (ProMoFasT) vs oral (PSMF): A pilot rct for 3 months: Data on clinical safety and efficacy (appetite control, body composition, muscular strength and pulmonary function test)

Samir Sukkar, Claudia Borrini, Alessio Signori, Alberto Vaccaro, Giovanni Barisone, et al.

Ircs San Martino – Ist University Hospital, Largo Rosanna Benzi 216132 Genova Italy

Introduction: The present RCT proposes to verify the safety and clinical efficacy of a protein sparing modified fast by tube (ProMoFasT) with protein intake 1 g/kg/ideal body weight per day with carbohydrate intake $< 1\%$ for 10 days alternating with 20 days of a normal-calorie diet, for 3 months, in obese patients VS oral route (PSMF).

Methods: 20 patients as ProMoFasT and 10 as PSMF. The endpoints were: Body weight; BMI; Abdominal circumference; Haber's appetite test; Body composition by means of BIA; Handgrip Strength; pulmonary function test) and side-effects.

Nestlé Co. supplied the materials without funds.

Results: A decrease was observed for FM ($p < 0.001$) -8.8% 30 days, -12.2% 60 days and -10.4% 90 days compared to baseline. Difference between groups wasn't statistically significant ($p = 0.16$).

A progressive decrease of FFM after 60 days was observed ($p < 0.001$) but no differences PSMF vs ProMoFasT group were observed ($p = 0.62$). No significant decrease in hand grip strength during follow-up was found. A significant decrease in VAS for appetite ($p < 0.001$) was observed with a lower decrease at 30 and 60 days. A trend toward an higher decrease of values of VAS in ProMoFasT was observed particularly at 60 days.

There are no reported major side effects resulting from the enteral nutrition in any patient.

Conclusions: The analysis of the obtained data shows that the method of ProMoFasT is associate with more fat and appetite loss tha PSMF and has got no side effects.

TRACK 6 – Obesity as a Gateway to other Diseases

T6 – Guided Posters

T6:PO.001

Associations between metabolic syndrome and three-dimensional breast density using digital mammography

Jee-Hyun Kang, Seon-Yong Bhang, et al.

Department of family medicine, college of medicine, Konyang university, Daejeon, South Korea

Introduction: Metabolic syndrome has been associated with an increased risk of breast cancer, but little is known the association between metabolic syndrome and mammographic density, an independent predictor of breast cancer. In this study, we studied the association between metabolic syndrome or its components and three-dimensional breast density using digital mammography.

Methods: We analyzed cross-sectional data from 61 premenopausal and 105 postmenopausal women in district hospital. Metabolic syndrome was defined according to the modified NCEP-ATP III(National Cholesterol Education Program's Adult Treatment Panel III) guideline. We measured percentage of breast density using digital mammography. Stepwise multiple regression analysis was used to estimate the association between mammographic density and metabolic syndrome, as well as its components.

Results: Mean mammographic density was lower in the group with metabolic syndrome compared with non-metabolic syndrome group. In the stepwise multiple regression analysis controlling after age and menopausal status, waist circumference ($\beta = -3.112$, S.E. = 0.927, $P = 0.001$) and low HDL-cholesterol ($\beta = -2.967$, S.E. = 1.109, $P = 0.008$) were found as independent variables for percentage of mammographic density, however, metabolic syndrome itself was not. After additional adjustment with body mass index, only low HDL-cholesterol was associated with percentage of mammographic density ($\beta = -2.953$, S.E. = 0.882, $P = 0.001$).

Conclusion: In this study group, only low HDL cholesterol was associated with three-dimensional mammographic density independently after adjusting for age, menopausal status and body mass index. These findings need to be confirmed in further larger prospective studies.

T6:PO.002

NAFLD Patients With and Without Obesity

Ilze Skuja¹, Inga Stukena¹, Gita Krievina², Aivars Lejnicks¹

¹Riga Stradins University

²University of Latvia

Introduction: The current estimate is that nonalcoholic fatty liver disease (NAFLD) is one component of the metabolic syndrome (MS). Insulin resistance is a factor what could connect NAFLD and MS. Additional metabolic risk factors include pro-inflammatory cytokines (e.g. plasminogen activator inhibitor-1 (PAI-1)) and adhesion molecules (e.g. E-selectin) which lead to cardiovascular disease (CVD).

Methods: In 155 patients (30–45 years, asymptomatic) glucose (Glu), HOMA-IR, HDLC, non-HDLC, TG, AST and ALT were estimated. PAI-1 and E-selectin levels were measured by Luminex xMAP technology. Liver attenuation (LA) and liver spleen ratio (L/Sd) were estimated by CT. Patients were divided into two parts according to waist circumference (WC). Each part was divided in 2 groups: L/Sd>1.1 and L/Sd≤1.1. NAFLD is confirmed when L/Sd≤1.1.

Results: Significant correlations between WC and PAI-1 ($r = 0.52$; $r = 0.30$; $r = 0.36$), ALT ($r = 0.51$; $r = 0.47$; $r = 0.35$), AST ($r = 0.37$; $r = 0.41$; $r = 0.29$) and LA ($r = -0.44$; $r = -0.29$; $r = -0.32$), L/Sd ($r = 0.40$;

$r = -0.41$; $r = -0.29$) were found in the whole group; patients with normal WC and with enlarged WC, respectively ($p < 0.05$). Comparing groups with and without NAFLD, Glu (all $p = 0.024$), HOMA-IR ($p = 0.004$), TG ($p < 0.001$), PAI-1 ($p < 0.001$), E-selectin ($p < 0.001$), ALT ($p < 0.001$), AST ($p < 0.001$) were increased in group with NAFLD in patients with enlarged WC, but there were no significant differences in patients with normal WC.

Conclusion: It is worse and risky to be obese and have NAFLD comparing to obese without NAFLD. Patients with central obesity and NAFLD could be recommended for further investigation and treatment to remove the earlier onset of diabetes and CVD development.

T6:PO.003

Cardiovascular autonomic function and its association with metabolic parameters in obese normoglycemic subjects

Rumyana Dimova, Tsvetalina Tankova, Nevena Chakarova, Dakovska, Greta Grozeva

Department of Diabetology, Clinical Centre of Endocrinology, Medical University, Sofia

Introduction: The aim of the study was to evaluate cardiovascular autonomic function (CAF) and its association with metabolic parameters in obese subjects with normal glucose tolerance.

Methods: A total of 111 subjects (mean age 42.8 ± 14.7 years, mean BMI 30.0 ± 6.8 kg/m²), divided into 5 groups according to BMI: 28 normal weight, 32 overweight, 25 obesity class I, 15 class II, and 11 class III were enrolled. Glucose tolerance was studied during OGTT. Anthropometric indices, blood pressure and serum lipids were measured. Body composition was estimated by impedance analysis (InBody 720). CAF was assessed by ANX-3.0 using frequency-domain analysis during deep breathing (E/I ratio), Valsalva and standing from a seated position (30:15 ratio).

Results: Sympathetic nervous system (SNS) and parasympathetic nervous system (PSNS) activity at rest and standing were significantly decreased in obesity class II ($p = 0.005$, $p = 0.001$ and $p = 0.049$, $p = 0.004$, resp.) and class III ($p = 0.037$, $p = 0.019$ and $p = 0.019$, $p = 0.023$, resp.) as compared to normal weight, and PSNS activity during deep breathing was diminished in all obesity groups ($p = 0.018$, $p = 0.003$ and $p = 0.001$, resp.) as compared to normal weight. Significant negative correlation was observed between SNS and PSNS activity and waist, BMI, visceral fat area, total body fat, systolic and diastolic blood pressure, total and LDL cholesterol.

Conclusion: Obesity is associated with cardiovascular autonomic function deterioration – significant depression in both PSNS and SNS activities which worsen with the progression of obesity stage. Central obesity, blood pressure, total and LDL cholesterol correlate with autonomic dysfunction and increase cardiovascular risk in the absence of glucose intolerance.

T6:PO.004

Predictive value of risk factors for the progression from prediabetes to type 2 diabetes

Tsvetalina Tankova¹, Nevena Chakarova¹, Lilya Dakovska¹, Iliana Atanassova¹, Georgi Kirilov¹, Krasimir Kalinov²

¹Clinical Center of Endocrinology, Medical University, Sofia, Bulgaria

²New Bulgarian University, Sofia, Bulgaria

Aim: The aim of the present study was to evaluate the predictive value of different risk factors and their changes on the progression from prediabetes to type 2 diabetes.

Material and Methods: A total of 383 subjects (213 females and 170 males), of mean age 51.93 ± 13.47 years and mean BMI 29.11 ± 5.3 kg/m² – 147 with normal glucose tolerance, 122 with impaired fasting glu-

cose (IFG) and 114 with impaired glucose tolerance (IGT), were included in the study and were followed-up 13.4 ± 2.2 months later. OGTT was performed in all participants. Anthropometric and laboratory parameters, blood pressure and body fat mass were assessed.

Results: Progression rates from IFG and IGT to diabetes over 1 year were 12.08 and 19.91 per 100 person-years, respectively. Baseline determinants of progression from IFG to diabetes were found to be insulin resistance (HOMA-IR) and systolic blood pressure, and from IGT to diabetes – overweight and obesity (BMI), waist circumference and HOMA-IR. The most significant predictors for the progression from IFG to diabetes were the increase in BMI, waist circumference, systolic blood pressure, total cholesterol and triglycerides; and for progression from IGT to diabetes – the changes in BMI, percentage of body fat, systolic and diastolic blood pressure.

Conclusion: Individuals with IFG or IGT have a rather high risk of developing diabetes within one year. The changes in body weight, waist circumference, body fat, total cholesterol, triglycerides, systolic and diastolic blood pressure are significant determinants of progression to diabetes, which implies for adequate measures for their control aiming at prevention of the disease.

T6:PO.005

Role of Adipokines in Insulin synthesis and secretion

Daniela Lixandru¹, Simona Carniciu², Adelina Rosca¹, Petruta Alexandru³, Irina Stoian¹, Bogdan Smeu⁴, Catalin Copaescu⁴, Constantin Ionescu-Tirgoviste²

¹University of Medicine and Pharmacy “Carol Davila”

²NIDNMD “Prof. N. Paulescu”

³Institute of Biochemistry of the Romanian Academy

⁴Delta Hospital

Introduction: The adipose tissue has become a central player in the pathogenesis of metabolic disease. The aim of this study was to evaluate whether preadipocytes from different depots, could change differently synthesis and secretion of insulin in beta-pancreatic cells.

Methods: We performed isolation, cultivation and differentiation of human preadipocytes using either abdominal subcutaneous or mesenteric adipose tissue obtained from bariatric interventions. The media from day 0,4,7,10,15 and 20 was added over PANC-1 beta-pancreatic cells (2×10^4 cells) and the insulin and proinsulin levels were measured by ELISA. We also used a transwell system in which the PANC-1 cells grown in the lower well of the 6-well culture plate were co-cultured for 24 hours with differentiated adipocytes in the transwell inserts (with $0.4 \mu\text{m}$ porous membrane). The leptin, adiponectin, insulin and proinsulin levels in co-cultured PANC-1 cells (media and cell lysates) were determined by ELISA as well. The experiments were done in duplicate and repeated four times.

Results: Intracellular proinsulin level was higher than in the media while insulin was lower in the cell lysates and these were maintained with adipocytes differentiation. The expression level of leptin increases steadily with the degree of differentiation only intracellular while levels of adiponectin did not differ. When the two types of cells were cocultured in the transwell system except for proinsulin all parameters did not differ from those obtained in experiment 1. Adipose tissue origin does not influence neither synthesis nor secretion of insulin.

Conclusion: Our results suggest that the ratio between pro/anti-inflammatory adipokines during adipocytes differentiation has an important role in both production and secretion of insulin in beta-pancreatic cells.

T6:PO.007

Childhood obesity associated cardiovascular and cardiorenal risk factors in relation to pubertal status

Mina Lateva¹, Bliznakova², Sonya Galcheva², Galina Yordanova¹, Neshkinska¹, Halvadzhiyan¹, Mladenov³, Iotova²

¹Dept. of Pediatrics and medical genetics, Medical University Varna

²Dept. of Pediatrics and medical genetics, Medical University Varna; UM-HAT “Sv. Marina” Varna

³UMHAT “Sv. Marina” Varna

Introduction: Obesity is known to be associated with hypertension, one of the major causes of chronic kidney disease in adults. This study aims to evaluate the association between childhood obesity, cardiovascular and renal risk factors.

Methods: A total of 104 consecutive obese children (IOTF, Cole et al., 2000) investigated in 11.2012–11.2013 and aged 11.8 ± 3.6 (4–17.6 years), without chronic diseases, were included (38.5% boys). Body weight, height, waist circumference (WC) and blood pressure (BP) were measured using standard procedures. Pubertal status was defined applying Tanner scale. Blood and urine samples were collected after a 12-hour overnight fasting. The presence of hypertension (systolic, diastolic or both) was defined according to NHBPEP (2004) as a measure above 90th percentile for age, sex and height.

Results: Above one third of the participants (41.6%) had elevated systolic BP (83.8% pubertal, $p < 0.001$). Microalbuminuria (MA) was detected in 7.2% of the children (85.7% pubertal, $p = 0.014$). Systolic hypertension and MA were simultaneously present in 3% of the children, all pubertal (mean age 15.69 ± 1.42 years) and with positive family history of hypertension. There were no significant correlations between positive MA and weight, BMI, WC. However, cardiovascular risk factors such as total cholesterol, HDL-cholesterol and hsCRP were significantly associated with MA in the pubertal group ($p = 0.054$, $p = 0.038$, $p = 0.015$ respectively).

Conclusion: The current findings suggest development of kidney dysfunction in obese children with positive family history of hypertension after the initiation of puberty. Microalbuminuria might be a good marker to identify pubertal children with increased risk of endovascular damage.

T6 – Cancer

T6:PO.009

Effect of excess body adiposity on the expression of genes involved in early steps of mammary carcinogenesis on diet-induced obese female rats

Begoña Cabia, Ana Belén Crujeiras, María Amil, Marcos C. Carreira, Arturo Roca-Rivada, Cecilia Castelao, María Pardo, Luisa María Seoane, Felipe F. Casanueva

Dpt. Molecular and Cellular Endocrinology, University of Santiago de Compostela (USC) and Instituto de Investigación Sanitaria de Santiago de Compostela (IDIS), Spain. CIBER de Fisiopatología, Obesidad y Nutrición (CIBERObn), Instituto de Salud Carlos III

Introduction: Obesity is increasing worldwide and is associated with higher risk for some cancers. However, the mechanisms underlying this association are unclear. Because the obesity microenvironment could promote the onset of carcinogenesis, the aim of this study was to evaluate the association between excess body adiposity and the expression of genes related to the activation of early steps of tumor promotion on the mammary gland.

Methods: Three weeks-old female Sprague-Dawley rats were fed a high fat diet (DIO: 60% Kcal/g fat, $n = 14$) or standard chow (LEAN: 3% Kcal/g fat, $n = 15$) for 10 weeks. Body weight and food intake were measured weekly. After sacrifice, retroperitoneal fat tissue was weighed and mammary tissue was extracted for qRT-PCR analysis. Genes associated

with cell proliferation (Survivin/BIRC5 and MYC), DNA repair (TP53), and antioxidant protection (GSTM2, ALDH3A1) were quantified.

Results: The DIO group showed a body weight 14.1% higher than LEAN group ($p < 0.001$). These differences were reflected on higher retroperitoneal fat content on DIO ($3.22 \pm 0.89\text{g}$) vs. LEAN group ($2.33 \pm 0.52\text{g}$; $p = 0.012$). Interestingly, DIO rats showed a higher gene expression for Survivin ($\Delta 68.2\%$), MYC ($\Delta 50.1\%$), TP53 ($\Delta 40.5\%$), ALDH3A1 ($\Delta 74.1\%$), and GSTM2 ($\Delta 25.7\%$) with respect to LEAN group.

Conclusion: These data show that obesity is associated with changes potentially involved in early steps of tumor promotion, as shown by an increase in cellular proliferation and DNA damage related genes, even before detecting histological changes on the mammary tissue of obese female individuals. Further studies are needed to elucidate whether reducing body weight might be a therapeutic strategy to prevent this process.

T6:PO.010

Increased intestinal tumorigenesis by genetic or diet-induced obesity in a double mutant (*Min x ob*) mouse model may involve both disturbed blood glucose regulation and inflammation

Ngo, Hetland, Nygaard, Steffensen

Norwegian Institute of Public Health, Department of Food, Water and Cosmetics, Oslo, Norway

Introduction: We have studied two hypotheses for the association between obesity and intestinal tumorigenesis.

Methods: These experiments were done in double mutant F1 offspring from intercrossing of C57BL/6J-*ApcMin* (adenomatous polyposis coli-multiple intestinal neoplasia)/+ mouse, which develops spontaneous intestinal tumors, and C57BL/6J-*Lepob* (leptin-obese)/+ mouse, which develops obesity, on 10% or 45% fat diet.

Results: Terminal body weight (bw) and number of small intestinal tumors were significantly increased in *Min/+*,*ob/ob* compared with *Min/+*,*ob/+* and *Min/+*,*+/+* mice. In these mice given a 45% fat diet from weaning to termination at 11 weeks, terminal bw and number of small intestinal tumors were increased further compared with 10% fat diet. Insulin resistance and hyperinsulinemia are implicated by higher blood glucose levels (non-fasted) and area under the curve (AUC) in a glucose tolerance test (fasted), as well as higher plasma insulin levels, in *ob/ob* mice compared with *ob/+* and *+/+*. A 45% fat diet further increased glucose, but not insulin levels. An alternative hypothesis implicates inflammation. The proinflammatory cytokine tumor necrosis factor (TNF) α was increased in *ob/ob* versus *ob/+* and *+/+*, but was not further increased by a 45% fat diet. To draw firm conclusions for the cytokines interleukin 6 (IL-6) and IL-1 β the positive samples were too few and none, respectively. The genotypes *ob/+* and *+/+* did not differ significantly in any of these end points. **Conclusion:** Both genetic and diet-induced obesity increases intestinal tumorigenesis in this mouse model, and the association between obesity and intestinal tumorigenesis may involve disturbed blood glucose regulation and inflammation.

T6:PO.011

In utero exposure to perfluorooctanoate (PFOA) or perfluorooctane sulfonate (PFOS) did not increase body weight or intestinal tumorigenesis in multiple intestinal neoplasia (*Min/+*) mice

Ngo, Hetland, Steffensen

Norwegian Institute of Public Health, Department of Food, Water and Cosmetics, Oslo, Norway

Introduction: We examined whether perfluorooctanoate (PFOA) or perfluorooctane sulfonate (PFOS) had obesogenic effect or increased spontaneous intestinal tumorigenesis in the mouse model C57BL/6J-*ApcMin*

(adenomatous polyposis coli-multiple intestinal neoplasia)/+ after *in utero* exposure.

Methods: The dams were exposed to PFOA or PFOS (0.01, 0.1 or 3.0 mg/kg bw/day) by p.o. gavage on GD1–17. The *Min/+* and *+/+* offspring were terminated at week 11 for examination of intestinal tumorigenesis or at week 20 for obesogenic effect, respectively. Body weights of the dams and pups were recorded throughout life. Food intake was determined at week 6 and 10. Blood glucose (non-fasted) was measured at week 6 and 11.

Results: No obesogenic effect of PFOA or PFOS was observed up to 20 weeks of age. PFOA or PFOS did not increase the incidence or number of tumors in the small intestine or colon of *Min/+* mice or affect their location along the intestines. Feed intake was not affected. Some indications of toxicity of PFOA, but not of PFOS, were observed. There was lower survival of pups after 3.0 mg/kg PFOA, lower body weight in pups after 3.0 and possibly 0.1 mg/kg PFOA, and increased relative liver weight after 0.01 and possibly 0.1 mg/kg PFOA. Plasma glucose was lower after 0.01 and 0.1 mg/kg PFOA.

Conclusion: *In utero* exposure to PFOA and PFOS in the doses used did not have obesogenic effect on *Min/+* or *+/+* mice, at least not up to 11 or 20 weeks of age, nor increased intestinal tumorigenesis in *Min/+* mice.

T6:PO.012

Obesogenic conditions *in utero* and during nursing increased body weight and intestinal tumorigenesis in *Min/+* mice as adults

Ngo, Hetland, Steffensen

Norwegian Institute of Public Health, Department of Food, Water and Cosmetics, Oslo, Norway

Introduction: We studied effects of 45% fat diet in various periods of life on development of obesity and susceptibility to intestinal tumorigenesis in the C57BL/6J-*ApcMin* (adenomatous polyposis coli-multiple intestinal neoplasia)/+ mice as adults.

Methods: The mice were exposed to 10% fat diet throughout life (negative control) or 45% fat diet *in utero*, during nursing, during both *in utero* and nursing, during adult life, or during their whole life-span, and terminated at 11 weeks for tumorigenesis (*Min/+*) or 23 weeks for obesogenic effect (*+/+*).

Results: Body weight as area under the curve (AUC) from day 3 to termination was significantly increased after 45% fat diet during nursing, and during *in utero* and nursing, as well as throughout life. In the glucose tolerance test, early exposure to 45% fat diet *in utero*, during nursing, or during *in utero* and nursing, did not affect blood glucose, whereas exposure to 45% fat diet as adults or throughout life significantly increased glucose AUC compared with the control. However, 45% fat diet during nursing, or during *in utero* and nursing, significantly increased the number of small intestinal tumors compared with the control. So did exposure to 45% fat diet in adult life or throughout life, but these dietary exposures for longer time did not significantly increase the number of small intestinal tumors further compared with exposure during *in utero* and nursing.

Conclusion: A high fat diet early in life increases obesity and intestinal tumors in mice as adults, revealing a critical window of exposure.

T6:PO.013

Osteopontin induces aromatase expression in human adipocytes

Maximilian Zeyda¹, Lukas Leitner¹, Bianca Itariu¹, Edvin Turkof², Viktor Grablowitz³, Gerhard Prager², Thomas M. Stulnig¹

¹Christian Doppler Laboratory for Cardio-Metabolic Immunotherapy and Clin. Div. of Endocrinology and Metabolism, Dept. of Medicine III, Medical University of Vienna, Vienna, Austria

²Dept. of Surgery, Medical University of Vienna, Vienna, Austria

³Div. of Surgery, Hospital "Goettlicher Heiland", Vienna, Austria

Introduction: Distinct malignancies such as breast or endometrial cancer are related to estrogen action and their risk is significantly increased by obesity. Osteopontin (OPN) is a multifunctional protein the expression of which is highly upregulated in adipose tissue of obese. Its function is potentiated by proteolytic cleavage, e.g. by matrix metalloproteases (MMP) that are also induced by obesity. Induction of the estrogen-synthesizing enzyme aromatase by inflammatory stimuli such as TNF-alpha and IL-1 has recently been shown in preadipocytes. However, an impact of OPN and other inflammatory adipokines on aromatase expression in mature adipocytes has not been investigated yet.

Methods: Gene expression was determined in omental and subcutaneous adipose tissue samples of 25 morbidly obese and age- and sex- matched control subjects. Adipocytes were differentiated from the stromal-vascular cell fraction of human subcutaneous adipose tissue derived from liposyringes and treated with full-length OPN or OPN cleaved with recombinant MMP.

Results: Aromatase expression was significantly upregulated in visceral and subcutaneous adipose tissue of obese as compared to lean subjects and strongly correlated with gene expression of OPN and several MMPs. In vitro, full-length OPN upregulated aromatase expression in mature adipocytes to a similar extent as TNF-alpha and this effect was potentiated by MMP cleavage of OPN.

Conclusion: OPN – particularly when cleaved by MMPs – could contribute to the association of obesity with estrogen-dependent cancers by enhancing local and systemic estrogen production.

T6:PO.014

Weight gain after Thyroidectomy in Patients with Thyroid Cancer

Yong Seong Kim, Seongbin Hong, et al.

Inha University Hospital

Introduction: Patients who undergo thyroidectomy due to thyroid cancer often complain weight gain, although they are on suppressive thyroid hormone treatment. The aim of this study is to know whether thyroid cancer patients gain the weight after thyroidectomy and weight change is dependent on estrogen state or use of rhTSH.

Methods: We performed a retrospective chart review of subjects receiving medical care at an academic medical center. Two hundred two patients who underwent total thyroidectomy were included. As a control group, patients with thyroid nodule and euthyroidism were matched for age, gender, menopausal status. The weight changes occurring over first one year and thyroid function were assessed.

Results: Mean age was 51 ± 12 years and patients was composed with 38% of premenopausal, 15% perimenopausal women, 37% of postmenopausal women and 20% of men. Patients with thyroid cancer gained 2.2 kg during the first year. It was not significantly different with control. However, weight change in perimenopausal and post menopausal women gained more weight than control ($P < 0.05$). Age, baseline body weight and weight gain were not correlated.

Conclusion: Patient who had undergone thyroidectomy gained more weight than their control, especially in peri- and postmenopausal women. Patients in this age should be monitored for their weight carefully.

T6:PO.015

Acylated serum ghrelin in obese gynecological cancer patients

Iro Gounitsioti¹, Dimitrios Poulimeneas¹, Maria G. Grammatikopoulou¹, Dimitrios Tsolakidis², Alexandros Papanikolaou², Charalambos Kotzamanidis¹, Maria Tsigga¹, Basil Tarlatzis²

¹Department of Human Nutrition & Dietetics, Alexander Technological Educational Institute, Thessaloniki, Greece

²1st Department of Obstetrics and Gynecology, Aristotle University, Thessaloniki, Greece

Introduction: Obesity is associated with increased risk of cancer. Recently, an association has been found between obesity and certain gynecological cancers. Obesity and appetite have been extensively studied either with subjective or objective methods in the past. The aim of our study was to examine association between acylated serum ghrelin levels with weight status in patients with gynecology cancer at diagnosis.

Methods: The sample included 35 gynecological oncology patients, scheduled for removal operation, recruited during September 2012-June 2013 from the 1st Dept. of Obstetrics & Gynecology, at Papageorgiou Hospital. Basic anthropometric measurements were taken and the number of cigarettes smoked per day was recorded for each patient. In addition, acylated serum ghrelin levels were measured with Enzyme-Linked ImmunoSorbent Assay-ELISA, as an objective assessment of appetite in this population.

Results: Serum ghrelin levels were significantly lower among those with central obesity (47.1 ± 26.3 vs 115.7 ± 83.1 , $p \leq 0.039$). Serum ghrelin demonstrated negative correlations to the BMI ($\rho = -0.611$, $p \leq 0.001$), age ($\rho = -0.610$, $p \leq 0.001$), and triceps skinfold of participants ($\rho = -0.493$, $p \leq 0.003$), and a positive correlation to the number of cigarettes smoked per day ($\rho = 0.345$, $p \leq 0.043$). As expected, ghrelin levels were significantly different between the different BMI categories ($p \leq 0.001$), demonstrating a gradual decrease with each higher weight status category. Cancer site and stage did not appear to affect ghrelin levels.

Conclusion: As in the healthy population, acylated serum ghrelin levels, and subsequently appetite, of gynecological cancer patients, appear to be negatively associated with weight status, BMI and waist circumference

T6 – Cardiovascular

T6:PO.016

Association of uncoupling protein 2 and 3 gene polymorphisms in chronic diseases of women in the bariatric surgery ward

Schnor¹, Verlengia², Novais¹, Rasera-Jr¹, Leite¹, Oliveira¹

¹Universidade Estadual Paulista Julio de Mesquita Filho

²Universidade Metodista de Piracicaba

Introduction: Some variants of the uncoupling protein 2 and 3 (UCP2 and UCP3) genes seem to contribute to the development of obesity. Moreover, UPCs may be associated by obesity-related characteristics because of their role in energy homeostasis, production of free radicals, and regulation of fatty acid and glucose oxidation.

Methods: A total of 127 women aged 21 to 45 years in the bariatric surgery ward participated in the study. Personal and sociodemographic data were collected by anamnesis and health-related data from the medical record. DNA was obtained from peripheral blood and the polymorphisms determined by real-time polymerase chain reaction (RT-PCR).

Results: Carriers of the CC genotype of the -55C/T polymorphism in the UCP3 gene were more often dyslipidemic. After logistic regression, carriers of the GG genotype of the -866G/A polymorphism and CC genotype of the polymorphism -55C/T in the UCP3 gene were more likely to

develop hypercholesterolemia. The CC genotype of the -55C/T polymorphism increased susceptibility to glucose intolerance/diabetes.

Conclusion: The -866G/A polymorphisms in the UCP2 gene and -55C/T polymorphisms in the UCP3 gene affected the obesity-related comorbidities, especially hypercholesterolemia in women in the bariatric surgery ward.

T6:PO.017

CML and sRAGE levels in metabolically healthy centrally obese vs. lean middle aged diabetes- and medication-free subjects

Katarina Sebekova¹, Zorka Krivosikova², Martin Gajdos²

¹IMBM, Comenius University Medical Faculty, Bratislava, Slovakia

²Dept. Clinical Pharmacology, Medical Faculty, Slovak Medical University, Bratislava, Slovakia

Introduction: Obesity is associated with microinflammation and enhanced oxidative stress. N ϵ -carboxymethyllysine (CML), the most abundant circulating advanced glycation end product (AGE), is *in vivo* formed via glycooxidation reactions. CML induces oxidative stress and inflammatory reactions. Paradoxically, plasma CML levels are decreased in obese subjects. We investigated the levels of CML and soluble receptor for advanced glycation end-products (sRAGE) in metabolically healthy obese (MHO) and lean subjects.

Methods: 72 lean controls (35 \pm 8 years, 50F/22M) were compared with 38 centrally obese subjects (37 \pm 10 years, 29F/9M) not presenting other signs of metabolic syndrome. Anthropometric data, standard blood chemistry, plasma CML, sRAGE, inflammatory markers, adipokines (ELISA), fluorescent AGEs and advanced oxidation protein products were determined.

Results: MHO subjects (waist cf. 87 \pm 8 cm vs. 76 \pm 7 cm in lean, $p < 0.001$) presented significantly higher fasting insulinemia, hs-CRP, and leptin levels if compared with the controls. While CML levels in MHO only tended to be lower (26.5 \pm 6.6 vs. 26.8 \pm 6.7 μ g/g albumin), sRAGE levels were lower (1130 \pm 435 vs. 1404 \pm 484 pg/ml, $p < 0.01$), and the CML-to-sRAGE ratio higher (1.24 \pm 0.50 vs. 1.04 \pm 0.45 ng/pg, $p < 0.05$). Other blood chemistry variables showed no significance.

Conclusion: MHO middle-aged medication free subjects not presenting alteration in other signs of metabolic syndrome display, in comparison with their lean counterparts, mildly elevated markers of microinflammation, incipient glucose homeostasis dysregulation, and a decline in sRAGE, but not in that of CML levels. Whether isolated central obesity affects primarily the sRAGE levels in contrast to those of CML remains to be elucidated in further studies.

T6:PO.018

Effect of abdominal obesity on postprandial lipoprotein concentration changes by linear electrophoresis

Sabaka, Čaprná, Bendžala, Komorníková, Oravec, Baláž, Gašpar

2nd Department of Internal Medicine, Comenius university in Bratislava, Slovakia

Introduction: The effects of visceral fat accumulation on postprandial lipoprotein concentrations have not yet been studied in details. We therefore focused on the postprandial lipoprotein profile in otherwise healthy men and women with abdominal obesity and their comparison with the control group of volunteers with normal waist circumference.

Methods: The concentration of lipoprotein classes and subclasses was measured before and 4 hours after a standard meal by linear polyacrylamide gel electrophoresis.

Results: A statistically significant postprandial rise in triacylglycerol (TAG) concentration occurred in all cohorts. Highest rise was in the cohort of obese men. VLDL increased 4 hours after meal in all cohorts ex-

cept the women with normal waist circumference. The concentration of large IDL particles increased in both non-obese men and women. In women with abdominal obesity, however, it decreased, while in obese men there was no statistically significant change. The concentration of small and medium-sized IDL particles decreased in all cohorts. Analyzing subclasses changes of large, medium-sized and small LDL particles we saw no significant shift in their concentrations, except the subclass of large LDL particles, which decreased in men. Concentrations of medium and small HDL particles decreased postprandially in cohorts of volunteers with normal waist circumference. However, they remained unchanged in cohorts of subjects with abdominal obesity.

Conclusion: The nature and extent of postprandial changes of the lipoprotein profile changes depended on gender and presence of abdominal obesity.

T6:PO.019

Insulin resistance and oxidative stress after an oral unsaturated fat load test in subjects with abdominal obesity

Jose F. Martinez-Valls¹, Sergio Martinez-Hervas², Ana Artero³, Juncal Martinez-Ibanez³, Esther Benito⁴, Miguel Civera³, F. Javier Chaves⁵, Jose T. Real², Juan F. Ascaso²

¹Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de Valencia. Spain. Departamento de Medicina. Universidad de Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain.

²Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de Valencia. Spain. Departamento de Medicina. Universidad de Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain. CIBER de Diabetes y Enfermedades Metabólicas asoci

³Servicio de Endocrinología y Nutrición. Hospital Clínico Universitario de Valencia. Spain. Instituto de Investigación Sanitaria INCLIVA. Spain.

⁴Instituto de Investigación Sanitaria INCLIVA. Spain. CIBER de Diabetes y Enfermedades Metabólicas asociadas (CIBERDEM). Spain.

⁵CIBER de Diabetes y Enfermedades Metabólicas asociadas (CIBERDEM). Spain. Unidad de Genotipado y Diagnóstico Genético. Fundación Investigación Hospital Clínico-INCLIVA. Valencia. Spain

Introduction: Insulin resistance and oxidative stress are related to increased atherosclerosis. Our aim was to analyze whether subjects with abdominal obesity showed higher levels of oxidative stress and the influence of an oral unsaturated fat load test in the oxidative stress status and insulin resistance.

Methods: We included 20 subjects with abdominal obesity (waist circumference >102 cm for men and >88 cm for women; fasting plasma glucose < 126 mg/dl) and 20 healthy controls (waist circumference < 102 cm for men and < 88 cm for women; fasting plasma glucose < 100 mg/dl; total cholesterol < 200 mg/dl, and triglycerides < 150 mg/dl). After 12 hours of fasting we performed a standardized fat load test (0–8 hours) with supracal[®] (50 g/m²).

Results: The subjects with obesity showed significant higher levels of basal HOMA (1.1 \pm 0.6 vs 4.6 \pm 3.9, respectively for controls and obese subjects; $p < 0.01$) and oxidative stress levels (GSSG/GSH ratio 0.025 \pm 0.005 vs 0.068 \pm 0.019, respectively for controls and obese subjects; $p < 0.0001$). Triglycerides rose after the administration of the unsaturated fat, achieving the maximum at 4 hours. However, HOMA and GSSG/GSH ratio showed significant decrease.

Conclusion: Unsaturated fat improves insulin resistance and oxidative stress status. Thus, the consumption of unsaturated fat could be beneficial even in subjects with obesity.

T6:PO.020

Carotid intima media thickness in morbid obese patients

Dilek Yazıcı, Dilek Gogas Yavuz, Mehmet Yasar, Melin Uygur, Oguzhan Deyneli

Marmara University Medical School, Section of Endocrinology and Metabolism

Introduction: Increased mortality in morbid obesity is related to atherosclerosis. Carotid intima media thickness (CIMT) is a sign of early atherosclerosis. The aim of the study is to determine CIMT in morbid obese patients that did not have hormonal etiologies.

Methods: Morbid obese patients evaluated preoperatively for bariatric surgery were included. TSH and HbA1c were determined and 1mg dexamethasone suppression test was performed. Oral glucose tolerance test (OGTT) was done and lipids were determined. Patients with TSH below 0.5IU/L and above 4IU/L, HbA1c > 5.7, patients with disturbed OGTT and dexamethasone suppressed cortisol levels above 1.8µg/dL were not included. CIMT was determined from carotid arteries using ultrasonography.

Results: Ninety patients (34.3 ± 10.1years; F/M:77/13) were evaluated with 74 healthy controls (39.4 ± 10.3years; F/M:54/20). FBG and HbA1c were comparable between obese and controls. Total cholesterol levels were similar, while LDL and triglycerides were higher and HDL was lower in the obese compared to controls. CIMT was higher in obese (0.64 ± 0.10mm) compared to controls (0.57 ± 0.11mm, p = 0.001). CIMT was correlated with FBG (r = 0.48, p = 0.0005), 120 min glucose during OGTT (r = 0.65, p < 0.0001) and LDL (r = 0.27, p = 0.04), but not with BMI, HbA1c, HDL or triglycerides. Multivariate analysis revealed age and 120min glucose to be determinants of CIMT, among age, FBG, LDL cholesterol and 120min glucose as independent parameters.

Conclusion: In obese patients without any hormonal etiology, CIMT levels were higher compared to controls. Early atherosclerosis is observed in morbid obese patients, possibly related to subclinical changes in glucose metabolism.

T6:PO.021

Non-Linearity between anthropometric measures, subcutaneous adipose tissue thickness and thickness of epicardial adipose tissues

Vrselja, Ćurić, Perić Kačarević, Marić, Radić

School of Medicine University J. J. Strossmayer, Osijek, Croatia

Introduction: Adipose tissue is the largest endocrine organ, mostly located under the skin, as subcutaneous adipose tissue (SAT), and around visceral organs, as visceral adipose tissue (VAT), the latter being highly correlated with coronary artery disease (CAD) and other metabolic conditions. One way of assessing the CAD risk and metabolic risk is by use of low-cost anthropometric measures, although it is known that they are inaccurate, and cannot discriminate between VAT and SAT. Thickened epicardial adipose tissues (EAT; part of VAT) was recently linked with severity of CAD. Therefore, we aimed to assess, in detail, the nature of relationships among anthropometric measures, SAT and EAT thickness.

Methods: Anthropometric measures were obtained from 53 CAD and 42 age and BMI matched nonCAD patients. Vascular and structural statuses were obtained with coronarography and echocardiography, as well as measurements of the EAT and SAT thickness.

Results: Anthropometric measures and SAT thickness follow a non-linear S curve relationship with EAT thickness. EAT thickness and SAT thinner than 10 mm have a strong, non-linear power curve relationship. Thickening of SAT above 10 mm is independent of EAT thickness.

Conclusion: Anthropometric measures and SAT have a non-linear relationship with EAT possibly due to adipose tissue remodeling that develops with hypoxia, which is more prominent in VAT.

T6:PO.022

Cardiac oxidative stress relates to impaired post-ischemic recovery in insulin resistant mice

Tomas Jelenik¹, Uli Floegel², Olesja Ritter¹, Ilka Rokitta¹, Jörg Kotzka¹, Michael Roden¹, Julia Szendroedj¹, et al.

¹German Diabetes Center

²Department of Molecular Cardiology

Introduction: Non-alcoholic fatty liver (NAFL) and insulin resistance relate to cardiac mortality. Humans with type 2 diabetes (T2D) have impaired mitochondrial function in skeletal muscle and liver. We hypothesized that cardiac energy metabolism is altered in mice with NAFL.

Methods: Female mice, 36 weeks, with adipose-specific overexpression of sterol-regulatory-element-binding-protein-1c (AP2), with lipodystrophy and NAFL due to hyperlipidemia, and controls (CON) underwent hyperinsulinemic-euglycemic clamps (n = 5–7). Systolic blood pressure was measured in the left ventricle (n = 5), respiration and H₂O₂-production of cardiac isolated mitochondria by high-resolution respirometry and Amplex Red (n = 6–8) and cardiac function by magnetic resonance imaging (n = 8) without ischemia and 7 days after myocardial ischemia-reperfusion.

Results: Glucose disposal was lower in AP2 mice than in CON (–70%; p < 0.05). AP2 mice had 34% increased heart to body weight ratios and increased diastolic and systolic wall thickness (p < 0.05). Systolic blood pressure was comparable to CON. Cardiac mitochondrial oxidative capacity on glycolytic substrates was 93% higher in AP2 mice. Oxidative capacity on β-oxidation-derived substrates was 125% greater in AP2 mice. H₂O₂ production by mitochondrial complex III was doubled (p < 0.05) in AP2 mice, compared to CON. Ejection fraction was unchanged at baseline and decreased 26% 7 days post ischemia as compared to CON (p < 0.05).

Conclusion: Insulin resistance and steatosis relate to high oxidation with a shift towards lipids. Increased energy turnover might result from hyperlipidemia and/or cardiac hypertrophy, which is not caused by higher blood pressure. Oxidative stress could underlie ischemic intolerance and impaired cardiac function and promote cardiac mortality of patients with T2D.

T6:PO.023

Circulating microparticles and hypercoagulability in obese patients

Eva Zabeo, Elena Campello, Roberto Fabris, Chiara Dal Prà, Veronica Zanato, Vera Bettini, Elisabetta Ferlini, Paolo Simioni, Paolo Prandoni, Roberto Vettor

Department of Medicine, University of Padova, Italy

Introduction: Overweight and obese patients have an increased risk of developing venous and arterial thromboembolism. This hypercoagulability could be related to the procoagulant activity of both the circulating microparticles (MP) and the plasma.

Methods: 20 overweight, 20 I degree, 20 II degree and 20 III degree obesity patients were enrolled and compared to 40 age/gender-matched normal weight controls. We performed levels of microparticles (MP) of different origin and MP activity, thrombin generation (TG), as a global hypercoagulability marker, and FVIIa-AT complex assay, as an indirect marker of tissue factor (TF) as coagulation tests and interleukine-6, tumour necrosis factor α and high-sensitive C reactive protein as inflammatory parameters.

Results: A statistically significant increase in median levels of all MP subtypes was observed in obese patients compared to controls. Overweight patients had higher levels of annexin V-MP (AMP), endothelial-derived (EMP), leukocyte-derived (LMP) and TF-bearing MP than controls. All obese patients had a significantly shorter mean lag time (p < 0.05), higher mean peak thrombin (p < 0.01) and increased mean endogenous thrombin potential (ETP) (p < 0.001) compared to healthy controls. Similar

trends were seen in overweight. Both AMP levels and ETP were found to positively correlate with BMI, waist circumference and inflammatory parameters.

Conclusion: Excessive adipose tissue may induce overproduction of MP and increase TG. High prothrombotic potential is found in overweight patients free of metabolic syndrome and it increases with the severity of obesity. Assessment of MP, TG and VIIa-AT complex may have a role in the characterization of hypercoagulability in overweight and obese patients.

T6:PO.024

Cardiometabolic risk factors in the metabolically healthy centrally obese vs. lean adolescents

Ivana Koborová¹, Radana Kollárová¹, Zora Gerová², Katarína Šebeková¹

¹Institute of Molecular BioMedicine, Medical Faculty, Comenius University, Bratislava, Slovakia

²Regional Authority for Public Health in Bratislava, Bratislava, Slovakia

Introduction: Studies focusing on the metabolically healthy obese (MHO) phenomenon in the adolescents are scarce and usually compare the MHO vs. metabolically challenged obese subjects. We asked whether in the adolescents presence of single central obesity affects cardiometabolic risk factors.

Methods: From among the Caucasian non-diabetic subjects with normal renal function participating in the secondary-schools-based cross-sectional study "Respect for Health" 15-to-20-year-olds who did not present any sign of MS except for central obesity (waist-to-height ratio >0.5) were selected and compared with their lean healthy (LH) counterparts. Standard and non-traditional cardiometabolic risk markers (CMRM) were evaluated.

Results: From among all participating boys 52% (n = 684) did not present any sign of MS, 27 (2%) were MHO. Except for all markers of obesity (BMI, waist circumference, waist/height, total body fat) MHO boys presented higher fasting total- and LDL-cholesterol, TAG, hs-CRP, insulin and uric acid levels, and were less insulin sensitive (QUICKI) than their LH counterparts. Plasma levels of homocysteine, atherogenic index of plasma, eGFR, and urinary albumin/creatinine ratio did not differ significantly. 61% (n = 818) of participating girls were LH while 30 (2%) were MHO. MHO girls presented higher markers of obesity, diastolic and mean arterial blood pressure, LDL-cholesterol and uric acid levels than LH girls. The other investigated variables did not differ significantly.

Conclusion: MHO adolescents present increased CMRM in comparison with their LH counterparts. CMRM cluster differently among the genders, and are elevated within their reference range.

T6:PO.025

Development of Anthocyanin Intake Model using Creme Nutrition®

Sandrine Pigat

Creme Global

Introduction: This analysis is part of the EU FP7 BACCHUS project which investigates the beneficial effects of dietary bioactive peptides and polyphenols on cardiovascular health in humans. By combining consumption data from the UK NDNS Rolling Survey with data on the bioactive constituents anthocyanins found in berries (obtained from eBasis), a dietary intake model was created to assess actual intakes of anthocyanins from berries in the UK.

Methods: Data on anthocyanin levels in berries was extracted from eBasis, a database containing published data on the content and biological effects of bioactive constituents in plant based foods. This data was then matched to all berries consumed by participants of the NDNS survey. A discrete data distribution of concentrations was created to consider mul-

tle data points of concentrations derived from eBasis. Assessments are performed by combining the UK food consumption diaries and eBasis data with probabilistic Creme Nutrition® intake models.

Results: Mean and P97.5 daily anthocyanin intake from fresh and frozen berries in the UK population are displayed below:

Population	Food	Compound	Intake mg/d			
			Mean	Mean Err	P97.5	P97.5 Err
Total Population	All Berries	Total Anthocyanins	4.94	0.92	70.53	23.25
		Total Phenolics	4.35	0.90	72.19	23.54
Consumers Only	All Berries	Total Anthocyanins	28.40	4.82	246.01	35.20
		Total Phenolics	24.10	4.79	196.88	34.43

Conclusion: A model linking anthocyanin data (based on eBasis data) and berry intake in the UK was established. This research included fresh and whole shaped berries only; therefore further comprehensive intake analyses from the total diet may be considered.

T6:PO.026

Exploring the mechanistic basis for the obesity paradox in patients undergoing percutaneous coronary intervention for coronary artery disease

Maura Shields¹, Catherine Crowe¹, Jim Crowley², Francis Finucane¹

¹Bariatric Medicine Service, Galway University Hospitals.

²Department of Cardiology, Galway University Hospitals.

Introduction: Increased adiposity is a risk factor for cardiovascular disease, but the association between body mass index (BMI) and cardiovascular morbidity and mortality is characterised by the 'obesity paradox', whereby obese patients with established cardiovascular disease have lower mortality than lean patients. The mechanistic basis for this is not known. We sought to determine whether BMI influences patterns of coronary artery disease (CAD) in adults undergoing percutaneous intervention (PCI).

Methods: We conducted a retrospective cohort study of 257 adults who had BMI measured during rehabilitation after PCI for CAD. Data were recorded regarding the degree of stenosis in each arterial territory and the number of affected territories. The Chi-Square test and logistic regression were used to determine whether these differed in lean compared to overweight and obese patients, or by BMI.

Results: 79.9% of patients were male, 9.9% were lean (BMI <25 kgm⁻²), 35.8% never smoked, 14.2% and 51.3% had self-reported diabetes and hypertension, respectively and 76.6% had a family history of CAD. 37% of lean and 18.2% of overweight/ obese patients were female (p = 0.039). Age (61.4 versus 59.7, p = 0.43) and the mean number of affected vessels (2.6 versus 2.7, p = 0.36) were similar in both groups, while there were no differences in the anatomical location or severity of stenosis.

Conclusion: The influence of BMI on morbidity and mortality in patients with prevalent coronary artery disease does not appear to be mediated by differences in the location or severity of coronary artery plaques.

T6:PO.027

Effect of abdominal obesity on postprandial lipoprotein concentrations by linear electrophoresis

Peter Sabaka, Martin Čaprnda, Matej Bendžala, Dávid Baláž, Stanislav Oravec, Ľudovít Gašpar

2nd Department of Internal Medicine, Comenius university in Bratislava, Slovakia

Introduction: The effects of visceral fat accumulation on postprandial lipoprotein concentrations have not yet been studied in details. We therefore focused on the postprandial lipoprotein profile in otherwise healthy men and women with abdominal obesity and their comparison with the control group of volunteers with normal waist circumference

Methods: The concentration of lipoprotein classes and subclasses was measured before and 4 hours after a standard meal by linear polyacrylamide gel electrophoresis.⁷

Results: A statistically significant postprandial rise in triacylglycerol (TAG) concentration occurred in all cohorts. Highest rise was in the cohort of obese men. VLDL increased 4 hours after meal in all cohorts except the women with normal waist circumference. The concentration of large IDL particles increased in both non-obese men and women. In women with abdominal obesity, however, it decreased, while in obese men there was no statistically significant change. The concentration of small and medium-sized IDL particles decreased in all cohorts. Analyzing subclasses changes of large, medium-sized and small LDL particles we saw no significant shift in their concentrations, except the subclass of large LDL particles, which decreased in men. Concentrations of medium and small HDL particles decreased postprandially in cohorts of volunteers with normal waist circumference. However, they remained unchanged in cohorts of subjects with abdominal obesity.

Conclusion: We observed significant postprandial changes of the lipoprotein profile, but the nature and extent of these changes depended on gender and presence of abdominal obesity.

T6:PO.028

Evaluation of cardio metabolic control in obese patients with metabolic syndrome

Daniela Popova, Emilya Dimitrova, Kiril Petrov, Biserka Strahilova, Maya Ditchева, Nikolay Hadjipetrov

Clinic of Metabolic Endocrine Diseases and Dietetics, University Hospital Queen Giovanna-ISUL, Medical University of Sofia

Introduction: Metabolic syndrome /MS/ starts to become epidemic during the last few decades associated with growing cardiovascular morbidity and mortality despite progress of therapeutical strategies. The arterial hypertension /AH/ and dyslipidaemia /DLP/ in MS are leading important known risk factors with the major frequency. Their relationships with insulin resistance and impaired glucose metabolism start to become more and more clarified.

Methods: The aim of the study is to identify the frequency of optimal control of AH and DLP according gender, ages and global risk in obese patients with MS according ESC 2009 and ESC/EAS 2011 guidelines and the most frequently used classes and molecules of antihypertensive and lipid lowering medications. Retrospectively a group of 152 hospitalized obese patients with MS, 64 male and 88 female aged from 20 to 84 years old was analyzed and ambulatory measured blood pressure, laboratory measured lipid profile and ESC risk score were registered. The global risk according additional risk factors was stratified and current AN and DLP therapy intervention including class and molecule of medications was analyzed.

Results: In 126 patients with AH 17,46% were without pharmacological treatment, in 30,16% of treated pharmacologically was achieved target levels of blood pressure and in 69,84% was identified unsatisfactory control of blood pressure. Among all the patients was identified DLP but only 23,03% were pharmacologically treated and 14,47% were achieved target lipid levels.

Conclusion: Among predominant part of obese patients with MS was necessary to optimize pharmacological treatment in order to achieve better cardio metabolic control.

T6:PO.029

Levels of circulating Elastin-Antielastin Immune Complexes and Elastin derived Peptides in sera of Patients with obesity and essential hypertension

Asparuh Nikolov¹, Tsinlikov¹, Tsinlikova¹, Nicoloff², Blazhev², Garev¹

¹Department of Internal Diseases, Medical University, Pleven

²Department of Biology, Medical University, Pleven

Introduction: Elastin and collagen are the main proteins of vascular wall. An important factor in the development of vascular wall alterations is degradation of the elastic fiber major protein – elastin. The aim of our study was to: (1) Measure levels of elastin-derived peptides (EDP) and elastin-antielastin circulating immune complexes (EA CIC) in sera of obese patients with essential hypertension and (2) to compare their levels in obese patients with essential hypertension and in obese patients without essential hypertension and healthy controls.

Methods: The study population consisted of 135 patients divided into three groups as follows: obese patients with elevated blood pressure (n = 47), mean age 62.5 ± 12.58 years (Group 1); obese patients with normal blood pressure (n = 46), mean age 60.4 ± 8.4 years (Group 2); and control group of healthy subjects (n = 42), mean age 58.9 ± 7.56 years (Group 3).

An elastin-specific ELISA for detection of EDP was used. EA CIC were investigated by new method for immune complexes detection by means of ELISA-type techniques (CIF-ELISA).

Results: Patients with obesity and AH (Group 1) showed statistically significantly higher levels of EDP (0.261 ± 0.027) in comparison with Group 2 (0.218 ± 0.030) and healthy controls (0.199 ± 0.004) (p < 0,05). There were non-significant differences in serum EDP levels between obese patients without AH and healthy controls (p > 0,05). Group 1 showed statistically significantly higher levels of EA CIC (0.204 ± 0.045) than patients from Group 2 (0.152 ± 0.014) and healthy controls (0.089 ± 0.008).

Conclusion: Determination of serum EDP and EA CIC levels may be a useful method for monitoring of development of arterial hypertension in obese patients.

T6:PO.030

Comparison of Obesity Indices for detecting metabolic impairments in lebanese adults

Rouham Yamout¹, Souha Fares², Abia Sibai², Moubadda Assi², Walid Ammar³

¹Ministry of Public Health, American University of Beirut

²American University of Beirut

³Ministry of Public Health; American University of Beirut

Introduction: This study examines three obesity indices: body mass index (BMI), waist circumference (WC), and waist-to-height ratio (WHR), to define the index that has the best discriminatory power against metabolic and cardiovascular outcomes.

Methods: We used 2148 records generated from a multifactorial cardiovascular assessment service including fasting blood sugar, blood pressure, self-reported history of diabetes, hypertension, dyslipidemia and CVD. Receiver-operating characteristic curve analyses were used to define the optimal cutoff points of the three obesity indices against a cardiovascular outcome measure defined as the presence of two metabolic impairments and/or history of CVD. The predictive characteristics of the three obesity indices were compared through by comparing of the Areas Under the Curve between each of the obesity indices and each of the outcome variables, and Odds ratio obtained from a logistic models adjusted for

smoking status, family history for premature CVD, and socio-economic variables, run between each of the obesity indices and each of the five outcome measures separately.

Results: The optimal cutoffs for BMI were ≥ 28.6 kg/m² in men and ≥ 27.2 kg/m² in women; those of WC were ≥ 99 cm in men and ≥ 92 cm in women and those of WHtR were ≥ 0.58 in men and ≥ 0.57 in women. Central obesity indices were better predictors than BMI for most outcomes assessed.

Conclusion: We recommend the use of WC measurement in massive assessment of cardiovascular health.

T6:PO.031

A low-fat, low-caloric diet enhances the hypolipidemic effect of hypolipidemic medication in overweight patients

Dimitra Kagiava¹, Adamantios Bourdakis², Christina Dalabira³

¹Nutritionist-Dietitian, MSc in Public Health Nutrition

²Pathologist-Specialized in Lipidology

³Health Visitor

Introduction: In this study, a comparative analysis between exclusive medical therapy (MT) and combined medical-dietary therapy (MDT) was conducted, in order to investigate the possibility and level of an extra benefit from the dietary therapy (DT).

Methods: Among patients with dyslipidemia, the ones with high body mass index (>25 kg/m²), were selected. The allocation in the intervention group, that received MDT, or the control group, that received MT (mainly statins), was based upon the acceptance or the rejection respectively of the DT (energy restriction of 500–1000 kcal and fat restriction up to 27–30% of total energy). The patients were finally included in the study, only if they showed good compliance for at least two consequent months and also if they did not have blood lipid levels that were extremely abnormal or uncontrolled via MT. The measurements that were collected were blood levels of triglycerides (TG), total, low-density and high-density cholesterol (T-CHOL, LDL-C, HDL-C), as well as of body mass (BM).

Results: Improved blood lipid levels were seen in both groups and were statistically significant. All improvements, but the TG reduction, were notably larger in the intervention group. However, these differences were not significant. There was a significant correlation, though, between the improvements of BM and those of TG.

Conclusion: This study brought important indications for the contribution of the DT and the consequent weight loss in the management of dyslipidemia via MT, but did not manage to prove it, mainly due to its small sample. More and larger studies are required.

T6 – Diabetes

T6:PO.032

Effects of pterostilbene on glycaemic control in obese rats

Saioa Gomez-Zorita¹, Maria Teresa Macarulla¹, Leixuri Aguirre¹, Alfredo Fernandez-Quintela¹, Agnes M Rimando², Maria Puy Portillo¹

¹Department of Nutrition and Food Science, University of País Vasco, Vitoria, Spain. CIBERObs Physiopathology of Obesity and Nutrition, Institute of Health Carlos III (ISCIII), (Spain).

²United States Department of Agriculture, Agricultural Research Service, Natural Products Utilization Research Unit, Mississippi, USA

Introduction: Pterostilbene is a polyphenol chemically related to resveratrol. It shows higher bioavailability and longer half-life than resveratrol. The present study aimed to determine the effect of pterostilbene on insulin resistance induced by an obesogenic feeding.

Methods: 27 male growing Wistar rats were divided into three experimental groups (n = 9), and fed an obesogenic diet, supplemented with pterostilbene: PT15 group (15 mg pterostilbene/kg body weight/d), PT30 group (30 mg pterostilbene/kg body weight/d) or not (control group). One week before the end of the experimental period (6 weeks), glucose tolerance test was performed, and the Area Under the Curve (AUC) and Peripheral Glucose Utilization (PGU) were calculated. Once finished the treatment, rats were sacrificed and liver was dissected. Hepatic glucose-6-phosphatase (G6Pase) and glucokinase (GK) activities were measured spectrophotometrically.

Results: With regard to glycaemic control, PT15 group showed lower AUC (-23% ; $P < 0.01$), and higher PGU ($+7\%$; $P < 0.05$) than control group. Surprisingly, this effect was not found in PT30 group. GK activity showed a significant increase in PT15 group ($+34\%$; $P < 0.05$), but not in PT30 group. No significant changes were observed in G6Pase activity among the experimental groups.

Conclusion: Pterostilbene is a promising molecule in the field of functional ingredients because it improves glycaemic control in rats showing insulin resistance induced by obesogenic feeding. It can be suggested that increased glucose clearance induced by this polyphenol is on the basis of its anti-diabetic effect. A dose-response pattern was not observed.

T6:PO.033

Beef tallow based, but not soybean-oil based low-carbohydrate/high-fat diets increase intramyocellular lipid concentrations and impair glucose tolerance in rats

Maximilian Bielohuby, Ayse Zengin, Riia Sustarsic, Elahu Sustarsic, Amon Horngacher, Sarina Benedix, Martin Bidlingmaier

Endocrine Research Unit, Medizinische Klinik und Poliklinik IV, Klinikum der LMU, Munich, Germany

Introduction: Low-carbohydrate/high-fat diets (LC-HFD) induce weight loss in both animals and humans. In rats, we have previously shown that consumption of LC-HFD is paralleled by increased visceral adiposity, intramyocellular lipid (IMCL) accumulation and skeletal muscle triglyceride (mTG) content, all of which contribute to impaired glucose tolerance. At the same time we showed glucose intolerance and insulin resistance in rats fed iso-energetically with beef-tallow based LC-HFD by using glucose tolerance tests (GTT) and hyperinsulinaemic-euglycaemic clamps.

Methods: We now investigated if the exchange of beef-tallow with soybean-oil as the dietary fat source has an impact on glucose metabolism, visceral and skeletal muscle fat accumulation. Male Wistar rats were pair-fed for four weeks iso-energetic amounts of standard rodent chow or one of two different LC-HF diets (% of metabolizable energy, fat/protein/CHO: LC-HF-1 (78.7/19.1/2.2), LC-HF-2 (92.8/5.5/1.7) and CH (16.7/19./64.3)), containing either beef-tallow or soybean-oil as only fat source.

Results: As expected, rats fed with the beef-LC-HFD showed higher visceral fat mass, impaired glucose tolerance and higher IMCL accumulation after 4 weeks. Similar to beef-LC-HFD, also rats fed with the soy-LC-HFD displayed significantly higher visceral fat in comparison to controls. In contrast to the beef-LC-HFD-groups, GTTs suggest that glucose tolerance in soy-LC-HFD groups was impaired to a lesser extent compared to beef-LC-HFD. Furthermore, rats fed soy-LC-HFD did not exhibit increased ICML-accumulation and mTG content.

Conclusion: Our preliminary data suggest that the consumption of LC-HFD containing soybean-oil instead of beef-tallow still results in higher visceral fat mass, but does not affect IMCL and has less negative effects on glucose metabolism.

T6:PO.034

Differential Regulation of Gastric Bypass and Sleeve Gastrectomy on Plasma Nesfatin-1 and Obestatin Levels in Patients with Type 2 Diabetes Mellitus

Chen¹, Lee²

¹Faculty of Medicine, National Yang-Ming University School of Medicine, Taipei, Taiwan; Division of Gastroenterology, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan

²Department of Surgery, Min-Sheng General Hospital, Taoyuan, Taiwan

Introduction: The mechanisms by which bariatric surgeries, including gastric bypass (GB) and sleeve gastrectomy (SG), achieve remission of type 2 diabetes mellitus (T2DM) and sustained weight reduction are unknown. We hypothesized that the novel anorexigenic hormone nesfatin-1 and another new hormone obestatin might contribute to the marked improvement in glycemic homeostasis and weight loss in diabetics after GB and SG.

Methods: A hospital-based, prospective study was conducted. Overnight fasting plasma concentrations of nesfatin-1 and obestatin were analyzed in T2DM patients before surgery, and at 3 and 12 months after laparoscopic GB and SG.

Results: At 12 months, reductions of body mass index (BMI), fasting blood glucose, and glycated hemoglobin were similar between GB and SG groups (P all >0.05). Plasma nesfatin-1 levels in patients undergoing GB or SG significantly decreased after surgeries (P both <0.05). In contrast, plasma obestatin concentrations significantly increased in patients after SG ($P < 0.05$) but without any alteration after GB. The alterations of plasma nesfatin-1 were significantly and negatively associated with the reduction of fasting blood glucose ($P < 0.05$) at 12 months after GB and SG. In the SG group, the reduction of nesfatin-1 significantly and positively correlated with the decrease of BMI ($P < 0.05$).

Conclusion: GB and SG produce differential influences with regards to circulating nesfatin-1 and obestatin levels in non-morbidly obese, T2DM patients. Circulating nesfatin-1 may modulate glucose homeostasis in two surgical procedures, and participate in regulating body weight in SG.

T6:PO.035

Assessment of advanced glycation end products in overweight and obesity

Chakarova, Dimova, Tankova, Grozeva, Dakovska

Department of diabetology, Clinical Center of Endocrinology, Medical University Sofia

Aim: The aim of the present study was to assess advanced glycation end products (AGEs) in overweight and obesity and their relation to anthropometric and glycaemic control parameters.

Material and methods: 252 subjects (mean age 51.2 ± 12.3 years, mean BMI 31.0 ± 5.9 kg/m²) – 40 with normal weight, 72 overweight and 140 with obesity were enrolled. Glucose tolerance was studied during OGTT applying 2006 WHO criteria. According to glucose tolerance the subjects were divided into three age-matched groups – 102 with normal glucose tolerance (NGT) (mean age 49.7 ± 12.6 years, mean BMI 29.3 ± 5.4 kg/m²), 93 with prediabetes (mean age 53.7 ± 12.5 years, mean BMI 32.4 ± 5.3 kg/m²) and 57 with newly-diagnosed diabetes (NDD) (mean age 53.7 ± 12.5 years, mean BMI 31.6 ± 6.9 kg/m²). Skin autofluorescence (AF), reflecting tissue AGEs accumulation was measured non-invasively by AGE-Reader (DiagnOpticsTM, The Netherlands) using the fluorescence of ultraviolet light on the ventral side of the lower arm.

Results: No significant difference in AGEs accumulation was found between obese, overweight and normal weight subjects. When analyzed according to glucose tolerance, tissue AGEs were significantly higher in the group with NDD compared to NGT group ($p = 0.023$). Significant positive correlation was observed between AGEs accumulation and age ($r = 0.44$, $p = 0.0001$) and HbA1c ($r = 0.19$, $p = 0.002$) but not between AGEs and BMI.

Conclusions: Overweight and obesity are not associated with increased AGEs formation on their own. Age and glycaemic control appear to be major determinants of AGEs accumulation.

T6:PO.036

The relationship between anthropometric parameters and changes in insulin doses in hospitalized patients with uncontrolled type 2 diabetes mellitus

Marcin Kosmalski, Melania Mikolajczyk

Department of Internal Diseases, Diabetology and Clinical Pharmacology, Medical University of Lodz

Introduction: Daily dose of insulin (DDI) in type 2 diabetes mellitus (T2DM) patients depends on many factors. The aim of our study was to assess relationship between anthropometric parameters and DDI on admission and at discharge from hospital in patients with uncontrolled T2DM.

Methods: We enrolled 340 patients (age 67.01 ± 11.05 years, 194 female), hospitalized for bad diabetic control (mean A1c value $8.93 \pm 1.83\%$), treated with insulin in various regimens. In every patients following data were collected: medical history (including DDI and diabetic lifestyle), anthropometric parameters (BMI, waist and hip circumference, WHR) and basic laboratory tests (FPG, PPG, A1c and lipids). Additionally, we compared DDI on admission and at discharge from hospital.

Results: The obtained results indicate, that about 95% hospitalized patients did not follow rules of diabetic lifestyle. The average of DDI on admission was 47.87 ± 23.95 U and at discharge 50.87 ± 23.66 U. Mean value of BMI was 31.35 ± 5.47 kg/m². 140 patients were overweight and 163 had obesity. In 178 patients the dose of insulin increased (from 42.93 ± 21.45 U to 58.46 ± 23.05 U) and in 125 decreased (from $54.6126.36$ U to 41.20 ± 21.26 U), 37 of them did not required modification of the dose. During hospitalization after implementation of diabetic diet and intensive educational program overweight and obesity patients did not required significant changes in DDI. Interestingly, patients with normal BMI needed higher doses at discharge to improve their glycemic control.

Conclusion: Our findings indicate that majority of overweight and obesity patients with T2DM require substantial lifestyle modification to improve diabetes control. There is no need to increase the daily dose of insulin if this type of patients strictly follow the rules of healthy lifestyle.

T6:PO.037

A positive association between Body Mass Index and Red Blood Cells, Hemoglobin and Hematocrit is dependent on abdominal fat distribution markers and the presence of metabolic syndrome components – results from a North-East Italy population study

Rocco Barazzoni, Pierandrea Vinci, Gianluca Gortan Cappellari, Enrico Chendi, Mario Ius, Paolo Comina, Annamaria Semolic, Roberta Situlin, Michela Zanetti, Gianfranco Guarnieri

Dept of Medical, Surgical and Health Sciences, University of Trieste, Italy

Introduction: Obesity (BMI ≥ 30 kg/m²) and abdominal fat are major risk factors for insulin resistance (IR). Red blood cells (RBC), hemoglobin and hematocrit are reportedly associated with, and could contribute to IR in the general population.

Methods: We investigated 1) the potential impact of BMI per se and abdominal fat distribution [waist circumference (WC)] on RBC, hemoglobin and hematocrit, and 2) their potential associations with IR (HOMA), in a cohort ($n = 1836$, M/F=865/971, age=49 \pm 1) from the MoMa study assessing obesity-related metabolic complications in North-East Italy – Friuli-Venezia-Giulia.

Results: Age-, sex- and smoking-adjusted RBC, hemoglobin and hematocrit increased ($P < 0.01$) from lean to overweight but not ($P=NS$) from

overweight to obese BMI, and from lowest to middle but not middle to highest WC tertile. In all subjects, hematological parameters were positively associated with BMI and WC, plasma glucose, triglycerides, low HDL-cholesterol and blood pressure ($P < 0.05$). Associations between BMI and hematological parameters were no longer significant after adjustment for the above metabolic parameters or WC. RBC, hemoglobin and hematocrit were also associated with HOMA ($P < 0.001$) and these associations remained significant after adjusting for plasma glucose, triglycerides, HDL-cholesterol and blood pressure, as well as BMI/WC.

Conclusion: Higher RBC, hemoglobin or hematocrit are not associated with obesity per se, and a general association between BMI and hematological parameters is mediated by abdominal fat distribution markers and obesity-associated metabolic complications. Hematological parameters are conversely associated with IR independently of anthropometry. Increasing RBC, hemoglobin and hematocrit could negatively modulate insulin resistance in a North-East Italy population, independently of obesity and abdominal fat.

T6:PO.038

Effect of obesity and weight loss on insulin resistance

Feray Akbas, Hanife Usta Atmaca, Sencan Acar, Mustafa Boz

MD, Istanbul Training and Research Hospital, Internal Medicine Department, Istanbul, Turkey

Introduction: Insulin resistance might be explained as abnormal biological response to endogenous or exogenous insulin. This study aims to evaluate the changes in metabolic parameters and insulin resistance after a – at least 5% – of weight loss in obese patients.

Methods: 50 patients admitted to Istanbul Training and Research Hospital Obesity Outpatient Clinic and achieved 5% or more weight loss were included in the study. Metabolic parameters before and after weight loss were evaluated.

Results: 86% (43 patients) of patients were female and 14% (7 patients) of patients were male. Mean BMI, FBG, TG, HDL, fasting insulin and HOMA-IR levels showed improvement at different levels after at least 5% of weight loss compared to baseline values (Table 1). While 36% (18 patients) of patients had metabolic syndrome before weight loss, the percentage decreased to 18% (9 patients) after at least 5% of weight loss.

Conclusion: Insulin resistance is associated with, type 2 diabetes, obesity, metabolic syndrome, hypertension, hyperlipidemia, coronary heart disease and polycystic ovary syndrome. To improve insulin sensitivity in obese patients will decrease the morbidity and mortality of related diseases, contribute to public health and decrease health costs.

Table 1:

Parameters Searched	Mean values before at least 5% of weight loss	Mean values after at least 5% of weight loss
BMI (kg/m ²)	40.57 ± 4.05	36.66 ± 4.35
FBG (mg/dl)	92.70 ± 17.70	91.80 ± 13.00
Fasting insulin (uU/ml)	17.80 ± 5.98	14.73 ± 3.93
TG (mg/dl)	140.50 ± 73.41	115.80 ± 41.13
HDL (mg/dl)	53.40 ± 10.81	56.20 ± 12.66
HOMA-IR	4.25 ± 1.48	3.05 ± 0.53

T6:PO.039

Thyroid dysfunction in patients with obesity and metabolic syndrome in adults

Bojan Lozanov¹, Vankova², Lachezar Lozanov³, et al.

¹Professor in Endocrinology

²MD,

³l.lozanov@abv.bg

Introduction: Obesity and Metabolic syndrome are linked to many endocrine abnormalities including thyroid dysfunction, especially the subclinical and overt hypothyroidism

The aim of the study was to investigate of prevalence of thyroid dysfunction in adult patients with Obesity (Ob) and Metabolic syndrome (MetS) in a Bulgarian population

Methods: Patients included in the study were 231 at mean age 43±13 yr, 90 pts with central Ob and 189 with MetS (NCEP-ATP III criteria). All patients were assessed for BMI, ABP, US-thyroid, OGTT, HOMA-IR, Cholesterol, HDL, 3-glycerides, Uric acid

Results: Thyroid dysfunction was found in 130 pts (56q3%), including 101 pts (43,7%) with subclinical or overt hypothyroidism, 15 pts (6,5%) with thyrotoxicosis, 14 pts with euthyroid Hashimoto' thyroiditis. The prevalence of hypothyroidism in Ob and MetS patients was similar (43–44%) three times more in women (48q7&) than in men (16q6%). Diabetes mellitus affected 17,8% of Ob pts vs 20,8% of MetS, arterial hypertension 54% and 67% respectively. There was a positive correlation between BMI, HOMA-IR and cholesterol.

Conclusion: Our data demonstrate high prevalence of hypothyroidism in patients with Obesity and MetS which is linked to significant changes in body weight and metabolism. In this regard, it is important to evaluate the thyroid function in all patients with Obesity and Metabolic syndrome

T6:PO.040

Diabetes mellitus (DM) 2 type, obesity, menopause

Voloshynska, Ilashchuk

Bukovinian State Medical University

Introduction: Lifespan prolongation maintained fact that females spend 1/3 of their lives in peri- and menopausal period. Great prevalence of obesity and diabetes mellitus are marker of this age group. Diabetes mellitus (DM) 2 type and menopause are suggested to be mutually burdensome concerning increased cardiovascular risk, and insulin resistance may be common pathogenetic chain. Further investigation of clinical peculiarities is very important in estrogen deficient females.

Methods: 33 females with verified DM 2 (menopause, age – 49–57) were investigated vs. control – 10 females with preserved reproductive potential. Lipid metabolism was estimated with determination of total cholesterol (TC), LDL and triglycerides (TG) levels.

Results: Increase of all investigated parameters was observed in principal group comparing control: correspondently TC – 6,21 ± 0,7 vs. 4,97 ± 0,28 mmol/l, TG – 2,24 ± 0,5 vs. 0,76 ± 0,07 mmol/l, LDL – 4,05 ± 0,5 vs. 3,17 ± 0,23 mmol/l. Increase of blood pressure was detected in principal group: systolic – 139,93 ± 5,4 mm.Hg and diastolic – 85,63 ± 0,77 mm.Hg on the contrary to control (systolic blood pressure 116 ± 2,9 mm.Hg, diastolic – 75 ± 4,6 mm.Hg. Abdominal type of obesity was detected in primary group patients (waist circumference 91 ± 2,9 sm in principal group, 69 ± 2,6 cm in control).

Conclusion: 1. Abdominal type of obesity dominates in clinics of metabolic syndrome in menopausal patients with DM 2 type and is associated with increased blood pressure.

2. Lipid profile and screening for diabetes mellitus type 2 should be routine diagnostic tests in menopausal females suffering from arterial hypertension and/or obesity.

T6:PO.041

Obesity as a Gateway to type 2 Diabetes Mellitus

Ljubinko Vasiljevic

Hospital center Novi Pazar

Introduction: Type 2 Diabetes Mellitus are strongly associated with obesity. Furthermore, obesity may play an important role in developing Insulin resistance. All types of obesity are characterized by familial aggregation and single gene defects account for small number of cases. Persons who are obese are at high risk for developing Type 2 diabetes, particularly if a close family member is affected with diabetes. It becomes very important to maintain a healthy body weight in order to protect yourself from developing a chronic disease like diabetes.

Methods: We used a survey conducted from June to December 2013, among 600 patients in the Hospital center Novi Pazar, Serbia, who suffer from Type 2 Diabetes Mellitus.

Results: More than 70% of patients in the Hospital center Novi Pazar, Serbia, with type 2 Diabetes Mellitus are obese.

Conclusion: The most important thing in prevention is control of weight and exercise in a regular basis, which means about three times a week for 30 minutes each time. Walking is an excellent exercise for most people, but also you should choose an activity like swimming or fitness, or set of exercises that you enjoy.

T6 – Other

T6:PO.042

Microalbuminuria and cardiometabolic risk factors in general population of high school students

Radana Kollárová¹, Ivana Koborová¹, Zora Gerová², Katarína Šebeková¹

¹Institute of Molecular BioMedicine, Medical Faculty, Comenius University, Bratislava, Slovakia

²Regional Authority for Public Health in Bratislava, Bratislava, Slovakia

Introduction: In the adults, microalbuminuria (MA) is a marker of presence, or indicates an increased risk of development of cardiovascular and/or renal diseases. Roots of these diseases go back to childhood and adolescence. Data on prevalence of MA in adolescents are scarce, and the relationship between albumin/creatinine ratio (ACR) and cardiometabolic risk factors in this age group is not clear. We aimed to assess the prevalence of MA and the relationship of ACR with cardiometabolic risk factors in population of adolescents in Bratislava region.

Methods: We analyzed data from 2 685 adolescents (49% boys), aged 14–20 years. Anthropometric and blood pressure measurements were performed at high schools. Blood and urine samples were analyzed at central laboratory. MA was defined as ACR 2.5–25 mg/mmol for boys, 3.5–35 mg/mmol for girls.

Results: Prevalence of MA was 3.2% in boys, 3.3% in girls. Multivariate analysis showed that higher ACR in boys is associated with higher serum urea concentration, urine specific gravity and glomerular filtration rate, and lower BMI, waist/height ratio, waist circumference, body weight, total body fat, serum creatinine and pulse pressure. In girls, ACR was inversely associated with percentage of total body fat, serum albumin, BMI, body weight and age.

Conclusion: In apparently healthy adolescents of both genders the prevalence of MA was rather low. No association between traditional (atherogenic lipid profile, elevated blood pressure, insulin resistance, obesity) or non-standard (homocysteine, hs-CRP) markers of cardiometabolic risk and ACR were revealed in either gender. Paradoxically, ACR associated inversely with several markers of obesity.

T6:PO.043

Obesity pre and post renal transplantation: metabolic implications

Guelho¹, Bastos², Baptista², Paiva², Rodrigues², Ruas², Oliveira², Alves³, Roseiro⁴, Bastos⁴, Saraiva², Moreno², Cardoso², Vicente², Dantas⁵, Mota⁴, Carrilho²

¹Department of Endocrinology, Diabetes and Metabolism of Centro Hospitalar e Universitário de Coimbra, HUC-CHUC, E.P.E. Portugal

²Department of Endocrinology, Diabetes and Metabolism of Centro Hospitalar e Universitário de Coimbra, HUC-CHUC, E.P.E. Portugal

³Department of Nephrology of Centro Hospitalar e Universitário de Coimbra, HUC-CHUC, E.P.E. Portugal

⁴Department of Urology and Transplantation of Centro Hospitalar e Universitário de Coimbra, HUC-CHUC, E.P.E. Portugal

⁵Department of Endocrinology, Diabetes and Nutrition of Centro Hospitalar Baixo Vouga, E.P.E. Portugal

Introduction: In kidney transplant recipients, obesity can contribute to the development of multiple comorbidities, as post-transplantation diabetes mellitus (PTDM). This study aims to evaluate the prevalence of obesity before and after renal transplantation, and compare the metabolic profile repercussions according to weight evolution.

Methods: Cross-sectional observational study of patients followed in the Endocrinology and Renal Transplantation appointments between January and May 2013. Collected: anthropometry, therapeutics and comorbidities. Analytic evaluations [fasting glucose (FG), HbA1C, lipid profile, uricemia and CRP]. Statistical analysis: SPSS(21).

Results: Included 115 patients, 30 women and 85 men, with 54,92 ± 10,04 years. Anthropometric data revealed a significant increase of BMI (p < 0.01) and obesity prevalence (p < 0.01) after transplantation. Patients were classified according to their weight evolution: GI-remained normal weight, 70.4% (n = 81); GII-remained obese, 12.2% (n = 14); and GIII-developed obesity, 17.4% (n = 20) after transplantation. There were no differences between groups in prescribed therapy, particularly immunosuppressive. GII and GIII patients presented triglycerides, LDL-cholesterol and uricemia slightly higher and lower HDL-cholesterol (p > 0.05). There was a higher frequency of diabetic patients in GII and GIII, type 2 diabetes and PTDM, respectively. GIII PTDM patients presented significantly higher HbA1C and FG (p < 0.01), and used significantly higher insulin doses (p < 0.01).

Conclusion: Kidney transplant recipients are prone to develop obesity, with substantial proportion experiencing weight gain after transplantation. Obesity development was associated with a higher frequency of PTDM. These patients presented poor glycemic control and needed higher doses of insulin, which could also have contributed to weight gain. An appropriate nutritional approach can be crucial in reducing metabolic risk in these patients.

T6:PO.044

Overall and abdominal adiposity in midlife and subsequent cognitive function

Emmanuelle Kesse-Guyot¹, Valentina Andreeva¹, Mathilde Touvier¹, Claude Jeandel², Monique Ferry¹, Serge Hercberg³, Pilar Galan¹

¹Université Paris 13, Sorbonne-Paris-Cité, Equipe de Recherche en Épidémiologie Nutritionnelle, Centre d'Épidémiologie et Biostatistiques, Inserm U1153, Inra U1125, Cnam, Univ Paris 5, Univ Paris 7

²Centre de Gérontologie, Clinique Antonin Balmes, CHU Montpellier, Université Montpellier I

³Université Paris 13, Sorbonne-Paris-Cité, Equipe de Recherche en Épidémiologie Nutritionnelle, Centre d'Épidémiologie et Biostatistiques, Inserm U1153, Inra U1125, Cnam, Univ Paris 5, Univ Paris 7; Département de Santé Publique, Hôpital Avicenne

Introduction: The scientific literature supports a link between midlife adiposity and cognitive function or decline but most studies to-date have investigated only overall adiposity, often omitting important confounders

from the analyses. We investigated the relationships between two different midlife adiposity markers and subsequent cognitive function, testing midlife dietary patterns as a potential confounder of the associations.

Methods: The cognitive performance of 2,983 middle-aged adults participating in the SU.VI.MAX study was assessed in 2007–2009 using 6 neuropsychological tests. A composite cognitive score was also computed. Body mass index (BMI) and waist circumference (WC) were measured 13 years earlier. Associations between midlife adiposity and cognitive functioning were estimated through covariance analyses.

Results: Higher BMI and larger WC at midlife predicted lower executive function: the adjusted mean difference values (95% confidence interval) for a 1 SD increase were respectively -0.37 ($-0.76, 0.02$) and -0.48 ($-0.97, 0.00$). Further adjustment for midlife dietary patterns slightly attenuated these associations. No relationships were observed with verbal memory or global cognitive function.

Conclusion: Midlife overall and abdominal adiposity were similarly associated with lower executive functioning scores. Dietary patterns may partly explain such a relationship. Further studies controlling for lifestyle confounders are needed in order to draw firm conclusions.

T6:PO.045

Relationship between Obesity Indices and Bone Mineral Density among Korean Elderly

Shim Kyungwon¹, Won Misun²

¹Associate Professor

²MD

Introduction: Both obesity and osteoporosis are important public health concerns in an aging society. The relationship between obesity and osteoporosis has been widely studied, but the effect of obesity on bone mass remains controversial. The aim of this study was to evaluate the association of obesity indices with bone mineral densities (BMDs) in Korean elderly.

Methods: The study involved 175 men and 190 women (age ≥ 65 years) from the fifth Korean National Health and Nutrition Examination Survey of 2010–2011 (KNHANES V). Body composition and BMDs were measured using dual energy X-ray absorptiometry (DXA). Correlation analyses and multiple regression analyses were conducted in order to study the relationship between different measures of obesity indices and BMD at different skeletal sites.

Results: In men, upon adjusting for confounding factors, femoral neck BMD showed a significantly positive correlation with both lean mass and appendicular skeletal mass, while there appeared to be a significantly negative correlation with waist circumference and fat mass. However, in women, after adjusting for confounding factors, both lumbar and femoral neck BMD showed a significantly negative correlation with waist circumference. Upon conducting multiple linear regression analysis, it appeared as though lean mass was the only significant and decisive positive factor for BMD, in both men and women.

Conclusion: Our study showed the different relationship between obesity indices and BMDs, based on gender among elderly Koreans. Lean mass was the only factor that showed a significantly positive effect on bone mass for both genders, suggesting that high lean mass has a protective effect on bone health in a population of Korean elderly men and women.

T6:PO.046

Arterial hypertension, blood pressure monitoring, metabolic syndrome

Ilashchuk, Voloshynska, Malishevskaya

Bukovinian State Medical University

Introduction: Metabolic syndrome (MS) presence significantly increases risk of development of cardiovascular or renal events in patients with arterial hypertension (AH). It is associated with great number of classic cardiovascular risk factors and early affliction of heart and kidneys.

Methods: Daily BP monitoring was performed to 60 patients (1st group – stable stenocardia (SS) +MS 2nd group – SS only).

Results: Much higher frequency of “dipper” profile with 10–20% daily index was observed in 2nd group (43,3% cases) comparing 1st (16,7%). “Non-dipper” profile was dominant type in combined MS and SS (60% cases). “Over-dipper” BP profiles were detected in 16,7% of 1st group and in 10% cases – in 2nd group. “Night-peaker” profile frequency was equal in both groups.

Patients with prognostically favorable «dipper» profile of BP had significantly lower Body mass index in both groups ($28,3+0,96$ kg/m²) comparing those in whom unfavorable profiles were discovered ($32,8+1,15$ kg/m², $p<0,005$).

Patients with prognostically favorable «dipper» profile of BP had significantly lower levels of HbA1c ($7,56+0,37\%$) comparing “Non-dipper” or “Night-peaker” $8,78+0,44\%$, $p<0,05$).

Conclusion: Decrease of frequency of detection of favorable BP profile in patients with SS and MS indicates prognostically worse course of arterial hypertension. Formation of unfavorable BP profiles correlates directly with BMI.

T6:PO.047

BMI trajectories throughout paediatric age and blood pressure at young adulthood: A Portuguese population-based cohort

Araújo, Severo, Barros, Ramos

Institute of Public Health, University of Porto Department of Clinical Epidemiology, Predictive Medicine and Public Health, University of Porto Medical School

Introduction: Our aim is to estimate the association between BMI trajectories during paediatric age and blood pressure (BP) at young adulthood.

Methods: As part of the EPITeen cohort (Portugal), systolic and diastolic blood pressure (SBP, DBP) was measured at 13, 17 and 21 years, using the auscultatory method. Weight and height were measured according to standardized procedures under the project and, additionally, measurements performed as part of the medical routine since birth were extracted from the child health books. We analysed data from 561 subjects corresponding to 12684 measurements. Weight was modelled, controlling for height, and including the interaction term between sex and height. The residuals of this model were used to compute individual growth curves, using mixed-effects models and the trajectories were identified through mixture models. The association between growth trajectories and BP was estimated by linear regression (β , 95% CI), controlling for sex and height.

Results: Three BMI trajectories were identified: traj1 (47.4%) and traj2 (42.6%) present parallel growth, but traj2 with higher BMI. Traj3 (10.0%) presents lower age at adiposity rebound with marked increase in BMI since then and higher prevalence of obesity at 21y, compared to the other trajectories. Traj3 was associated with higher SBP at 21y ($\beta=4.509, 1.739;7.279$) and at 13y ($\beta=3.544, 0.151;6.938$). For DBP the results were $\beta=5.077 (2.899;7.256)$ and $\beta=4.602 (2.036;7.168)$, respectively. The magnitude of the association for traj2 was lower.

Conclusion: The trajectory characterized by marked increase in BMI was associated with high blood pressure since early adolescence and remained up to young adulthood.

T6:PO.048

Nutrition and metabolic disorders in patients with psoriasis

Ludmila Ivanova¹, Galina Zhelezova², Grisha Mateev³, Snejana Vassileva³, Pencheva⁴, Michailov⁴

¹Department of Neurology, Psychiatry and Rehabilitation, Preventive Medicine and Public Health Medical Faculty, Sofia University, "St. Kliment Ohridski", Bulgaria

²Department of Biology, Medical Genetics and Microbiology, Medical Faculty, Sofia University, "St. Kliment Ohridski"

³Department of Dermatology and Venerology, Medical University, Sofia

⁴Medical Diagnostic Laboratory, "Ramus", Sofia

Introduction: The epidemic of overweight and obesity is a serious public health problem, associated not only with a proven risk of cardiovascular disease but also with a contribution to other diseases that lead to disability and decreased quality of life. Psoriasis is one of these diseases, which are often accompanied by obesity and it is not clear if the two disorders share a common pathogenesis or obesity in patients with psoriasis is a result of some lifestyle factors as diet and physical activity.

Methods: To estimate the prevalence of obesity, metabolic disorders, diet and physical activity among individuals with psoriasis a cross-sectional study in the Department of Dermatology and Venerology, Medical University, Sofia was conducted. The study included 23 patients with diagnosed psoriasis and 25 healthy adults aged 21 to 80 years. Diet, alcohol consumption, smoking, physical activity, BMI, waist circumference, total – and HDL-cholesterol, triglycerides, fasting glucose and blood pressure were assessed.

Results: The prevalence of overweight among the psoriasis cases was 47.6% and 22.5% among the controls. Individuals with psoriasis reported lower physical activity and lower alcohol consumption compared to controls. No significant differences in diet and smoking habits between the two groups was identified. The most common feature in patients with overweight and psoriasis is abdominal obesity and hypertriglyceridemia which was not found in the control group.

Conclusion: The prevalence of overweight and dislipidemia is substantial among individuals with psoriasis in this study. Given the serious complications associated with the metabolic syndrome, this frequent co morbidity should be recognized and treated.

T6:PO.049

Consequences of overweight and obesity on human skeletal system

Ivan Struhár, Michal Kumstát

Faculty of Sport Studies, Department of Health Support, Masaryk University, Czech Republic

Introduction: Obesity is a serious worldwide problem. Metabolic consequences of obesity have been vastly studied, especially type 2 diabetes, heart disease and cancer. Less attention has been paid to postural changes, postural deviations and low back pain. A number of intervention programmes of reducing body weight have been created so far, however few of them might be considered as successful. The reasons are not fully understood. Body weight changes are responsible for various postural changes, which concurrently might reduce intervention programme adherence.

Methods: We want to emphasize some of the overweight and obesity postural disability consequences according to study of recent relevant literature. Understanding of these issues is important factor of prevention.

Results: Postural status of obese people is often impaired by alterations, such as protruding abdomen associated with the increase in lumbar lordosis. Furthermore, exaggerated thoracic kyphosis, leading to protrusion of the head and intervertebral disc herniation are of interest as well. Importantly, the risk of disc degeneration is substantially higher when BMI is above 25 kg/m². An excess of weight also negatively effects plantar arch of feet.

Conclusion: The prevalence of obesity is rising progressively. It is important to solve the problem of obesity as a part of the broad and complex

phenomenon. Therefore it is needed to integrate proper scientific disciplines especially from the field of physiotherapy.

T6:PO.050

Characteristics of metabolic disturbances in women with polycystic ovary syndrome (PCOS)

Maria Orbetzova¹, Gencho Genchev²

¹Clinic of Endocrinology, "Sv. Georgy" University Hospital, Medical University, Plovdiv; Bulgaria

²Department of Social Medicine and Health Management, "Tzaritza Joanna" University Hospital, Medical University, Sofia, Bulgaria

Introduction: PCOS is considered as typical representative of metabolic syndrome with insulin resistance and compensatory hyperinsulinaemia being the underlying mechanism. PCOS is associated with higher prevalence of visceral obesity, carbohydrate disturbances, dyslipidaemia unfavorable ratio between atherogenic and antiatherogenic adipocytokines. The aim of our study was to characterize the metabolic disturbances in a large cohort of Bulgarian PCOS women.

Methods: This retrospective study comprised of 345 women (mean age 25.9 ± 6.0 years, mean BMI 28.15 ± 7.5 kg/m²) with proven diagnosis according to the ESHRE-ASRM criteria. Anthropometric parameters, body fat distribution, glucose and insulin during an oral glucose tolerance test, lipid profile, adiponectin and leptin were investigated. The results were compared to those in age matched healthy women.

Results: Obesity was found in 51% and overweight in 27% of the PCOS women. Impaired glucose tolerance was found in 6.1% and diabetes mellitus in 2.3% of them. Basal insulin and HOMA index were significantly higher and HDL-cholesterol significantly lower in PCOS women as compared to the controls, obesity being an aggravating factor. Adiponectin was significantly lower while leptin was significantly higher in PCOS women as compared to the controls. Hypertension was found in 25% of the PCOS women.

Conclusion: Our data support the strong evidence that even in younger age women

Friday, 30 May, 2014

TRACK 2 – Nutrition, Behaviour, Activity and Environment

T2 – Guided Posters

T2:PO.001

Comparison of two different incremental exercise tests for determination of aerobic fitness in severe obese men: effect of exercise duration

Davide Malatesta¹, Franco Codecasa², Mauro Cornacchia², Sabrina Maestrini³, Paolo Capodaglio⁴, Amelia Brunani⁵, Alberto Salvadori², Stefano Lanzi¹

¹Institute of Sport Sciences of University of Lausanne (ISSUL), Department of Physiology, Faculty of Biology and Medicine, University of Lausanne

²Pulmonary rehabilitation department, Istituto Auxologico Italiano, Piancavallo, Italy

³Molecular biology laboratory, Istituto Auxologico Italiano, Piancavallo, Italy

⁴Orthopaedic Rehabilitation Unit and Clinical Lab for Gait and Posture Analysis, Istituto Auxologico Italiano, Piancavallo, Italy

⁵Medicine rehabilitation department, Istituto Auxologico Italiano, Piancavallo, Italy

Introduction: Higher aerobic fitness is associated with important health benefits in obese individuals and is usually assessed during a maximal

incremental test (T) of short duration (8–12 min, TS) (Buchfuhrer et al., 1983). In normal-weight individuals, it has been suggested that also longer T (~25–30 min, TL), with 5–6 min steps duration (typically used to assess fat oxidation and metabolic fitness in obese individuals), elicits valid maximal aerobic fitness values (Midgley et al. 2008). However, this has not been investigated in severe obese (SO) individuals. Therefore, this study aimed to compare the determination of aerobic fitness with TS and TL in SO men.

Methods: Eleven SO men (40.1 ± 4.0 yr; 41.9 ± 2.7 kg·m⁻²) performed on a cycle-ergometer a TS (40-W warm-up with 20-W·min⁻¹ increments) to assess the peak oxygen uptake ($\dot{V}O_{2peak,TS}$), maximal heart rate (HR_{max,TS}) and peak power output (PPOTS). Afterward, they performed a TL (20% PPOTS warm-up with 10% PPOTS·5min⁻¹ increments) to evaluate $\dot{V}O_{2peak,TL}$, HR_{max,TL} and PPOTL.

Results: TL was 2.6 significantly longer than TS ($P \leq 0.001$). There were no significant differences in $\dot{V}O_{2peak}$ (TS: 3.08 ± 0.34 l·min⁻¹; TL: 2.98 ± 0.46 l·min⁻¹; $P=0.31$) and HR_{max} (TS: 165.0 ± 14.4 bpm; TL: 164.8 ± 16.2 bpm; $P=0.95$) between the two tests. $\dot{V}O_{2peak,TS}$ was significantly correlated with $\dot{V}O_{2peak,TL}$ ($r = 0.75$; $P=0.008$) as well as HR_{max,TS} with HR_{max,LS} ($r = 0.94$; $P \leq 0.001$). PPOTS was significantly higher than PPOTL ($+15\%$; $P \leq 0.001$). However, two PPOs were significantly correlated ($r = 0.91$; $P \leq 0.001$) attesting a systematic underestimation of PPO in TL.

Conclusion: TL is an appropriate tool to assess aerobic fitness and to prescribe exercise training in SO men.

T2:PO.002

Strength gains can be achieved through an active lifestyle promotion intervention in obese adolescents

Sandra Martins¹, Armando Raimundo², António Palmeira³, Helena Fonseca⁴

¹Centro de Estudos de Exercício e Saúde, Faculdade de Educação Física e Desporto, Universidade Lusófona, Lisboa, Portugal

²Research Centre of Sports, Health and Human Development, Évora University, Évora, Portugal

³Centro de Estudos de Exercício e Saúde, Faculdade de Educação Física e Desporto, Universidade Lusófona, Lisboa, Portugal; CIPER, FMH, University of Lisbon

⁴Paediatric Obesity Clinic, Paediatric Department, Hospital de Santa Maria, Lisboa, Portugal; Faculdade de Medicina de Lisboa, Universidade de Lisboa, Lisboa, Portugal

Introduction: In obesity, fat mass increase is associated with functional ability impairment and maximal strength reduction. The purpose of the present study was to analyze lower limb peak torque (PT) changes after a 6-month intervention aiming active lifestyle promotion in obese adolescents.

Methods: 21 adolescents (14.62 ± 1.24 yr; 32.50 ± 3.64 kg/m²), 16 girls, participated in this study. Baseline and 6-month data were collected assessing thigh PT (Biodex System 3 – Biodex Corp., Shirley, NY, USA), and body composition (dual-energy X-ray absorptiometry – Hologic-QDR Hologic, Inc., Bedford, MA, USA). Descriptive analysis was performed, along with normality test (Kolmogorov-Smirnov test), paired samples t-test, and Pearson correlation.

Results: An increase in PT was observed during knee extension at 60° ($\Delta=32.53$ Nm; $p=.001$) and 180° ($\Delta=16.13$ Nm; $p=.002$). No significant changes were found in knee flexion ($p > .05$). Significant associations were found, at baseline and at 6-month, between strength performance at 60° and lower body lean body mass ($r=.692$; $p=.001$ and $r=.791$; $p<.001$, respectively) and lower body percent fat mass ($r=-.807$; $p<.001$ and $r=-.652$; $p=.001$, respectively).

Conclusion: An intervention planned to promote an active lifestyle in obese adolescents was successful in the development of knee extension maximal strength, which can be elicited through walking and activities of daily living, thus increasing adolescent's functionality. The absence of improvement regarding knee flexion maximal strength might be explained by the need of specific exercise strategies to be achieved. Even among obese adolescents, strength performance presents a positive association with lean mass, as well as a negative association with fat mass.

T2:PO.003

Significant impact of eccentric endurance exercise on liver enzymes in overweight and obese individuals

Philipp Rein¹, Alexander Vonbank¹, Christoph Saely¹, Daniela Zanolin², Andreas Leihener², Heinz Drexel²

¹Department of Internal Medicine & Cardiology, Academic Teaching Hospital Feldkirch

²Vivit-Institute, Academic Teaching Hospital Feldkirch

Introduction: Elevated liver enzymes are highly prevalent in overweight and obese patients, reflect the presence of non-alcoholic fatty liver disease, and are associated with an increased risk of diabetes and cardiovascular events. Liver enzymes can be lowered by physical exercise, but many overweight patients are not willing or not able to engage in strenuous exercise regimens. Eccentric endurance exercise is less strenuous than concentric exercise but its effects on liver enzymes are unknown.

Methods: We allocated 42 overweight and obese sedentary individuals to an exercise intervention program, consisting of hiking downwards a pre-defined route over two months. For the opposite way, a cable car was used where compliance was recorded electronically. The difference in altitude was 540 metres; the distance was covered three to five times a week. A matched group of 12 individuals served as a control group. Metabolic profiles were obtained at baseline and after the two months period.

Results: Compared to baseline, 8 weeks of eccentric endurance exercise significantly lowered serum alanine-aminotransferase (ALT; 36 ± 23 vs. 31 ± 18 U/l; $p < 0.001$), the ALT/ aspartate-aminotransferase (AST)-ratio (1.22 ± 0.41 vs. 1.02 ± 0.33 ; $p < 0.001$), and serum gamma-glutamyl-transferase (56 ± 98 vs. 44 ± 65 U/l; $p = 0.005$), whereas these parameters did not change significantly in the control group ($p = 0.261$, $p = 0.272$, and $p = 0.644$, respectively). Eccentric endurance exercise was well tolerated and there were no serious adverse events.

Conclusion: Eccentric exercise is a promising new exercise modality which significantly lowers liver enzymes in overweight and obese individuals and therefore is of interest as a therapeutic intervention in non-alcoholic fatty liver disease patients.

T2:PO.004

Adipose tissue impairment as a central dysmetabolism inducing effect triggered by persistent organic pollutants

Pestana¹, Teixeira¹, Fernandes², Faria³, Sá¹, Faria⁴, Meireles¹, Norberto¹, Marques¹, Correia-Sá⁵, Guimarães⁶, Santos⁷, Taveira-Gomes³, Domingues⁵, Delerue-Matos⁵, Monteiro¹, Calhau⁸

¹Department of Biochemistry, Faculty of Medicine, University of Porto, Portugal

²Chemistry Investigation Centre (CIQ), Faculty of Sciences, University of Porto, Portugal and REQUIMTE – Instituto Superior de Engenharia, Instituto Politécnico do Porto, Portugal

³General Surgery Department, S. João Hospital, Faculty of Medicine, University of Porto, Portugal

⁴Department of Biochemistry, Faculty of Medicine, University of Porto, Portugal; and Chemistry Investigation Centre (CIQ), Faculty of Sciences, University of Porto, Portugal; and Faculty of Nutrition and Food Sciences, University of Porto, Portugal

⁵REQUIMTE – Instituto Superior de Engenharia, Instituto Politécnico do Porto, Portugal

⁶Department of Biochemistry, Faculty of Medicine, University of Porto, Portugal; and Department of Clinical Pathology, Hospital S. João, Porto, Portugal

⁷Department of Hygiene and Epidemiology, Faculty of Medicine and Institute of Public Health, University of Porto, Porto, Portugal

⁸Department of Biochemistry, Faculty of Medicine, University of Porto, Portugal; and CINTESIS – Center for Research in Health Technologies and Information Systems, Porto, Portugal

Introduction: The role of environmental toxicants with endocrine disrupting activity in the aetiology of obesity and its comorbidities has been recently highlighted. As the persistent organic pollutants (POPs) are ac-

cumulated in adipose tissue (AT), we focused our attention on its contribution to metabolic dysfunction, resorting to a complementary human/rodent approach.

Methods: We assessed the prevalence of 13 POPs in AT samples from obese Portuguese subjects that underwent bariatric surgery ($n = 189$), associating with the presence of metabolic dysfunction. To further understand their putative mechanisms, we investigated the effects of chronic *in vivo* exposure to *p,p'*-DDE (100 $\mu\text{g}/\text{kg}/\text{day}$) in a rat model of diet-induced obesity.

Results: In addition to the confirmation of POPs ubiquity in these human samples, we observed a dissimilar POPs storage capability in two distinct AT depots (vAT and scAT). Moreover, we revealed a positive correlation between POP levels and metabolic dysfunction in a context of obesity, with vAT contribution to metabolic dysfunction appearing to be more relevant.

Furthermore, our animal study shown that DDE exposure worsened the metabolic impact of high-fat exposure, along with an impairment of the mesenteric vAT dynamic capability and expansion function, characterised by transcription decrease of nervous system and tissue development-related genes, with special relevance for the neuropeptide galanin that also revealed changes in epigenetic regulation.

Conclusion: This highlighted that POPs stored in AT might be critical in metabolic dysfunction development in a context of obesity, supporting their broader recognition as “environmental dysmetabolism inducers”, in which the impairment of AT normal function seems to play an important role.

T2:PO.005

Deprivation by diet alone or by aerobic exercise alone: how modality of an acute intervention can differently impact ‘wanting’ and ‘liking’ of preferred foods

*Jameason Cameron*¹, *Gary Goldfield*¹, *Eric Doucet*²

¹CHEO

²University of Ottawa

Introduction: The relative reinforcing value (RRV) of food is assessed by the comparative reinforcing efficacy of two stimuli. Acute food deprivation increases the RRV value of preferred snack foods, but the impact of modality of deprivation on food reinforcement (‘wanting’) and hedonics (‘liking’) has to our knowledge not been evaluated.

Methods: Ten male subjects aged 23.7 ± 5.1 yrs. with initial body weight 83.2 ± 11.5 kg were included in this repeated-measures cross-over design. After randomization subjects performed 2 acute -25% daily needs energy deficits induced by diet only (DER) or by exercise only (DEX). The repeated measures were CON4, DER4, and DEX4, where body composition (DXA), ‘wanting’ (RRV: computer task), and ‘liking’ (palatability: visual analogue scale) of preferred foods was measured.

Results: Relative to CON4 there was a significant increase in snack points earned (versus fruit) in the DER4 (15.5 ± 4.3 vs. 24.7 ± 6.5) and DEX4 (15.5 ± 4.3 vs. 35.6 ± 4.8) sessions; a significant interaction showed higher mean snack points in the DEX4 session. Also relative to CON4, there was a significant increase in mean palatability rating of the snack reinforcers under DER (139.2 ± 13.5) and DEX (133.4 ± 19.6). All results presented are significant at $p < 0.05$.

Conclusion: ~We show ‘wanting’ and ‘liking’ of a palatable snack reinforcer increase together in a similar direction independent of deprivation modality. Obesity interventions targeting 25% energy restriction by either diet or exercise need to consider both forms of energy deprivation acutely increase the rewarding value of food, which may undermine or explain poor long-term maintenance of weight loss outcome.

T2:PO.006

Parental Feeding Practices as Mediators between Maternal Nutritional Knowledge and Children’s Fruit and Vegetable Intake

*Dimitrios Koutoukidis*¹, *Lucy Cooke*²

¹Department of Women’s Cancer, UCL Institute for Women’s Health and NIHR University College London Hospitals Biomedical Research Centre, London, UK

²Health Behaviour Research Centre, Department of Epidemiology and Public Health, University College London, UK

Introduction: Fruit and vegetable (FV) consumption may reduce mortality risk but UK children’s intake is below recommendations. Identification of determinants of children’s FV intake may inform strategies to facilitate its increase.

Methods: This cross-sectional study, conducted in 60 preschools and children’s centres in London in 2008, investigated the associations between parental nutritional knowledge, parental feeding practices and children’s FV intake. 434 primary caregivers of 2–5 year-old children completed a self-report questionnaire. Parental Nutritional Knowledge was assessed with the Nutritional Knowledge Questionnaire. Parental feeding practices included monitoring, encouragement, instrumental feeding, pressure to eat, modelling, covert control and restriction and were assessed using validated questionnaires. Parental and children’s FV intake were estimated as portions/day. The possible mediating effect of parental intake and feeding practices in the association between parental nutritional knowledge and children’s FV intake was assessed via product-of-coefficients tests in single and multiple mediation models controlling for parental education, ethnicity and children’s age and sex.

Results: The positive association between maternal nutritional knowledge and children’s FV intake (total $\beta=0.03$, CI: 0.02, 0.04) was fully mediated by a combination of parental FV intake ($\beta=0.0184$, CI: 0.0126, 0.0271) and encouragement ($\beta=0.0031$ CI: 0.0008, 0.0077), pressure to eat ($\beta=0.0048$ CI: 0.0019, 0.0101) and restriction ($\beta=0.0022$ CI: 0.0005, 0.0060).

Conclusion: Maternal nutritional knowledge promoted children’s FV intake mainly through maternal FV intake and through increased encouragement and restriction and decreased pressure to eat. Findings support these as targets in interventions.

Conflict of interest: None declared

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T2:PO.007

Proximate composition and fatty acid profile of three commercially important fish species from Bulgaria

Albena Merdzhanova, *Mona Stancheva*, *Lubomir Makedonski*

Department of Chemistry Faculty of Pharmacy Medical University of Varna

Introduction: The aim of the present study was to determine the proximate composition and fatty acid profile in two freshwater fish from carp family – common carp (*Cyprinus carpio*) and bighead carp (*Aristichthys nobilis*) and one Black Sea fish species – horse mackerel (*Trahurus mediterraneus ponticus*) traditionally consumed in Bulgaria.

Methods: Proximate composition was determined according to standard procedures: moisture, crude protein (Kjeldahl method), total lipids (Bligh and Dyer method, 1959). Analysis of fatty acid methyl esters was performed by Gas Chromatography – Mass Spectrometry.

Results: Crude protein was in the range 15.24–19.55%, fat content was from 3.80 to 12.76 g.100g-1 w.w. Energy values were in interval 440–750 kJ.100g-1 w.w. The fatty acid (FA) contents of the investigated fish species showed significant differences. The freshwater species were characterized with lower saturated FAs in range from 35.95% (carp) to 37.53% (bighead carp). Carp presented highest monounsaturated FAs (49.41%) and lowest polyunsaturated FAs (PUFA) (14.55%), including omega-3

FAs (4.00%). Bighead carp and horse mackerel showed significant lower monounsaturated FAs and higher PUFAs and omega-3 PUFA compared to carp.

Conclusion: The studied species were characterized by a good nutritional quality due to their higher protein and omega-3 PUFA contents and relatively low lipid and energy levels. All analyzed species showed omega-6/omega-3 ratio below recommended maximum values of 4.0 and PUFA/SFA ratio above recommended minimum values of 0.4. The presented results are important in order to inform consumers and to promote fish consumption in Bulgaria.

T2:PO.008

Deletion of the p66Shc gene protects from long-term effects of high-fat-diet exposure *in utero* in a gender-dependent fashion

*Veronica Bellisario*¹, *Pamela Panetta*¹, *Alessandra Berry*¹, *Sara Capoccia*¹, *Carla Raggi*¹, *Marco Giorgio*², *Pier Giuseppe Pelicci*², *Francesca Cirulli*¹

¹Dept. Cell Biology and Neuroscience, Behavioural Neurosciences, ISS, Rome, Italy

²Dept. of Experimental Oncology, IEO, Milan, Italy

Introduction: Deletion of the p66Shc-gene in mice results in reduced exposure to oxidative stress leading to a healthy and long-lived phenotype with reduced incidence of metabolic and cardiovascular pathologies. Deletion of the p66Shc-gene leads to increased metabolism and resistance to high-fat-diet-HFD. Since prenatal exposure to metabolic stress can affect the developing systems with long-term consequences during life, we hypothesized that p66Shc^{-/-}-mice might be protected, at adulthood, by the detrimental effects associated to prenatal exposure to HFD.

Methods: To verify such hypothesis adult offspring (3 and 12-month-old) of p66Shc^{-/-} and p66Shc^{+/+} dams fed HFD underwent to glucose-tolerance-GT and insulin-sensitivity-IS tests in order to measure the response to a metabolic challenge. The plasma levels of leptin were also measured.

Results: Offspring of HFD dams gained more weight both when young and when become middle-aged, compared to subjects exposed to control diet *in utero*. The prenatal HFD affected the levels of leptin in a gender-dependent fashion in the young p66Shc^{+/+}-mice, with reduced levels in males. Three month-old p66Shc^{-/-} were characterized by metabolic resilience in response to both GT and IS tests. HFD affected the response to GT-test in an opposite manner in the genders, overriding the p66Shc^{-/-}-resilience in males and exacerbating the metabolic resilience of HFD-p66Shc^{-/-}-females. Interestingly, prenatal HFD enhanced IS in middle-aged-males in both genotypes, suggesting a change in the response profile at later life stages.

Conclusion: These data indicate that exposure to HFD during critical developmental periods may determine a “metabolic imprinting” and that deletion of the p66Shc gene attenuates such effects.

T2:PO.010

Children consuming milk cereal drink are at increased risk for overweight – the IDEFICS Sweden study

*Monica Hunsberger*¹, *Wiberger*¹, *Eiben*¹, *Lissner*¹, *Mehlig*¹, *Papoutsou*²

¹University of Gothenburg

²Associate Investigator, Research and Educational Institute of Child Health, Cyprus

Introduction: The aims of this study were to characterize milk cereal drink (MCD) consumption and to investigate the association between MCD consumption and overweight, independent of breastfeeding, among Swedish children.

Methods: In the Swedish IDEFICS cohort of children 2–9 years of age (n = 1077) we examined early feeding practices and weight status at baseline (2007/2008) and at two year follow-up. Dietary and background

characteristics were self-reported by parents or guardians. Anthropometrics were measured at both time points. Characteristics of MCD users were explored with logistic regression. BMI z-scores at both time points and weight status at follow-up were regressed on explanatory factors using mixed linear and logistic regression, respectively.

Results: Children who consumed MCD were more likely to have parents that were both born in Sweden, with less than two years of post-secondary education and they received breast milk for a shorter period. MCD consumers had a higher BMI z-score at follow-up compared to baseline (difference in BMI z-score = 0.12, 95% CI = 0.07, 0.17) while the average BMI z-score in never-users remained stable over time (0.00, 95% CI –0.07, 0.08). MCD consumers had nearly twice the risk for overweight when compared to non-consumers. After excluding children already overweight at baseline, MCD consumers were nearly five times more likely to be overweight than non-consumers (OR =4.78, CI 95% 1.68–13.59).

Conclusion: MCD consumption is associated with an increased risk for overweight, which was not explained by the protective effect of breastfeeding. In addition, it seems to replace breastfeeding.

T2:PO.011

The effect of food groups on the NAFLD status in a Greek population

*Ioanna Panagiota Kalafati*¹, *Dimitra Borsa*¹, *Maria Dimitriou*¹, *Konstantinos Flessas*², *Jiannis Vlachogiannakos*³, *Konstantinos Revenas*², *Alexander Kokkinos*⁴, *Spiros D. Ladas*⁵, *George V. Dedoussis*¹

¹Department of Dietetics and Nutritional Sciences, Harokopio University of Athens, Greece

²Radiology Department, Laiko General Hospital, Athens, Greece

³Academic Department of Gastroenterology, Athens University Medical School, Laiko General Hospital, Athens, Greece

⁴First Department of Propaedeutic Medicine, Athens University Medical School, Laiko General Hospital, Athens, Greece

⁵First Department of Internal Medicine-Propaedeutic, University of Athens, Laiko General Hospital, Athens, Greece.

Introduction: Nonalcoholic fatty liver disease (NAFLD) is the hepatic manifestation of the metabolic syndrome. Dietary habits are a potential modifiable risk factor for the disease. The aim of the study was to investigate the diet contribution in its development and progression.

Methods: Greek adults (n = 183) were recruited and monitored for NAFLD status (low, medium, high) using abdominal ultrasonography. They were interviewed for demographic data and medical history and dietary intake was assessed by a 172-food item questionnaire. Anthropometric and biochemical measurements were also collected.

Results: By ultrasonography, we diagnosed 136 patients (39% men) and 47 healthy volunteers (47% men) (mean age 45.2 ± 11 years). Regarding the classification of NAFLD, the progression of the disease was associated with higher body mass index, %fat mass, waist circumference, waist-to-hip ratio, triglycerides, glucose, ALT and AST/ALT levels (p < 0.05). Dietary intakes of starch food, meat, fish, fruits, vegetables, soft drinks and dairy products were assessed. Moderate fruit and fish consumption was negatively correlated with the disease progression when adjusted for age, gender and calorie intake (p < 0.05). However, soft drinks were associated with worse disease status (p < 0.05).

Conclusion: The beneficial impact of dietary groups on the NAFLD staging is promising. More research is needed on the assessment of specific dietary patterns to clarify disease onset and development.

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T2 – Activity and exercise

T2:PO.013

Abdominal massage – a potential method to treat overweight and obesity alone and in combination with fitball

Kalinova

Department of theory and methodology of kinesitherapy, National Sport Academy "Vasil Levski", Sofia, Bulgaria

Introduction: Accumulating data over the past 20 years for complex neuro-humoral mechanisms which link abdominal tissues and organs with the regulation of energy balance is a precondition for new searches in the control of body weight, through the abdomen. This research attempts to reveal some aspects of the impact of abdominal massage and its combination with fitball exercises for weight reduction.

Methods: Thirty-three adults of both sex participated in two experimental groups: group A consist of 17 participants which received a course of 10 abdominal massage sessions (3 sessions per week for 4 weeks); group B includes 16 participants which received a course of 10 procedures combining fitball exercises and abdominal massage session (3 procedures per week for 4 weeks). Evaluation of body weight, BMI, waist and hip circumferences, WHR, 11 skin folds, %BW (Parizkova's formula) and palpable pain in abdominal region was made before and after the courses.

Results: In group A there was a significant reduction of waist circumference, skin folds, %BW, and palpable pain in abdominal region. In group B there was significant reduction in body weight, BMI, waist and hip circumferences, only at three of 11 measured skin folds. Significant differences between groups were found in skin folds and %BW.

Conclusion: The methodology of abdominal massage alone and in combination with fitball exercises leads to a reduction of some of the parameters of obesity. Individual application of abdominal massage has the strongest effect on reducing the deposition of fat in the abdominal area.

T2:PO.014

Associations between breakfast consumption, obesity and objectively-measured physical activity in a multi-national sample of 10 year old children: Preliminary findings from the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE)

Julia Zakrzewski¹, Martyn Standage², Fiona Gillison², Sean Cumming², Timothy Church³, Peter Katzmarzyk³, et al.

¹University of Bedfordshire, UK

²University of Bath, UK

³Pennington Biomedical Research Center, USA

Introduction: Children from developed countries who regularly skip breakfast typically have higher body mass indexes (BMIs). The direction of this relationship is somewhat paradoxical, but may be related to lower physical activity levels in breakfast skippers. Yet, it is plausible that similar relationships do not exist in all countries.

Methods: The present study examined associations between breakfast consumption, anthropometric variables, and objectively-assessed physical activity in a multi-national sample of 5150 children aged 10.5(0.6) years. Datasets from eight (United States, Australia, United Kingdom, Portugal, Colombia, India, Kenya and Canada) of the 12 countries participating in the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE) were analysed using multi-level modelling.

Results: Regular breakfast consumption was associated with lower BMI, waist circumference, body fat and BMI z-score (estimate = -1.149; t(4) = -4.504; P < 0.001). The association between breakfast consumption and time spent in vigorous physical activity approached significance (estimate = 0.480; t(4) = 1.942; P = 0.052); associations with moderate-to-vigorous physical activity and sedentary time were non-significant. Associa-

tions were consistent across all countries except Kenya, where all were reversed. The relatively low BMI z-score in Kenyan breakfast skippers (-0.27(1.11)) meant that consumers had higher z-scores that were nearer to zero (0.07(1.21)).

Conclusion: In a multi-national sample of 10.5 year-old children, regular breakfast consumption was associated with lower BMI and more vigorous physical activity in all but one country. Associations were reversed in the only country where the BMI z-score of breakfast skippers was below zero; thus, breakfast consumption was associated with a 'healthier', but not necessarily lower, BMI in all countries.

T2:PO.015

Impact of mothers nutrition and nutrition of offspring on spontaneous physical activity in male offspring

Perić Kačarević, Marić, Vrselja, Čekić, Radić

School of Medicine University J. J. Strossmayer, Osijek, Croatia

Introduction: Few studies have addressed the potential role of changes in energy expenditure, precisely in spontaneous physical activity (SPA) which accompanies nonexercise activity thermogenesis (NEAT), in mediating the resistance to fat gain. The aim of the study is to determine the effect of maternal diet on the role of spontaneous physical activity to modulate effects of development obesity in male offspring.

Methods: Ten female Sprague Dawley rats were randomly divided in two groups at the age of 21 days, one was fed high-fat diet (HFD), the other one with standard laboratory chow (CD). At the age of 12 weeks, the rats were mated, and their offspring were also randomly divided in HFD and CD group after the lactation period. We measured body weight and at the 11 weeks old rat's movements were measurement using Activity Cage.

Results: HFD-CD and CD-HFD groups had the lowest weight after birth, but their weight increased the most compared to CD-CD and HFD-HFD rats. The statistical difference in weight among groups was found only between CD-CD and HFD-CD group, with CD-CD group being heavier (430 ± 24 vs. 384 ± 24; p = 0.002). HFD-CD had more horizontal spontaneous movements then other three groups. CD-HFD and HFD-CD had more vertical spontaneous movements then other two groups (CD-CD and HFD-HFD).

Conclusion: CD-HFD and HFD-CD rats had highest SPA and highest weight gain. As energy intake exceeded energy expenditure the system responded by increasing energy expenditure. Changes in diet influenced the changes in SPA which predicted resistance to fat gain with overfeeding.

T2:PO.016

Influence of a complex weight reduction methodology on body composition, cardiovascular fitness and quality of life in obese people

Valentine Panayotov¹, Petkov¹, Palatova², Bonova¹, Yordanova³

¹National Sports Academy of Bulgaria

²Olympia SC

³EURODIET

Introduction: The rate of obesity escalated in recent years. A lot of different methodologies were implemented to address this problem. In this study we evaluated the impact of a regimen, consisting of physical activity of anaerobic-lactic type, combined with an energy deficient diet on body composition, cardiovascular fitness and the quality of life.

Methods: The participants were 30 healthy adults of both sexes with BMI > 27, randomly assigned to 3 groups – two experimental and one control. The experimental groups underwent energy deficient diets using either EURODIET products or conventional food sources. All participants performed 30 min. circuit training sessions of resistance exercises 3 times a week. The cardiovascular fitness was evaluated via calculation of VO₂max, using Astrand cycle fitness test. The study was 8 weeks long.

Results: We detected significant differences ($p \leq 0.05$) between the initial and the final values of the following variables and groups: Body mass, fat tissue percentage (group 1), BMI, Quality of Life Index score (groups 1 and 2); VO₂max for all.

Conclusion: A diet with food substitutes is superior to a conventional diet for losing weight and sparing the lean body mass. Physical activity alone is insufficient for losing weight. Practicing an anaerobic-lactic type of physical activity leads to an improvement of cardiovascular fitness.

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T2:PO.017

The Effect of Obesity on Coordination ability of Children

David Gaul¹, Johann Issartel¹, Declan Cody²

¹Dublin City University

²Our Ladys Children's Hospital Crumlin

Introduction: Motor skills are the basis for any bodily movement. They allow children to read, write, walk, talk and play sports. They play a central role in children's lives and specifically allow them to be physically active and healthy. Extended research has scrutinised the role of physical activity in obesity. However it appears recently that the lack of physical activity might not only be a factor for obesity but also a consequence of perceptual-motor difficulties (D'Hondt *et al.*, 2011).

Methods: This study will be of cross sectional design sampling obese ($n = 60$) and lean ($n = 60$) children between the ages of 6–12 years of age. The Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2) is used to evaluate children's fine motor skill proficiency. A second measure of coordination using a custom pendulum device also measures children's coordination ability with a variety of visual and/or auditory stimuli.

Results: Data collection is currently being undertaken with results expected prior to the conference.

Conclusion: Recent evidence has been uncovered to suggest that obese children have increased difficulties in the planning, initiating and controlling of motor skills (D'Hondt *et al.*, 2009). If this is the case, the decreased perceptual-motor function might impede performance of everyday life activities as well as their willingness to participate in physical activity (Bouffard, 1996; Cairney *et al* 2005, 2006). This could potentially offer an additional angle to which we can view the relationship between obesity and physical activity levels and give greater insights into how we can tackle this problem in the future

T2:PO.018

Long-term Cardiorespiratory Effects of Mediterranean Diet and Exercise Training Intervention in Sedentary Older Participants

Ahmad Alkhatib¹, Geoff Middleton², Markos Klonizakis¹

¹Academy of Sport and Physical Activity, Sheffield Hallam University, United Kingdom.

²School of Sport and Exercise Science, Faculty of Health and Social Care, University of Lincoln, United Kingdom.

Introduction: The cardio-protective benefits of exercise and healthy diets, especially Mediterranean Diet (MD) are well established. Combining MD with exercise training has been recently shown to reverse cardio-metabolic risk in ageing adults. This study tested whether the exercise and MD improvement in cardiorespiratory capacity are sustained after six-months in older participants.

Methods: With institutional ethical approval, seventeen sedentary healthy participants (age = 54.7 ± 3.5) completed eight-weeks of mod-

erate aerobic exercise training alone or combined with MD, assessed by MD adherence questionnaire. Cardiorespiratory capacity was assessed by ventilatory threshold (VT) before, after and six-months following the completion of training. Mixed-design ANOVA was used to assess within effects (training and follow-up) and between effects (MD- and Exercise-group).

Results: The initial intervention-dependent cardiorespiratory improvement in VT (12.2 ± 3.0 vs. 15.1 ± 3.1 ml.kg⁻¹.min⁻¹, $p < 0.01$), was maintained after six months compared with baseline (12.2 ± 3.0 vs. 13.2 ± 3.2 ml.kg⁻¹.min⁻¹, $p < 0.05$) with no significant deterioration in the six months after the completion of the intervention. However, no interaction effect was found between MD-group and exercise-group. Within groups comparisons showed a trend, though not significant, towards sustained benefits of the MD group (12.2 ± 2.7 , 14.1 ± 3.8 , 13.1 ± 3.7 ml.kg⁻¹.min⁻¹, $p = 0.078$ for main ANOVA effects) in pre-, post-intervention and follow-up respectively. However, this trend was more prominent and significant in the exercise group (12.2 ± 3.3 , 15.6 ± 3.0 , 13.3 ± 3.2 ml.kg⁻¹.min⁻¹, $p = 0.010$ for pre-, post-intervention and follow-up respectively).

Conclusion: In older sedentary adults, exercise training provides sustained improvement in cardiorespiratory capacity. Combining MD with exercise, though initially effective, require further research to distinguish the specific long-term benefits and adherence to MD.

T2:PO.019

GH responsiveness before and after a 3-week multidisciplinary body weight reduction program associated with an incremental respiratory muscle endurance training in obese adolescents

Alessandro Sartorio¹, Fiorenza Agosti², Alessandra Patrizi², Gabriella Tringali², Rezene Fessehatsion³, Silvano Cella⁴, Antonello Rigamonti⁴

¹Istituto Auxologico Italiano, IRCCS, Experimental Laboratory for Auxo-endocrinological Research & Division of Metabolic Diseases, Milan and Verbania, Italy

²Istituto Auxologico Italiano, IRCCS, Experimental Laboratory for Auxo-endocrinological Research, Milan and Verbania, Italy

³Istituto Auxologico Italiano, IRCCS, Division of Metabolic Diseases, Verbania, Italy

⁴Department of Medical Biotechnology and Translational Medicine, University of Milan, Italy

Introduction: Obesity-related hyposomatropism is usually reversible after a consistent weight loss induced by diet. Recently, a single bout of respiratory muscle endurance training (RMET) has been reported to induce marked GH responses in obese adults, its GH-releasing effect being significantly lower in obese adolescents.

Methods

GH responses to repeated RMET bouts (at 2-h interval) administered before and after a 3-week multidisciplinary weight reduction program combined with a progressively increasing RMET (15 daily sessions) were evaluated in 7 obese male adolescents [12–17 yrs, BMI: 38.5 ± 3.1 kg/m²; fat mass (FM): $37.0 \pm 2.0\%$].

Results

At the beginning of the study, baseline GH levels increased after the first RMET in all subjects ($p < 0.05$). The administration of the second RMET resulted in a lower ($p < 0.05$) GH increase in comparison with the first one. Three weeks of the integrated intervention reduced ($p < 0.05$) both body weight (from: 115.3 ± 9.2 kg to 111.5 ± 8.7 kg) and FM (from: 43.3 ± 5.7 kg to 41.9 ± 5.3 kg), these combined effects being however not sufficient to influence GH peaks to the 2 repeated RMET bouts (first bout: 4.8 ± 1.6 ng/ml vs. 4.8 ± 1.6 ng/ml; second bout: 0.9 ± 0.2 ng/ml vs. 1.1 ± 0.1 ng/ml, before and after 3 weeks, respectively).

Conclusion

A 3-week incremental RMET combined with a weight reduction intervention does not seem useful to positively influence the reduced GH responsiveness to 2 repeated RMET bouts in obese adolescents. More intensive and/or long-term RMET protocols, associated with energy-restricted di-

ets, determining more consistent changes in body composition, are likely needed to restore the impaired GH-IGF-1 function of obese adolescents.

Conflict of interest: No conflict of interest

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T2:PO.020

Effects of 2-week endurance training in severe obese men: High intensity interval versus Fatmax training

*Stefano Lanzi*¹, *Franco Codecasa*², *Mauro Cornacchia*², *Sabrina Maestrini*³, *Paolo Capodaglio*⁴, *Amelia Brunani*⁵, *Alberto Salvadori*², *Davide Malatesta*¹

¹ISSUL, University of Lausanne, Switzerland

²Pulmonary rehabilitation department, Istituto Auxologico Italiano, Piancavallo, Italy

³Molecular biology laboratory, Istituto Auxologico Italiano, Piancavallo, Italy

⁴Orthopaedic Rehabilitation Unit and Clinical Lab for Gait and Posture Analysis, Istituto Auxologico Italiano, Piancavallo, Italy

⁵Medicine rehabilitation department, Istituto Auxologico Italiano, Piancavallo, Italy

Introduction: High intensity interval training (HIT), which induces physiological adaptations that are linked to improved health outcomes (Gibala et al., 2012), is little investigated in severe obese (SO) individuals. This study aimed to compare the effects of two different 2-week training modalities [continuous training at the intensity eliciting the maximal fat oxidation (Fatmax) versus HIT] on the aerobic fitness, fat oxidation rates (FORs) and insulin resistance in SO men.

Methods: Eighteen SO men were randomly assigned to a Fatmax training group (n = 10, BMI: 40.9 ± 1.1, V'O₂max: 23.1 ± 1.2 mL.kg⁻¹.min⁻¹) or a HIT training group (n = 8, BMI: 42.8 ± 1.1, V'O₂max: 24.0 ± 1.3 mL.kg⁻¹.min⁻¹). Both groups performed 8 cycling-sessions matched for mechanical work spread over 14-days [40–50 min continuous exercise at ~60–70% of the maximal heart rate (HR_{max}) or 10×60-s cycling intervals at ~90% HR_{max} interspersed with 60-s recovery]. Aerobic fitness and FORs were assessed prior and following the training with a maximal incremental test. FORs were modelled as a function of exercise intensity with SIN model (Chenevière et al., 2009). Insulin and glucose concentrations were determined at rest to measure homeostasis assessment of insulin resistance (HOMA-IR) (Matthews et al., 1985).

Results: After training, V'O₂max increased significantly (p = 0.001) and FORs were significantly increased (p = 0.001) and shifted to higher exercise intensities (p = 0.04) in both groups. Training led to a significant reduction in HOMA-IR for both groups (p = 0.02) attesting increased insulin sensitivity.

Conclusion: HIT is feasible and may be a time-efficient complementary training tool to continuous exercise to improve FORs, aerobic fitness and insulin sensitivity in SO men.

T2:PO.021

Validation of the Children Attraction to Physical Activity Questionnaire on Mexican Children

*Roberto Espinoza-Gutierrez*¹, *Arturo Jimenez-Cruz*¹, *Montserrat Bacardi-Gascon*¹, *G Diaz-Ramirez*¹, *Raul Gonzalez-Ramirez*², *AL Armerndariz-Anguiano*¹

¹Universidad Autonoma de Baja California

²Colegio de la Frontera Norte

Introduction: Mexico is currently into an obesity epidemic, especially in children. Physical activity has been suggested to be one of the risk factors for this multifactorial disease. Children having positive attitudes toward physical activity (PA) have been shown to have a reducing effect on body mass index, which might last towards adulthood. The children attraction to physical activity questionnaire (CAPAQ) has been shown to be predic-

tive of positive attitudes among younger and older children. The purpose of this study was to identify the components of the CAPAQ that explain Mexican children responses toward PA, among different contingencies of growth and development.

Methods: CAPAQ was used to assess the positive attitude toward PA of 895 boys and girls, from second to sixth grade at elementary school. A factorial analysis with varimax rotation of 25 questions, with the main components of CAPAQ, about the attitudes toward PA, was conducted using SPSS version 21.

Results: Seven components were obtained with an Eigen value higher than one. A minimum coefficient of 0.40 was established to define which individual questions qualified to enter the component analysis. The seven components explained 51.7% of the total variance. Liking games and sports (19%), pear acceptance in doing PA (7%), liking physical exertion (7%), importance of exercise for health (6%), liking running (5%), negative effects of playing games and sports (5%), be in good shape (4%).

Conclusion: The seven components obtained from the analysis were able to explain the main concepts searched and applied by the CAPAQ.

T2:PO.022

Parent-children resemblance and associations of family behaviour on children body fat

*Maria João Lagoa*¹, *Gustavo Silva*², *Ana Inês Alves*², *Ana Filipa Medeiros*², *Jorge Mota*², *Luísa Aires*¹

¹Research Centre in Physical Activity, Health and Leisure (CIAFEL); Faculty of Sports – University of Porto. ²High Education Institute from Maia (ISMAI), Portugal

²Research Centre in Physical Activity, Health and Leisure (CIAFEL); Faculty of Sports – University of Porto.

Introduction: Family is a key element for the prevention of childhood obesity, both as shared genetic backgrounds and family behaviour factors, which can result in children and parents being alike on weight. The aim of this study was to evaluate the associations' of family on children weight status.

Methods: Parents (n = 566; 85% mothers and 15% fathers) of 560 children from 6 schools in Porto district participated in this study. Children weight and height were measured with standard procedures. Percentage of body fat (%BF) was assessed through bioelectrical impedance (Tanita MC 180 MA). Parents' weight and height were self-reported by questionnaire, together with socioeconomic status (SES) and behavioural risk factors for cardiovascular diseases (SDBR). Parents' vigorous physical activity (VPA) was estimated with IPAQ. Children with %BF and above 75th percentile were classified as overweight. Logistic Regression was performed to examine associations between children's %BF and parent's variables (BMI categories, SES, SDBR, VPA). Parents' normal weight, low SDBR, high SES and high VPA (days) were set as reference categories.

Results: Fathers overweight (OR=2.496; CI:1.22–5.12), obesity (OR=3.48; CI:1.43–8.45), SES (OR=2.631; CI:1.17–5.94) and SDBR (OR=2.163; CI:1.14–4.12) were associated with children's overweight. Mothers overweight (OR=3.1; CI:1.71–6.41), obesity (OR=4.64; CI:2.07–10.41) and VPA (OR=1.21; CI:1.03–1.42) were also associated with children's overweight.

Conclusion: Results showed that overweight/obese parents with other cumulative risk behaviours (low SES and high SDBR for fathers, and low VPA for mothers) are more likely to have overweight/obese children. Thus, parents intervention programs are crucial for counteracting obesity in children.

T2:PO.023

Long-term Cardiorespiratory Effects of Mediterranean Diet and Exercise Training Intervention in Sedentary Older Participants

Ahmad Alkhatib¹, Middleton², Klonizakis¹

¹Academy of Sport and Physical Activity, Sheffield Hallam University, United Kingdom

²School of Sport and Exercise Science, Faculty of Health and Social Care, University of Lincoln, United Kingdom

Introduction: The cardio-protective benefits of exercise and healthy diets, especially Mediterranean Diet (MD) are well established. Combining MD with exercise training has been recently shown to reverse cardio-metabolic risk in ageing adults. This study tested whether the exercise and MD improvement in cardiorespiratory capacity are sustained after six-months in older participants.

Methods: With ethical approval, seventeen sedentary healthy participants (age = 54.7 ± 3.5) completed eight-weeks of moderate aerobic exercise training alone or combined with MD, assessed by MD adherence questionnaire. Cardiorespiratory capacity was assessed by ventilatory threshold (VT) before, after and six-months following the completion of training. Mixed-design ANOVA was used to assess within effects (training and follow-up) and between effects (MD- and Exercise-group).

Results: The initial intervention-dependent cardiorespiratory improvement in VT (12.2 ± 3.0 vs. 15.1 ± 3.1 ml.kg⁻¹.min⁻¹, p < 0.01), was maintained after six months compared with baseline (12.2 ± 3.0 vs. 13.2 ± 3.2 ml.kg⁻¹.min⁻¹, p < 0.05) with no significant deterioration in the six months after the completion of the intervention. However, no interaction effect was found between MD-group and exercise-group. Within groups comparisons showed a trend, though not significant, towards sustained benefits of the MD group (12.2 ± 2.7, 14.1 ± 3.8, 13.1 ± 3.7 ml.kg⁻¹.min⁻¹, p = 0.078 for main ANOVA effects) in pre-, post-intervention and follow-up respectively. However, this trend was more prominent and significant in the exercise group (12.2 ± 3.3, 15.6 ± 3.0, 13.3 ± 3.2 ml.kg⁻¹.min⁻¹, p = 0.010 for pre-, post-intervention and follow-up respectively).

Conclusion: In older sedentary adults, exercise training provides sustained improvement in cardiorespiratory capacity. Combining MD with exercise, though initially effective, require further research to distinguish the specific long-term benefits and adherence to MD.

T2:PO.024

Differences in the classification of body weight in adolescents 18–19 years old in the usage of different tools – BMI and percentage of body fats, measured by bioelectrical impedance analysis

Darina Naydenova, Porojanova, Peteva

Medical University of Varna, Bulgaria

Introduction: The deviations of the normal weight are significant for identification of the metabolite risk. Overweight and obesity are associated with a serious health hazard. The identification of individuals with metabolite risk is performed with the help of anthropometrical indexes and categorization of body weight as normal, overweight and obesity. In practice this usually is based on the BMI. More accurate information for the metabolite risk is achieved by the measurement of body fats.

Methods: 122 adolescents from Varna, at the ages 18 – 19 years, have been investigated. All of them are with high physical activity, assessed by the International Physical Activity Questionnaire. Determined are BMI and the percentage of body fats is measured by bioelectrical impedance analysis.

Results: According to BMI underweight are 15% of the sporting adolescents, versus 36% with lower than normal body fats. Weight is assessed as normal based on the BMI in 51% of adolescents and respectively in 43% based on the index body fat. With overweight are 34% of adolescents but only 28% of them are with higher than normal body fats. The remaining 72%, classified according to BMI with overweight are with normal amount of body fats.

Conclusion: The determination of overweight based on BMI is not an accurate method for adolescents with high physical activity. Accurate and comfortable for practice method seems to be BIA, as it authentically measures body fats and truly interprets the increase on account of muscle body weight.

T2:PO.025

The Preschoolers Activity Trial (PAT): A randomized controlled trial evaluating the effects of physical activity on adiposity in the early years

Gary Goldfield¹, Alysha Harvey¹, Kimberly Grattan¹, Rachel Colley¹, Angela Alberga², Zachary Ferraro³, Vivienne Temple⁴, Patti-Jean Naylor⁴, Nicholas Barrowman¹, Shanna Wilson¹, Kristi Adamo¹

¹Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada;

²University of Calgary, Calgary, Alberta, Canada

³Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada

⁴University of Victoria, Victoria, British Columbia, Canada

Introduction: Approximately 25% of Canadian pre-school aged children are overweight or obese. Physical Activity (PA) helps prevent obesity in school-aged children and adolescents, but very few trials have been conducted in pre-school aged children. The purpose of this study was to evaluate the feasibility and efficacy of intervening with daycare providers to increase PA and decrease adiposity in 3–5 year old children attending licensed daycares.

Methods: A randomized controlled trial compared children (n = 40) whose day care providers received an intervention designed to promote PA versus children (n = 43) whose providers implemented the normal preschool curriculum. Intervention included two, 3-hour workshops plus 12 bi-monthly “booster” sessions. Children were assessed at baseline and 6-months. PA was measured objectively using accelerometry. Adiposity was assessed by measured BMI and bioelectrical impedance analysis.

Results: Linear mixed model analysis indicated no significant differences between groups in PA or adiposity over time. However, both groups significantly increased time spent in moderate-to vigorous PA (MVPA) and steps counts per day, and reduced percent body fat from baseline to 6-months. Increases in step counts per day, but not MVPA, were associated with decreases in BMI (r = -0.43, p < 0.01) and percent body fat (r = -0.30, p < 0.05).

Conclusion: Increases in volume of PA but not intensity (MVPA) was associated with reductions in adiposity. Although more intensive behavioural trials may be needed, intervening with day care providers to increase PA, especially volume of PA, may be a feasible and effective method of reducing adiposity in the early years.

T2 – Environment

T2:PO.026

Food availability at home and school are major contributors of energy dense food consumption by Mexican children

Gabriela Lopez-Barron, Arturo Jimenez-Cruz, Montserrat Bacardí-Gascón

Universidad Autónoma de Baja California

Introduction: The increasing OW and OB prevalence in children and adolescents is a serious public health problem, both in developed and in developing countries. The aim of this study was to find whether there is an association between energy-dense food (EDF) availability within home and school environments and weekly EDF consumption.

Methods: We assessed weight, height, BMI and WC of 284 5th grade children. A food frequency questionnaire, including EDF was applied to parents, children, teachers and food vendors in and around schools

Results: Fifty-four per cent of the children were obese and/or overweight, and 25% had abdominal obesity. We observed that the consumption of energy-dense foods in children, varied according to the school they attended ($p = 0.05$). Weekly consumption variability was explained, from 4 to 11%, with the availability of the food assessed. Home ($B = 1.4$; 95% CI 0.8, 1.9; $p = 0.0001$) and school food availability ($B = 1.1$; 95% CI 0.5, 1.7; $p = 0.0001$) showed a positive contribution on EDF weekly consumption.

Conclusion: Food availability at home and school were major contributors of EDF by Mexican children.

T2:PO.027

Associations between road traffic noise and body composition

Christensen, et al.

Danish Cancer Society

Introduction: Traffic noise has been related to adverse health effects such as cardiovascular and metabolic disorders. Potential modes of action are through a biological stress response and disturbance of sleep causing dysregulation of cortisol and appetite regulating hormones associated with overweight. In this study we aim to assess the effect of residential road traffic noise on body composition.

Methods: We used a population-based cohort of 57,053 middle aged people. Anthropometric measures including height, weight and bioelectrical impedance was collected at baseline in 1993–1997. The impedance measurements are used in sex-specific equations to calculate body fat mass, which was used to calculate body fat mass index (BFMI) and lean body mass index (LBMI). Traffic noise exposure was calculated using the Nordic prediction method based on complete residential address history for five years preceding enrolment. Associations between noise and anthropometric measures were analyzed using general linear models adjusted for socioeconomic status (SES), lifestyle factors and air pollution.

Results: For every 10 dB increase in noise waist circumference increased by 0.33 cm (95% CI: 0.19–0.48), while BMI increased by 0.17 points (95% CI: 0.12–0.23), BFMI 0.08 point (95% CI: 0.05–0.13) and LBMI also increased by 0.08 points (95% CI: 0.06–0.10) when adjusting for SES, age and sex.

Conclusion: The present study shows a positive association between residential exposure to road traffic noise and overweight in a general. The biological hypothesis is plausible however, the results must be confirmed by other studies before any conclusions can be drawn.

T2:PO.028

Phtalates as obesogens- exposure in healthy adult subjects (methodology of FANTOM study)

Dagmar Matejkova¹, Dana Mullerova¹, Stepan Svacina², Karel Vrbik³, Roman Piecha²

¹Faculty Hospital Pilsen, Czech Republic

²General University Hospital, Prague

³National Health Institute, Prague

Introduction: High phtalate contamination of environment contributes to obesity epidemics. Epidemiological human studies show, that phtalates could be obesogens and metabolic disruptors. To examine the level of exposure of phtalates in healthy Czech adults and to identify real main routes of phtalates exposure is the first task of FANTOM study. We have prepared the methodology of the study.

Methods: Randomly selected sample of 200 non obese healthy adults (100 males, 100 females) was recruited in Pilsen region. A 4 pages questionnaire was prepared to evaluate the possible contact with phtalates., Participants were asked for 24hours urine collection according the proto-

col and completion of the standardised questionnaire, Methodology was developed for identification of main routes of exposition from long-term and short term perspective in relation to obesity.

Results: We present questionnaire data showed that majority of our population is exposed to phtalates at is very common specially in obese people. We are just now evaluating the urine samples.

Conclusion: Our questionnaire epidemiological data support the possible high exposition to phtalates in Czech population in relation to overweight and obesity. We hope that this result will be supported by laboratory analysis in the next step of the study.. The analysis of urine phtalates in confrontation with the questionnaire data can help to identify the main routes of exposure (ingestion, inhalation or by transdermal exposure) in the next step of the study.

T2:PO.029

Factors associated with burden metabolic syndrome diseases in urban brazilian population: A multilevel analysis

Larissa Mendes¹, Fernanda Matozinhos², Crizian Saar², Milene Pessoa², Gustavo Velásquez-Meléndez²

¹Departamento de Nutrição- Universidade Federal de Juiz de Fora

²Departamento de Saúde Materno Infantil- Escola de Enfermagem- Universidade Federal de Minas Gerais

Introduction: The prevalence of the metabolic syndrome (MS) is constantly increasing. Studies reveal that neighborhood may offer opportunities or barriers to adopt healthy habits but less is known about the association between local in which people live and the characteristics of the environment with the MS. The aim of the study is identify the association between variables of the built and social environment and burden metabolic syndrome diseases (BMSD) in an urban Brazilian population

Methods: Participants were selected from the Surveillance of Risk Factors for Chronic Diseases through Telephone Interview (VIGITEL). For the present study, sample from the years 2008–2010 from the city of Belo Horizonte were used. BMSD was defined as the self-reported of at least two of the following factors: diabetes, dyslipidemia, hypertension and obesity. Sociodemographic, health status and lifestyle habits were also used. To characterize the built and social environment, we used georeferenced data of places for physical activity, population density, healthy food stores, neighborhood income and homicide rate. For data analysis we used weighted multilevel logistic regression.

Results: We studied 4,027 adults (40.13% men and 59.87% women, mean age 45.13 years) in the urban area of Belo Horizonte, Brazil. Cluster variability of BMSD between the neighborhoods was observed (median OR = 1.33). It was observed that individuals living in neighborhoods with more places for practicing Physical Activities (OR = 0.98;95% CI = 0.97–0.99) had decreased odds of BMSD. Furthermore, former smokers (OR = 1.32;95% CI = 1.06–1.64), poorer self-reported health status (OR = 2.15;95% CI = 1.16–4.01) and age (OR = 1.06, 95% CI = 1.05–1.07) had increased odds of BMSD.

Conclusion: Places for practicing physic physical activities may significantly influence health behaviors and outcomes as a BMSD.

T2:PO.030

Association between overweight and obesity and school asset for physical activity

Ka Wing Ho¹, Lobo Hung-tak Louie², Wilfred Hing-sang Wong¹, Chun-bong Chow¹, Patrick Ip¹

¹Department of Paediatrics and Adolescent Medicine, The University of Hong Kong

²Department of Physical Education, Hong Kong Baptist University

Introduction: Obesity is a global public health concern which carries a heavy burden to society. School-based interventions tackling obesity during childhood and early adolescence were more successful than in lat-

er life. However, the asset for physical activity (PA) varies from school to school and it is unknown whether such variation plays a role. This study, therefore, aims to explore the relationship between overweight and obesity and school PA assets.

Methods: Structured questionnaires based on previous literatures were sent to all primary and secondary school physical education (PE) teachers to survey their PA related attitude and experience and school PA environment. These items compiled three school PA asset index scores (teacher attitude, experience and school environment). Students' individual height and weight data of the participating schools were then retrieved from the Student Health Service database of the local government, which covers majority of students in the region. Overweight and obesity were defined according to the International Obesity Task Force (IOTF) criteria.

Results: The study utilised 215,538 student growth records and 1,174 teacher survey responses from 438 schools (45% of region total) in Hong Kong. Modelled with a multilevel logistic additive regression, we found that negative teacher attitude towards PA (OR = 1.22, $p < 0.01$) and poorer school PA environment (OR = 1.11, $p < 0.01$) associated with higher odds of overweight and obesity whereas PA teaching experience was a protective factor with OR = 0.86 ($p < 0.01$).

Conclusion: Students' overweight and obesity status were associated with school PA assets, including PE teachers' attitude, experience and school environment. Further interventions should consider targeting these assets.

T2:PO.031

Objectively examining the impact of the obesogenic environment on childhood obesity in North England

Hobbs

Leeds Metropolitan University

Current prevalence data questions whether national obesity targets can be met using existing approaches; 20.6% of boys and 17.4% of girls aged 10–11 years are classified as obese in England. Worse, obese children miss more school days and require more medical care than healthy weight children. While this questions the sustainability of existing health care systems, this burden could be mitigated through a preventative “upstream” approach through a better understanding of the obesogenic environment. Environmental characteristics that link to dietary behaviours and physical activity may be important. However, reviews make differing conclusions and critical appraisals of existing literature (Gebel et al. 2007) question even the notion of the ‘obesogenic’ environment, let alone its relevance to rising rates of obesity and overweight. Further, existing evidence is US-centric, adult-dominated and dogged by conceptual and methodological challenges.

Importantly, the inconsistent evidence proposes the need to consider new approaches – both in terms of observation and analysis to establish the actual nature, strength and applicability of these links. Therefore, this study aims to objectively scrutinise the concept of an obesogenic environment in a large sample of English children. Original objective measures of the built and social obesogenic environment are being collected using Google Street View and in person audits. Analyses will be conducted using ArcGIS, SPSS and multi-level modelling.

T2:PO.032

A multilevel analysis of factors associated with overweight in Brazilian adults

Larissa Mendes¹, Crizian Saar², Fernanda Matozinhos², Milene Pessoa², Gustavo Velásquez-Meléndez²

¹Departamento de Nutrição – Universidade Federal de Juiz de Fora

²Departamento de Saúde Materno Infantil – Escola de Enfermagem- Universidade Federal de Minas Gerais

Introduction: Characteristics of the environment in which people live, such as neighborhoods socioeconomic status, availability and access to

purchase healthy food, opportunities for physical activity and commuting on foot or by bicycle, have been proposed as factors associated with epidemic of obesity in many countries

Methods: Data generated in 2008, 2009 and 2010 by the Telephone-based Surveillance of Risk and Protective Factors for Chronic Diseases from the city of Belo Horizonte were used. Overweight was defined as body mass index $>25\text{kg}/\text{m}^2$. Individual-level data included sociodemographic, lifestyle habits and health status information. Georeferenced data were used for identification of parks, public squares, places for physical activity, population density and supermarkets, hypermarkets, shops and markets specialized in selling fruits and vegetables. To characterize the social environment, we used neighborhood income and homicide rate. For data analysis we used weighted multilevel logistic regression.

Results: The study included 4027 adults. Cluster variability of overweight between the neighborhoods was observed. Individuals living in neighborhoods with lower population density and fewer healthy food stores had increased odds of being overweight. Furthermore, it was observed that individuals with poorer self-reported health status, alcohol abuse, had increased odds of being overweight. Regular consumption of fruits and female participants were inversely associated to overweight.

Conclusion: In conclusion, population density as a proxy of walkability and healthy food availability may significantly influence health behaviors and outcomes as a weight status. Availability of healthy food stores could be a strategy to reduce adiposity in urban populations.

T2:PO.033

Objectively examining the impact of the obesogenic environment on childhood obesity in North England

Hobbs, Griffiths, Gately, McKenna

Leeds Metropolitan University

Current prevalence data questions whether national obesity targets can be met using existing approaches; 20.6% of boys and 17.4% of girls aged 10–11 years are classified as obese in England. Worse, obese children miss more school days and require more medical care than healthy weight children. While this questions the sustainability of existing health care systems, this burden could be mitigated through a preventative “upstream” approach through a better understanding of the obesogenic environment.

Environmental characteristics that link to dietary behaviours and physical activity may be important. However, reviews make differing conclusions and critical appraisals of existing literature (Gebel et al. 2007) question even the notion of the ‘obesogenic’ environment, let alone its relevance to rising rates of obesity and overweight. Further, existing evidence is US-centric, adult-dominated and dogged by conceptual and methodological challenges.

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T2 – Food Choice and appetite

T2:PO.034

Does CCK play a role in the control of satiety or satiation?

Gibbons¹, Finlayson¹, Caudwell¹, Hellström², Webb², Näslund³, Blundell¹

¹University of Leeds

²Uppsala University

³Karolinska Institutet

Introduction: Cholecystokinin (CCK) is generally understood to play a major role in appetite regulation through its action on satiety and/or satiation. Recent improvements in methods to measure CCK and methodological analysis of satiety and satiation influenced the design of the current study which examined: 1) the influence of macronutrients on postprandial CCK profiles and 2) the relationship between CCK profiles with pattern of subjective appetite (satiety) and later food intake (satiation).

Methods: Sixteen overweight/obese adults participated in a randomised-crossover study. Plasma was collected preprandially and periodically during the 180min postprandial period following a HighFat or HighCHO isocaloric meal. Simultaneous ratings of hunger and fullness were tracked for 180min at which point an *ad libitum* lunch meal was provided.

Results: The HF breakfast resulted in a faster and greater release of CCK8/33(s) compared to the HCHO breakfast ($F(1,15)=14.737, p < 0.01$). Profiles of hunger and fullness did not differ between the two conditions ($F(1,15)=0.505, p = 0.488$; $F(1,15)=2.277, p = 0.152$), nor did energy intake from the *ad libitum* meal (HF-947kcal, HCHO-939kcal; $t(14)=0.201, p = 0.844$). CCK8/33(s) profiles were not associated with subjective appetite during the rise or fall in satiety. No association between CCK8/33(s) and meal size was revealed.

Conclusion: Results demonstrated that CCK levels were higher after HF compared to HCHO meal. This higher, but physiologically relevant level of CCK was not associated with greater satiety nor was CCK correlated with meal size. Under these experimental circumstances, CCK showed a sensitive response to the type of food consumed but did not appear to play a unique general role in satiety or satiation.

T2:PO.035

Are supermarket 'Low Fat Foods' in the UK better than their 'regular fat' counterparts in terms of sugar and overall calorie content?

Caroline Steele, Dale Carter, Alicia Kaill, Tricia Monaghan, Matthew Capehorn

Rotherham Institute for Obesity

Introduction: Some foods on sale in UK supermarkets have direct "low fat" alternatives made by the same brands. This study set out to establish whether these low fat versions were nutritionally better, mainly in terms of sugar and overall calories.

Methods: Of the 10 most popular UK supermarkets, 4 provided on-line shopping facilities with nutritional information sufficient to complete the intended study; Sainsbury's, Asda, Waitrose and Tesco. At the end of November 2013, their websites were analysed. Fat, sugar and calorie content for any low fat food that had a directly comparable regular fat product made by the same brand were recorded.

Results: Of 62 products found in the 4 supermarkets, 56 low fat products had fewer calories, and on average overall the low fat products had 31% less calories.

However, 10% of low fat food still had more calories than the regular fat version.

37 of the 62 products (60%) had less sugar than the regular fat alternatives.

One low fat product had more fat than its regular fat alternative!

Conclusion: Low fat foods do appear on average to help reduce calorie intake and therefore may be encouraged as part of a weight loss strategy. However, appropriate food choices may still require reading nutritional information on the food labels as 10% of low fat foods still have more calories, and 40% have more sugar.

T2:PO.036

The odor of *Osmanthus fragrans* changes feeding pattern

Tsuji Tadataka¹, Inui Tadashi², Kogo Mikihiko¹, Yamamoto Takashi³

¹1st Department of Oral and Maxillofacial Surgery, Graduate School of Dentistry, Osaka University

²Division of Behavioral Physiology, Department of Behavioral Sciences, Graduate School of Human Sciences, Osaka University

³Department of Health and Nutrition, Faculty of Health Science, Kio University

Introduction: Odors have been shown to exert an influence on various physiological and behavioral activities. However, little is known whether or not odor stimulation directly affects feeding-related neuropeptides and feeding behavior involving masticatory muscle activities.

Methods: We selected the essential oils of milk and *Osmanthus fragrans* (OSM) as olfactory stimuli. To examine the effect of odors on the expression of orexigenic neuropeptides in the hypothalamus, such as AgRP, MCH, NPY and prepro-orexin as well as anorexigenic neuropeptides, such as CART and POMC were measured using RT-PCR. To analyze the changes in the feeding pattern, we recorded the electromyography (EMG) activities of the masticatory muscles during eating foods.

Results: The neural transmission by OSM decreased the mRNA expression of orexigenic neuropeptides as AgRP, NPY, MCH and prepro-orexin, while increased anorexigenic neuropeptides as CART and POMC in rats. EMG recordings from both the digastric and masseter muscles showed two distinct patterns of bursts corresponding to the gnawing and chewing phases. During the OSM odor exposure, the magnitude of the bursts became smaller in gnawing phase in both masseter and digastric muscles, the burst duration became longer in both phases in masseter muscle, and the interburst interval became longer in gnawing phase in masseter muscle. Consequently, the burst frequency in both phases in masseter muscle was decreased, consistent with sluggish masticatory movements.

Conclusion: This study suggests that the OSM odor decreases food intake, accompanied by changing eating pattern, which contrasts markedly with the facilitatory feeding pattern in rat intracerebroventricularly-injected with orexins.

T2:PO.037

Effects of polydextrose on appetite ratings and energy intakes: A systematic review and meta-analysis

Alvin Ibarra¹, Nerys Astbury², Kaisa Olli¹, Esa Alhoniemi³, Kirsti Tiihonen¹

¹DuPont Nutrition & Health, Kantvik, Finland

²New York Nutrition & Obesity Research Center, St Luke's Roosevelt Hospital Center, New York, USA

³Pharmatest Services Ltd., Turku, Finland

Introduction: Polydextrose (PDX) is a water-soluble and low-caloric (4kJ/g) polysaccharide of glucose widely used as a dietary fibre. Several studies have reported that the consumption of PDX can suppress subjective appetite ratings (AR) and reduce subsequent voluntary energy intake (EI). In a systematic review and meta-analysis of 8 studies we examined the effects of consuming PDX on these parameters.

Methods: The review followed the PRISMA methodology. A search for studies that investigated the effects of consuming PDX on appetite and EI at a subsequent meal was conducted. Eight studies were included for AR, and out of them 6 studies for EI. Meta-analysis was expressed as

Standardized Mean Difference (SMD, 95% CI). Linear regression was used to determine whether the model define EI as a function of PDX dose. **Results:** Methodologies of AR and EI varied largely among studies, with only one study reporting differences in AR. However, meta-analysis on studies reporting EI indicate that the consumption of PDX was associated with a reduction in subsequent EI (SMD=0.35; $P < 0.01$; I²=0). Furthermore, the dose of PDX consumed was correlated significantly with reduction in subsequent EI, EI = -0.67 PDX g ($P < 0.01$; R²=0.80). **Conclusion:** The studies included in this meta-analysis support the notion that consuming PDX reduces voluntary EI at a subsequent meal. Furthermore, the reduction in EI occurs in a dose dependent manner.

T2:PO.038

Consumer perception in Europe around the use of stevia in foods and beverages to reduce sugar intake

Cathy Kapica

The Awegrin Institute

Europe has a significant and growing rate of overweight and obesity. Dietary guidance recommends reduction of energy intake, particularly from sugars. Assessing acceptable alternatives will help achieve this goal. To determine knowledge, attitude and acceptance of sweeteners, including zero-calorie, naturally-sourced stevia, 1000 subjects representative of France, Germany, Italy, and Poland completed an internet survey (n = 4000). Half were female, age 18–64 years. Subjects had a positive impression of natural origin sweeteners, with the top choices being honey (France 84%; Germany 81%; Italy 87%; Poland 93%), sugar (France 51%; Germany 52%; Italy 60%; Poland 35%) and stevia (France 56%; Germany 52%; Italy 70%; Poland 65%). Subjects agreed that stevia is safe for adults (France 61%; Germany 90%; Italy 71%; Poland 61%) compared to sugar (France 60%; Germany 59%; Italy 64%; Poland 32%). Subjects agreed that stevia is appropriate as part of a healthy lifestyle (France 62%; Germany 84%; Italy 73%; Poland 74%), compared to sugar (France 33%; Germany 19%; Italy 67%; Poland 18%). In households with children, subjects agreed that stevia is safe for children (France 45%; Germany 86%; Italy 55%; Poland 60%), compared to sugar (France 55%; Germany 30%; Italy 59%; Poland 27%). Consumer acceptance, combined with European regulatory approvals and safety, make stevia a viable sugar alternative for the whole family. Using a natural-origin sweetener with zero calories, such as stevia, may help reduce dietary sugars and calories while maintaining consumer acceptance for taste and healthfulness.

T2:PO.039

Reproducibility and validity of the Three-Factor Eating Questionnaire R-18 among 10 to 12 year old Mexican children

Samuel Munguia-Lizarraga¹, Montserrat Bacardi-Gascon¹, Arturo Jimenez-Cruz¹, Ana Lilia Armendariz-Anguiano¹, Raul Gonzalez-Ramirez²

¹Universidad Autonoma de Baja California

²Colegio de la Frontera Norte

Introduction: The “Three-Factor Eating Questionnaire R-18 (TFEQ-R18)” was developed to measure three food patterns of food behavior: dietetic restriction, food disinhibiting, and eating in the absence of hunger. It has been assessed in the obese population and a short version in the general population. A high reliability for the three behaviors assessed has been shown. The purpose of this study was to assess the reproducibility and validity of an Spanish version of TFEQ-R18 including Mexican-Spanish expressions for 10 to 12 year old children.

Methods: The questionnaire was applied to 36 ten to twelve year old children in a public school in the largest city of the northwestern part of México. Two weeks later the questionnaire was again applied to the same children. The internal validation was applied to 535 children.

Results: The test-retest correlations ranged from 0.25 y 0.93. Internal validity for dietetic restriction had an alpha of 0.91, 0.84 for food disinhibiting and 0.90 for eating in absence of hunger.

Conclusion: These results indicate that an Spanish version of TFEQ-R18, with Mexican expressions might be a valid tool to evaluate dietetic restriction, food disinhibiting, and eating in absence of hunger in Mexican children.

T2:PO.040

Association of trans-acting si-RNA gene polymorphisms and food consumption in the bariatric surgery ward

Renata Cintra¹, Rozangela Verlengia², Alex Crisp³, Noa Schnor³, Patricia Novais⁴, Irineu Rasera-Jr³, Maria Oliveira³

¹Universidade Estadual Paulista Júlio de Mesquita

²Universidade Metodista de Piracicaba

³Universidade Estadual Paulista Julio de Mesquita Filho

⁴Universidade Estadual Paulista Júlio de Mesquita Filho

Introduction: The present work is part of a broad project of research that has studied the dietary aspects, the metabolic and genetic characteristics of morbid obesity, and the results of bariatric surgery. The objective was to determine how the genes that codify sweet, umami (TAS1R, rs35874116), and bitter (TAS2R, rs9701796) tastes influence food intake variables.

Methods: This study included 310 women aged 20 to 50 years with a body mass index > 35. Food intake will be assessed by three 24-hour food recalls. Single nucleotide polymorphisms (SNP) will be investigated in 155 women by polymerase chain reaction. The genotypic distribution was assessed by energy and macronutrient intake quartiles.

Results: The mean energy intake was 2011 ± 820 Kcal; the maximum carbohydrate intake represented 45% of the total energy intake, and vitamin A and calcium intakes were inadequate in 50% of the sample. The CC homozygote of telomere-associated sequence (TAS) 1 and TT homozygote of TAS 2 were found in most women (68% and 50.4%, respectively). Total energy or carbohydrate intakes were not associated with TAS 2. The SNP CC of TAS 1 consumed less energy (1st quartile) than the higher quartile.

Conclusion: A larger sample is necessary to reach a final conclusion, but partial results indicated that the SNP CC of TAS 1 could help to explain food intake.

T2:PO.041

Experiencing Obesity in an Unequal World

Paul Bissell¹, Marian Peacock², Joanne Blackburn³, Christine Smith³

¹School of Health & Related Research, University of Sheffield

²University of Sheffield

³Barnsley NHS Hospital Foundation Trust

Introduction: There is a well-documented social gradient in obesity. Contemporary health policy views obesity (and the gradient) as an outcome of an individual's failure to exercise rational choice over appetite, irrespective of social position. Whilst this is challenged from a political economy perspective where this is seen as a product of living in an obesogenic environment, there are few qualitative studies which locate the experiences of living with obesity in the context of social inequality.

Methods: Thirty (adult) family members from socio-economically advantaged and disadvantaged backgrounds (based on index of multiple deprivation scores) were interviewed using a biographical, narrative approach. Family members were sampled according to whether they were obese (based on a self-report questionnaire). Data were recorded, transcribed and analysed for emergent themes using qualitative interpretative analysis and group analysis.

Results: Participants positioned themselves as responsible, autonomous agents when accounting for their weight. Painful biographical work was

undertaken where food practices and life histories were positioned in opposition to mainstream discourses of failure. Participants reported visceral accounts of the pleasure and desire associated with consuming food, alongside considerable sadness and bodily ambivalence. Food consumption practices were reported as establishing spaces for agency, control and succour in lives shaped by disadvantage and lack.

Conclusion: Pleasure and desire associated with food, in the context of material inequality, is often absent from discussions within obesity science. We draw on the literature on cigarette smoking to illustrate this.

T2:PO.043

Deprivation by diet alone or by aerobic exercise alone: how modality of an acute intervention can differentially impact 'wanting' and 'liking' of preferred foods

Jameason Cameron¹, Gary Goldfield¹, Eric Doucet²

¹CHEO

²University of Ottawa

Introduction: The relative reinforcing value (RRV) of food is assessed by the comparative reinforcing efficacy of two stimuli. Acute food deprivation increases the RRV value of preferred snack foods, but the impact of modality of deprivation on food reinforcement ('wanting') and hedonics ('liking') has to our knowledge not been evaluated.

Methods: Ten male subjects aged 23.7 ± 5.1 yrs. with initial body weight 83.2 ± 11.5 kg were included in this repeated-measures cross-over design. After randomization subjects performed 2 acute -25% daily needs energy deficits induced by diet only (DER) or by exercise only (DEX). The repeated measures were CON4, DER4, and DEX4, where body composition (DXA), 'wanting' (RRV: computer task), and 'liking' (palatability: visual analogue scale) of preferred foods was measured.

Results: Relative to CON4 there was a significant increase in snack points earned (versus fruit) in the DER4 (15.5 ± 4.3 vs. 24.7 ± 6.5) and DEX4 (15.5 ± 4.3 vs. 35.6 ± 4.8) sessions; a significant interaction showed higher mean snack points in the DEX4 session. Also relative to CON4, there was a significant increase in mean palatability rating of the snack reinforcers under DER (139.2 ± 13.5) and DEX (133.4 ± 19.6). All results presented are significant at $p < 0.05$.

Conclusion: We show 'wanting' and 'liking' of a palatable snack reinforcer increase together in a similar direction independent of deprivation modality. Obesity interventions targeting 25% energy restriction by either diet or exercise need to consider both forms of energy deprivation acutely increase the rewarding value of food, which may undermine or explain poor long-term maintenance of weight loss outcome.

T2:PO.044

Incentivising "healthier" workplace vending options using price discounting: A multi-site study in central Scotland

John Mooney¹, Annie Anderson², Tracey Graham³, John Frank⁴

¹Research Associate, School of Health & Related Research (SCHARR), University of Sheffield.

²Professor of Public Health Nutrition, Centre for Public Health Nutrition Research, University of Dundee.

³Director, Abercromby Vending Ltd., Glasgow.

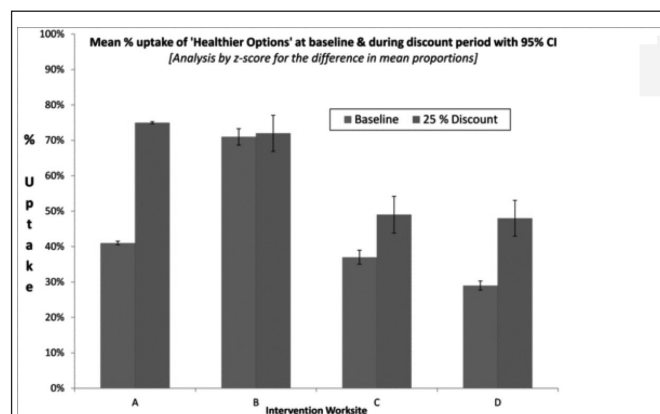
⁴Director of Scottish Collaboration for Public Health Research & Policy, University of Edinburgh.

Introduction: Price-incentivised increases in the uptake of healthier vending machine options have been demonstrated in both colleges and workplaces in the US. While less affluent social groups are known to be more price sensitive, the extent to which this might impact on the success of price incentives remains unexplored. We examined the relative effectiveness of a 25% price reduction in increasing the uptake of nutritionally balanced vending machine options across 4 diverse worksites in Scotland serviced by the same vending company.

Methods: Four worksites were selected for their size (range: 250–1200 employees), internal workforce homogeneity and diversity of business (From IT to manufacturing). At least 30% of all vending options were classed as nutritionally balanced (labelled 'EatWise') using FSA-approved software. Weekly average proportionate uptake of 'EatWise' options was monitored by electronic receipts over a 12 week baseline period, before a six week long price discount intervention of 25%.

Results: The proportional uptake of 'EatWise' balanced options increased in the discount phase by 34.5% ($p < 0.001$); 1.8% ($p = 0.42$); 12.9% ($p = 0.023$) and 19.6% ($p = 0.0010$) for sites A to D respectively. The only non-significant change was for site B (health-sector), where uptake of balanced options was much higher at baseline (71%) as were the relative stocking levels. 6 week post-intervention results are not yet available.

Conclusion: Price-discounting can be an effective means of initiating more nutritiously balanced vending choices among diverse groups of employees in a Scottish population. The extent to which the improved choices are sustained, will be a critical question for the follow-up results.



T2:PO.045

Prevention through healthy eating habits promotion: the European FOOD programme (Fighting Obesity through Offer and Demand)

Nolwenn Bertrand¹, Martin Caraher², et al.

¹Edenred

²City University London

Introduction: Obesity and overweight are known risk factors leading to numerous NCDs. With urbanisation, habits have changed over time with processed food, eating out of the home and sedentarily more common. To break this cycle of poor health, workplace interventions play an important role in prevention as many workers spend the major time of their waking hours at work.

Methods: FOOD was initiated as a pilot project in 2009, supported by EU funds. Edenred, as coordinator, partnered with Public Health Authorities, Nutritionists and Universities to work in Belgium, Czech Republic, Italy, France, Spain and Sweden. The main objective was to promote healthy eating habits to employees during their working day.

The FOOD project has created channels of communication between companies and restaurants using the unique network of contacts of the meal voucher system. The partners proposed five complementary sets of phased actions ranging from an inventory of existing practices to the evaluation of recommendations and communication pilots.

Results: After the co-funding period, the majority of the partners decided to continue under a long-term programme. After implementation in Slovakia and Portugal, the partners still act to connect the offer and demand sides of healthy eating. More than 170 tools in 8 countries have reached 6 million employees and 400,000 restaurants since 2009. They are all adapted to the cultural context and professional constraints of the target groups.

Conclusion: With simple messages and an efficient methodology, FOOD contributes to health prevention at the workplace with the combination of external factors: offer and demand are reconnected.

T2:PO.046

Effect of thermal processing on fat soluble vitamin contents in Black Sea shad (*Alosa pontica*)

Diana Dobрева, Albena Merdzhanova, Mona Stancheva

Department of Chemistry Faculty of Pharmacy Medical University of Varna

Introduction: Fishes are regarded as important natural food sources of fat soluble vitamins, which are necessary for healthy diet. Temperature processing of fish tissue enhances its taste, inactivates pathogenic microorganisms and increases its shelf life. The fat soluble vitamins are considered to be especially susceptible to oxidation during cooking process before consumption.

The aim of the present study was to evaluate the effect of steaming (10 min at 90°C) and grilling (7 min on each side) on retinol (vitamin A), cholecalciferol (vitamin D3) and alpha-tocopherol (vitamin E) contents in Shad fillets.

Methods: The sample preparation procedure includes saponification and extraction of fat soluble vitamins with n-hexane. HPLC analysis was performed on RP column with a mobile phase of methanol:water = 97:3.

Results: The retinol, cholecalciferol and alpha-tocopherol content in fresh fish fillets are $4.4 \pm 0.1 \mu\text{g}/100\text{g}$, $45.1 \pm 1.5 \mu\text{g}/100\text{g}$ and $1971.0 \pm 62.9 \mu\text{g}/100\text{g}$, respectively. The amount of vitamin A in steamed fillets decreases significantly (~40%), when compared to its content in the raw samples. In contrast vitamin D3 and vitamin E remain almost unchanged. Among three fat soluble vitamins, the grilling process affects significantly only vitamin A and vitamin E content.

Conclusion: The sample preparation procedure includes saponification and extraction of fat soluble vitamins with n-hexane. HPLC analysis was performed on RP column with a mobile phase of methanol:water = 97:3.

T2:PO.047

Some metabolic effects of high-fructose corn syrup consumption

Naskovska, Naydenova

Medical University of Varna, Bulgaria

Introduction: Fructose is a monosaccharide and reducing sugar. It is more or less frequently than glucose in the juices of plants, fruits, and especially in honey. Fructose is almost similar to glucose because they are isomers to each other. The difference is in their metabolic pathway due to its almost complete hepatic extraction and rapid hepatic conversion into glucose, glycogen, lactate, and fat. Most work has examined effects of pure fructose, rather than high-fructose corn syrup (HFCS), the most commonly consumed form of fructose. There are several types of HFCS. The difference between them is the ratio between glucose and fructose.

Methods: The information is summarized by the online publications from ScienceDirect. Scientists made many observations and researches on humans and experimental animals, which are receiving an increased amount of HFCS for a period of time.

Results: It has been observed now that obesity, diabetes mellitus, insulin resistance and hypertension are associated with chronic consumption of HFCS. Adverse metabolic effects of fructose are responsible for hepatic de novo lipogenesis, hyperuricemia, oxidative stress and lipotoxicity. The results by healthy people indicate that nutrient overloading can, over a short period of time, significantly stimulate hepatic fat deposition.

Conclusion: In the last 100 years, consuming sugar has increased from 20 lbs to somewhere between 120–150 lbs processed simple sugar each year. The tendency is this numbers to increase rather to decrease. This increased consumption is in association with increased frequency of certain metabolic disorders.

T2:PO.048

Why protein, as a weight reduction dietary supplement

Mohammad Samadi¹, Hadi Atarod², Foad Asjodi³

¹Exercise Physiology Research Center, Baqiyatallah university of medical sciences, Tehran, Iran Nutritional research Obesity and fitness No.53. Berezil Ave. Sheikh bahae Str Teheran, Iran

²Sport medicine center, National Olympic & Paralympic academy, Tehran, Iran

³Sport supplement research center, PNC Co, Tehran, Iran

Introduction: Satiety is important in regulating food intake and has important public health significance in the control of obesity. Dairy products and/or dairy components have been shown to suppress short-term food intake, increase subjective satiety and stimulate the mechanisms known to signal satiation and satiety.

Results: Whey protein as a dairy product has potential as a functional food component to contribute to the regulation of body weight by providing satiety signals that affect both short-term and long-term food intake regulation. Whey ingestion activates many components of the food intake regulatory system. Whey protein is insulinotropic so cause satiety. Whey is much higher than other proteins in branched chain amino acids (BCAA), especially leucine, a proposed benefit to food intake regulation and the maintenance of lean body mass. Leucine enters the brain from the blood more rapidly than any other amino acid and its importance to hypothalamic regulation of food intake has been shown recently. Whey cause different nutrient related responses of anorexigenic hormones including CCK, GLP-1 (glucagon-like peptide-1), GIP (Gastric inhibitory polypeptide), PYY (peptide YY).

Conclusion: Whey protein affects satiation and satiety by the actions of: (1) whey protein fractions per se; (2) bioactive peptides; (3) amino-acids released after digestion; (4) combined action of whey protein and/or peptides and/or amino acids with other milk constituents. Based on results whey protein could be used as a weight control dietary supplement.

T2 – Psychological and behavioral factors

T2:PO.050

Satisfaction of obese pregnant women with the DALI pilot lifestyle study

Judith Jelsma¹, Sander Galjaard², Goele Jans³, Roland Devlieger², David Simmons⁴, Mireille Poppel¹, et al.

¹Department of Public and Occupational Health, EMGO+-Institute for Health and Care Research, VU University Medical Centre, Amsterdam, the Netherlands

²KU Leuven Department of Development and Regeneration: Pregnancy, Fetus and Neonate, Gynaecology and Obstetrics, University Hospitals Leuven, Belgium

³Department of Development and Regeneration, University of Leuven, Belgium

⁴Institute of Metabolic Science, Addenbrookes Hospital, Cambridge, England

Introduction: Process evaluations provide insight into how an intervention is conducted, so that improvements can be implemented. This study investigated how satisfied obese pregnant women were with different intervention components in the DALI pilot lifestyle study.

Methods: Different lifestyle coaches across Europe provided physical activity and/or nutrition behavior counseling, based on motivational interviewing, to 143 pregnant women with a body mass index of ≥ 29 . The intervention was simple and tailored to the individual woman. Between 35 and 37 weeks of pregnancy women received a process evaluation questionnaire, in which they could score their satisfaction with different aspects of this lifestyle study on a 10 point scale.

Results: 100 women completed the evaluation questionnaire. The most common reason to participate in DALI was to minimize the chance of

developing gestational diabetes mellitus (69%). The wish to help research was also frequently mentioned (57%). The DALI study participants were highly satisfied with the intervention and rated this study 8.6 (SD \pm 1.4) overall. The face to face conversations with the lifestyle coach were given 8.9 (SD \pm 1.4). Moreover, 97% of the women said they adopted a lifestyle change and 83% were certain they would maintain this adopted lifestyle change after delivery. Further results regarding reach, fidelity and dose will be presented.

Conclusion: The results show a positive experience with lifestyle counseling throughout pregnancy, indicating no need for further major improvements to the intervention before continuing to the main trial. Simple messages and personal tailoring are key factors to consider in intervention design.

T2:PO.051

Depression, body image and binge eating in individuals with obesity: the role of age, gender and lipid intake

Joana Carvalho-Ferreira¹, Bárbara Dal Molin Netto¹, Aline de Piano¹, Danielle Caranti¹, Flávia Corgosinho¹, Giovana Jamar¹, Deborah Masquio¹, Lian Tock², Marco Túlio de Mello¹, Sergio Tufik³, Ana Dâmaso³

¹Universidade Federal de São Paulo

²Weight Science

³Universidade Federal de São Paulo – UNIFESP

Introduction: We examined body image dissatisfaction and symptoms of binge eating and depression in a large age range of obese individuals. The aim of this study was to verify the associations between psychological symptoms in obese individuals and the role of age, gender and energy intake on these parameters.

Methods: Two hundred treatment-seeking obese adolescents (13 to 19 years) and adults (23 to 60 years) were evaluated. Self-report questionnaires were used to assess psychological symptoms and anthropometric measurements were performed. Data were analyzed with significant p set at ≤ 0.05 .

Results: It was observed that obese individuals have high prevalence of psychological symptoms, such as binge eating and depression. In addition, they are often distressed with their body image. Although women presented a lower average of body mass, they were significantly more dissatisfied with body image than men ($p < 0.005$). Depression, binge eating and body image were predictors to each other. Lipids intake was a predictor factor of binge eating ($\beta = 0.034$; $p = 0.018$), age showed to be predictor factor of depression symptoms ($\beta = -0.108$; $p = 0.003$) and gender was a predictor for body image dissatisfaction ($\beta = -19.104$; $p = 0.002$).

Conclusion: These findings suggest that, in order to provide a better intervention for the obese population, these factors should be taken into account, improving mental health and clinical practice.

Conflict of interest: Nothing to disclose.

Funding: AFIP, FAPESP [2011/50356–0, 2011/50414–0, 2013/04136–4], CNPq, CAPES PNP 2566/2011, CAPES-REUNI, FADA and UNIFESP supported the Obesity Study Group Intervention Program.

T2:PO.052

How to Accelerate Behaviour Change in Community-Based Programmes

Pierre Richard¹, Mireille Roillet², Rafael Casas³, Silvia Bucur⁴, Hannah Finch⁵, Jean-Michel Borys⁵

¹Epode International Network

²VIASANO, Belgium

³THAO, Spain

⁴Im living healthy too – SETS[®], Romania

⁵EPODE International Network

Introduction: Inciting behavior change for a more healthy and active lifestyle represents a significant challenge for public health. It is key that the levers in order to accelerate behaviour change are better understood.

The Epode International Network (EIN) is a non governmental organisation which has been created to support Community Based Programmes (CBPs) aimed at preventing obesity. Today 35 programmes from 24 countries are members of the network.

Methods: EIN conducted a study among its members, the objective of which was to identify the importance of a brand in motivating the community and to understand the specificities of communication strategies required to ensure behaviour change.

This study compared the communication strategies of CPBs from 4 different countries, analysing the creation and evolution of a specific brand and local strategies (e.g. use of characters, motivational tools and social media...)

Results: The strengths and weaknesses of the communication strategies used will be presented with a specific focus on the importance of communication to incite behaviour change. The results reveal significant differences between programmes. Lessons learned from the reality on the field show that communication implemented from the outset and rigorously maintained throughout the programme has a positive impact on behaviour change, particularly when combined with strategic social marketing tools.

Conclusion: The results of this study demonstrate that motivational tools and the presence of a positive brand image are crucial to accelerate behaviour change in community based programmes.

T2:PO.053

Factors associated with low domain specific self-esteem in children with overweight

Yngvild Danielsen¹, Kjell Morten Stormark², Inger Hilde Nordhus¹, Magne Mæhle³, Liv Sand³, Belinda Ekornås³, Ståle Pallesen⁴

¹Department of Clinical Psychology, University of Bergen

²Centre for Child and Adolescent Mental Health, Uni Research, Bergen Norway

³Centre for Child and Adolescent Mental Health, Uni Research

⁴Department of Psychosocial Science, University of Bergen

Introduction: Low self-esteem is one of the main psychosocial factors related to childhood overweight. Yet not all overweight children are affected. Little is known about what characterises the group of overweight children with the lowest self-esteem. Our aim was to identify factors related to low domain specific self-esteem in children with overweight/obesity

Methods: Children (aged 10–13; $N=5185$) and parents from a large population-based sample completed the Eating Disturbance Scale, the Self-Perception Profile for Children, and questions about bullying and socio-economic status (SES). Parents reported the child's weight and height. 545 children with overweight/obesity were identified in the overall sample and selected for the current analyses. Self-esteem scores from this group were compared to scores from the children with normal weight. Factors examined in relation to self-esteem in children with overweight/obesity were: Age, gender, SES, disturbed eating, bullying, parents' evaluation of weight status and degree of overweight.

Results: Children with overweight scored significantly lower than normal weight children on all self-esteem domains. Athletic competence and physical appearance were most impaired. Disturbed eating and bullying were related to low physical appearance, scholastic, social and athletic self-esteem. Being female, a pre-teen, having a higher BMI and being evaluated as overweight by parents were associated with lower satisfaction with physical appearance.

Conclusion: Disturbed eating and bullying are significantly related to low self-esteem in the overweight group.

T2:PO.054

Decrease in leptin concentrations predicted change in depression symptoms of obese adolescents during weight loss

Joana Carvalho-Ferreira¹, Deborah Masquio¹, Bárbara Dal Molin Netto¹, Raquel Campos¹, Flávia Corgosinho², Lian Tock², Sergio Tufik², Marco Túlio de Mello¹, Ana Dâmaso²

¹Universidade Federal de São Paulo

²Universidade Federal de São Paulo – UNIFESP

Introduction: The aim of the present research was to investigate the role of leptin as a mechanism that mediate the association between obesity and depression in adolescents.

Methods: 74 obese adolescents (16,28 ± 2,37 years and BMI 35,65 ± 4,64 kg/m²). They were evaluated at baseline and after one year of treatment for anthropometric profile, body composition, serum analyses and depression symptoms. Data were analyzed with significant p set at ≤0.05.

Results: The sample was distributed into tertiles according to magnitude of decrease in leptin concentration after therapy: 1st (≤4 ng/ml) (T1), 2nd (4–15,5 ng/ml) (T2) and 3rd (≥ 15,6 ng/ml) (T3). Body mass, BMI, fat (% and Kg) decreased significantly in all groups and the same occurs on increase of lean fat (%). Depression decrease significantly on T2 and T3. The decrease in fat (%) and increase in lean fat (%) was greater in T3 comparing to T1. Additionally, decrease on depression was greater in T2 and T3 comparing to T1. Moreover, changes in depression was correlated with changes in leptin ($r = 0,38$; $p = 0,001$) and multiple regression analyses confirmed changes in leptin as predictor for changes in depression independent of gender and age ($\beta = 0,34$; $p \leq 0,001$), changes in body mass ($\beta = 0,29$; $p = 0,02$), changes in fat (kg) ($\beta = 0,14$; $p \leq 0,001$) and changes in BMI ($\beta = 0,28$; $p = 0,03$).

Conclusion: Changes in concentrations of leptin seems to play an important role in the association between obesity and depression during weight loss.

Conflict of interest: Nothing to disclose.

Funding: AFIP, FAPESP [2011/50356–0, 2011/50414–0, 2013/04136–4], CNPq, CAPES PNP 2566/2011, CAPES-REUNI, FADA and UNIFESP supported the Obesity Study Group Intervention Program.

T2:PO.055

Sambucus ebulus L. tea consumption affects leptin and adiponectin levels in healthy volunteers

Oskan Tasinov, Yoana Kiselova-Kaneva, Diana Ivanova

Medical University – Varna, Department of Biochemistry, Molecular Medicine and Nutrigenomics

Introduction: Recent nutrition studies are focused on the effect of different herbs and derived beverages on human metabolism. *Sambucus ebulus* L. (SE) is widely used as a remedy in Bulgarian ethno medicine in conditions related to inflammation. This study aims to analyze the effect of SE fruit tea on some adipokine and cytokine levels in healthy human subjects.

Methods: Study involved 21 healthy volunteers with BMI between 18.5 and 25. They consumed 200ml tea/day for 30 days. Plasma samples were collected before and after the intervention period. Leptin, adiponectin, TNF-alpha and IL-6 protein levels were measured using commercially available ELISA kits.

Results: Significant decrease in plasma levels of both leptin ($p < 0.01$) and adiponectin ($p < 0.001$) was established. In the same time TNF-alpha and IL-6 plasma levels decreased non-significantly.

Conclusion: Results presented in this study are from a first pilot study of SE effects in human subjects. Leptin and adiponectin levels seem to respond easily to SE fruit tea consumption. Further analyses are required to clarify the whole effect of SE fruit tea on adipose tissue metabolism.

T2:PO.056

Self-compassion as a resource in the self-stigma process of overweight and obese individuals

Hilbert¹, Braehler², Zenger²

¹Integrated Research and Treatment Center AdiposityDiseases Department of Medical Psychology and Medical Sociology University of Leipzig Medical Center

²Department of Medical Psychology and Medical Sociology University of Leipzig Medical Center

Introduction: Self-stigma in obese individuals has strong associations with impairments in mental and global health. The psychological processes involved in the association between self-stigma and health outcomes are, however, largely unclear. This study sought to explore self-compassion, a healthy attitude toward oneself with regard to one's failures and inadequacies, as a psychological resource in the self-stigma process.

Methods: In a representative general population sample of $N = 1158$ overweight and obese individuals, the impact of self-compassion as a mediator between self-stigma and mental and physical health outcomes including body mass index (BMI, kg/m²) was examined using structural equation modeling and controlling for sociodemographic factors. Psychological variables were assessed using psychometric self-report questionnaires.

Results: Self-compassion partially mediated the relationship between self-stigma and the outcomes of depression, somatic symptoms, and health status/quality of life, lowering the predictive effect of self-stigma on the outcomes by one third. In contrast, self-compassion, being unrelated to BMI, did not mediate the significant association between self-stigma and BMI.

Conclusion: Self-compassion has the potential to act as a buffer against mental and physical health detriments of self-stigma in overweight and obesity and could, thus, represent a target for interventions to reduce self-stigma. Other resources that are more directly linked to weight management such as mindful eating behavior are more likely to account for lowering the association between self-stigma and BMI than general self-compassion.

T2:PO.057

"I eat better when physically active": The mediating role of autonomous regulations towards eating

Eliana Carraça¹, Sook Leong², Caroline Horwath², Pedro Teixeira¹

¹CIPER, Faculty of Human Kinetics, University of Lisbon, Portugal

²Department of Human Nutrition, University of Otago, New Zealand

Introduction: Intuitive eating is a promising alternative to traditional weight management strategies and might reflect an intrinsically motivated regulation of food intake. Prior research suggested that exercise facilitates the regulation of eating behavior, partly by increasing autonomous motivations. Thus, exercise could predict intuitive eating through this motivational pathway. This hypothesis was examined.

Methods: A total of 1581 adults (age: 45.5 ± 3.2yr; BMI:26.3 ± 5.9kg/m²) participated in a nationally representative survey in New Zealand. The Intuitive Eating Scale evaluated reliance on hunger/satiety cues (RHSC), unconditional permission to eat (UPE) and eating for physical rather than emotional reasons (EPR); the Regulation of Eating Behavior Scale assessed autonomous and controlled regulations towards eating, and the Rapid Assessment of Physical Activity Questionnaire measured exercise level. Correlational and mediation analyses were conducted.

Results: Physically active (vs. insufficiently active) participants showed higher autonomous regulations towards eating and RHSC and, unexpectedly, lower levels of UPE (all $ps < .001$). Autonomous regulations were positively correlated with RHSC ($r = .29$, $p < .001$) and EPR ($r = .23$, $p < .001$), and negatively with UPE ($r = -.27$, $p < .001$). Autonomous regulations mediated associations between exercise and intuitive eating (95% CI of .12 to .20 for RHSC, of .10 to .17 for EPR, and of -.16 to -.09 for

UPE; all $p < .001$). Controlled regulations were negatively correlated with intuitive eating, but did not mediate the exercise-eating relationship.

Conclusion: Engaging in regular exercise predicts a more intuitive eating style, more reliant on physiological signals, which may facilitate weight control. The present results suggest that having an internally motivated eating regulation partially explains this association.

T2:PO.058

Quality of life and associated factors in overweight children and children with obesity

Margarita Gurova¹, Anna Guseva², Valeria Novikova³

¹Belgorod National Research University

²Department of Gastroenterology, Regional Children Hospital, Kursk

³Federal Centre of the Head, Blood and Endocrinology named after V.A. Almazov, Saint Petersburg

Introduction: Obesity is common metabolic disorder in children, but little information is available about quality of life (QoL) and other aspects of their well being.

Methods: For this purpose we assessed QoL, the level of personal, reactive anxiety and depression in obese and overweight children. Results were compared with healthy control children. All children were asked to complete the adopted SF-36 questionnaire, the Scales of personal (PA) and reactive anxiety (RA) and Depression Scale.

Results: We studied 60 obese children – the 1st group (body mass index (BMI) 27.5 ± 1.24) and 65 overweight children – the 2nd group (BMI 23.6 ± 1.09). 30 children were taken as a control group (BMI 18.4 ± 1.41). QoL in overweight and obese children were significantly lower as compared to healthy children (56.04 ± 18.13 and 52.96 ± 23.32 vs. 86.92 ± 11.8 , $p < 0.01$). The more important deviations were found in terms of impairment in emotional and physical role functioning in obese children, whereas in overweight children – in social functioning. The mean values of scale in PA and RA anxiety were higher in children with metabolic disorders than in healthy ones and increase with increasing BMI: PA 46.45 ± 9.95 (1 group) and 42.74 ± 9.17 (2 group) vs. 32.59 ± 8.03 , $p < 0.001$ and 41.79 ± 9.05 vs 38.04 ± 7.75 vs 218 ± 7.26 ($p < 0.001$). The same tendency was found according to the Depression Scale.

Conclusion: Quality of life of children with metabolic disorders (overweight and obesity) is significantly reduced as compared to healthy children and associated with persistent psychological problems.

T2:PO.059

Central obesity anthropometric measures are directly related to anxiety symptoms in obese adults.

Lorenza Carvalho¹, Cibele Furlan², Amanda Moraes¹, Ricardo Badan¹, Vanessa Poli¹, Mario Maróstica Junior², Eliane Ribeiro¹, Danielle Caranti¹

¹UNIFESP

²UNICAMP

Introduction: Obesity is an increasingly prevalent public health problem and is associated with mental disorders as anxiety. Central obesity measure, such as abdominal perimeter and conicity index were analyzed in relation to symptoms of anxiety.

Methods: 28 volunteers of different genders with BMI between 30–40 kg/m^2 (baseline 35.04 ± 2.91) received a systematic exercise therapy, a diet for weight loss and psychological therapy. An interdisciplinary intervention took place three times a week, once a week with the nutrition and psychology team and three times a week with the physical education team. The interdisciplinary therapy lasted 6 months. The anthropometric measurements as abdominal perimeter, weight and height were used for analysis of central obesity by abdominal perimeter and conicity index, along with the Beck Anxiety Inventory (BAI) they were applied at the beginning of the intervention and after 6 months.

The Pearson correlation coefficient was used between three variables measuring range: abdominal perimeter, conicity index and BAI.

Results: BAI was positively correlated with abdominal perimeter ($r = 0.4357$; $p = 0.020$) and conicity index ($r = 0.4181$, $p = 0.027$). A moderate correlation between the reduction of abdominal perimeter, conicity index and reduction of anxiety symptoms in volunteers at the end of the interdisciplinary therapy was found.

Conclusion: There are evidences that the reduction of anthropometric measures was associated with improvement of anxiety symptoms in obese individuals involved in an interdisciplinary treatment program.

T2:PO.060

Health related quality of life 5 years after bariatric surgery and intensive lifestyle intervention for morbid obesity

Tor-Ivar Karlsen¹, Randi Størdal Lund², Rune Sandbu², Jøran Hjeltnes²

¹Morbid Obesity Centre, Vestfold Hospital Trust, Norway 2. University of Agder, Norway

²Morbid Obesity Centre, Vestfold Hospital Trust, Norway

Introduction: We examined and compared 5-years effectiveness of Roux-en-Y gastric bypass (RYGB) and a 1-year intensive lifestyle intervention programme (ILI) on health related quality of life (HRQL).

Methods: A total of 139 consecutive treatment seeking morbidly obese patients underwent either RYGB ($n = 76$) or ILI ($n = 63$). After five years, 49 (65%) RYGB-patients and 35 (56%) ILI-patients completed clinical and HRQL assessments (physical, mental and emotional HRQL, number and distress of symptoms). We performed ANCOVA adjusting for baseline BMI, gender, age, marital status, employment and HRQL with last observation carried forward as imputation method. Cohen's d was calculated to assess effect size (ES) with $ES \geq 0.80$ considered as a large difference, $0.50-0.79$ as moderate and $0.20-0.49$ as small.

Results: Within the RYGB-group, all HRQL measures improved significantly ($p < 0.01$) (all $ES > 0.80$ except of mental HRQL with $ES = 0.73$). Within the ILI-group all HRQL measures, except of physical HRQL ($ES = 0.20$), improved significantly ($p < 0.05$) with moderate ES ($0.50-0.79$). The RYGB-group, compared to the ILI-group, had a mean (95% CI) increase of 25 (16,35) points ($p < 0.001$, $ES = 1.04$) in emotional HRQL. Compared to the ILI-group, the RYGB-group had a mean (95% CI) increase of physical HRQL, and reduction of number of symptoms and symptom distress of 5 (1,9) ($ES = 0.50$), 2 (0,4) ($ES = 0.50$) and 9 (2,17) ($ES = 0.43$) points respectively. Mental HRQL did not differ significantly between groups at 5 years ($ES = 0.18$).

Conclusion: Both treatments resulted in improvements in most measures of long term HRQL. The magnitude of beneficial treatment effects was particularly pronounced after RYGB, especially in terms of emotional HRQL.

T2:PO.061

Seeking normality from bariatric surgery

Catherine Homer, Angela Tod

Sheffield Hallam University

Introduction: Eligibility for bariatric surgery (BS) is assessed using medical criteria. Body Mass Index (BMI) is the main condition for selection. Primary outcomes of success for BS are weight loss and reductions of comorbidities e.g. diabetes. Psychosocial outcomes are not consistently monitored in the UK. Associated service provision of BS varies and do not always contain a strong psychological component offering support pre or post BS. Obese patients may have faced a lifetime of psychosocial and physical challenges which influence their expectations of BS. Failure to address unrealistic expectations prior to surgery may undermine any promising clinical outcomes.

Methods: A qualitative study using in-depth semi-structured interviews, Photovoice and Framework Analysis techniques. 18 participants interviewed pre bariatric surgery.

Results: Patients have high expectations of how their lives will change following BS. Whilst patients have weight loss and health goals, seeking to be 'normal' can override their desire to become a healthy weight. Participants described feelings of shame, stigma and low self-esteem linked to anger at themselves and others. Space in the home offered them a form of protection from the outside world but often increased social isolation. Navigating the physical space inside and outside the home was challenging and often negative experiences exacerbated feelings of shame and humiliation. Patients felt they did not belong to the 'normal' world and anticipated they would regain this place following surgery.

Conclusion: Patients weight loss expectation maybe achievable from BS. However services need to identify and address unrealistic psychosocial expectations of normality after BS.

T2:PO.062

Training GPs increases the number of consultations of young people in which healthy eating and exercise is raised

Winifred Paulis¹, Marienke van Middelkoop¹, Sylvia Kauer², George Patton³, Lena Sancic²

¹Department of General Practice, Erasmus MC, University Medical Center, Rotterdam, the Netherlands

²General Practice and Primary Health Care Academic Centre, The University of Melbourne, Melbourne, Australia

³Department of Paediatrics, University of Melbourne and Murdoch Children's Research Institute, Royal Children's Hospital, Melbourne

Introduction: Background GPs experience barriers in addressing weight in consultations of young people.

Aims To identify

how often healthy eating and exercise is raised by GPs in consultations with young people

whether young people report willingness to change

the effectiveness of a GP training program on the number of consultations in which behaviour is raised

the effects of the training program on young people's BMI, eating and exercise.

Methods: Data from a RCT including 40 general practices were used. Intervention GPs received a training on screening health risk behaviours. Controls visited a seminar. Data from young people (N=901, 14–24 years) were collected post-intervention, at three and 12 months follow-up.

Results: GPs in intervention practices raised both eating (OR 1.71, 95% CI [1.09, 2.68]) and exercise behaviour (OR 2.04, 95% CI [1.29, 3.23]) significantly more often post-intervention (28% of consultations) than GPs in control practices (22%). There were no differences between young people of intervention and control practices in healthy eating, exercise or BMI at follow-up. 24% of young people were overweight or obese, half of them reported willingness to change eating or exercise behaviour, however most noted that these behaviours were not raised by the GP.

Conclusion: Training GPs increases the number of consultations in which eating and exercise behaviour is raised. This was not associated with differences in behaviour of young people at follow-up. However, there are missed opportunities since a high percentage reported willingness to change behaviour but noted that GPs did not raise this issue.

T2:PO.063

Long-term effectiveness of two family based life style intervention programs on childhood obesity. A 2-years randomized controlled pragmatic trial

Beate Benestad¹, Samira Lekhal¹, Jens Kristoffer Hertel¹, Rønnaug Ødegård², Jøran Hjelmæsæth¹

¹The Morbid Obesity Center, Vestfold Hospital trust, Tønsberg, Norway

²St. Olavs Hospital, Trondheim University Hospital, Mid-Norway Regional Health Authority

Introduction: We assessed the 2-years effectiveness of family based life-style intervention at a rehabilitation center versus an outpatient clinic.

Methods: Randomized controlled pragmatic trial, comparing two different family based lifestyle intervention programs on change in BMI SD-score (BMI SDS). Families with at least one obese child (BMI \geq iso-BMI 30) aged 7–12 years and one obese parent were recruited through media and primary health care facilities. The participants were randomized to: Group A – family summer camp (2 weeks) and four repetition weekends at a rehabilitation center, or Group B – 4 days family education in a specialist health service. Participants were offered monthly primary care follow-up.

Results: A total of 76 children (51% boys) (families) were allocated to treatment group A (n = 40) or B (n = 36). At baseline, mean (SD) age was 9.7 (1.1) years, BMI 28.4 (3.9) kg/m² and BMI SDS 3.09 (0.73). A total of 65 (86%) children completed the 2-years study (37 in group A, 28 in group B) and were included in the analysis. Statistics: ANCOVA with baseline BMI SDS as covariate.

Both groups improved their mean (95% CI) BMI SDS significantly; group A; -0.33 (-0.43 to -0.22), group B; -0.13 (-0.25 to -0.01). However, the children in group A had a significantly greater reduction of BMI SDS than those in group B; between group difference of BMI SDS of -0.20 (-0.36 to -0.04); $F(1,62)=6.13$, $p = 0.016$, partial eta squared 0.09.

Conclusion: Family based treatment at a rehabilitation center seems to have a clinically meaningful long-term effect on childhood obesity.

T2:PO.064

Are negative thoughts about physical activity stopping children from being active?

Fiona Ling¹, Alison McManus², Rich Masters³, Remco Polman¹

¹Institute of Sport, Exercise & Active Living, Victoria University

²School of Health & Exercise Sciences, University of British Columbia

³Institute of Human Performance, University of Hong Kong

Introduction: Research has consistently shown that children worldwide live an increasingly sedentary lifestyle, yet to date, physical activity (PA) interventions have achieved limited effectiveness. Empirical evidence suggests that the tendency to engage in recurrent thoughts about negative experiences (termed 'emotional rehearsal') is associated with negative PA behavioural change and increased cardiovascular disease risks in children. Since the design of PA interventions is seldom informed by the children themselves, it is possible that certain aspects of these interventions may have unintentionally prompted PA-related emotional rehearsal, leading to intervention futility. Therefore, the aims of this study were 1) to qualitatively identify aspects of PA that Chinese children emotionally rehearse about and 2) to explore the construct of PA-specific emotional rehearsal with regards to its relationship with objectively measured habitual PA, physical self-concept and the tendency to explicitly attend to body movements.

Methods: Participants (aged 6–12) were recruited from a local government school (n = 229). All completed the questionnaire measures. A sub-sample also took part in focus group discussions regarding intrinsic factors affecting PA participation.

Results: Three prominent themes emerged from the focus group discussions – fear for unfavourable external factors, physical functioning and bodily concerns. Regression analysis showed that low habitual PA, low physical self-concept and greater tendency to consciously control body movements were significant predictors of PA-specific emotional rehearsal.

Conclusion: Our findings can potentially inform future PA interventions for Chinese children. Crucially, public health initiatives should encourage input from children in their design for possibly greater success in positive health behavioural change.

T2:PO.065

Does lifestyle coaching affect diet and physical activity stage of change scores in obese pregnant women? Pilot observations from the European DALI project

Goele Jans¹, Lieveke Ameye¹, Christophe Matthys², Sander Galjaard³, Judith Jelsma⁴, David Simmons⁵, Mireille Van Poppel⁴, Roland Devlieger³, Dali Core Investigator Group⁶

¹Department of Development and Regeneration, University of Leuven, Belgium

²Department of Clinical and Experimental Medicine, University of Leuven, Belgium; Department of Endocrinology, University Hospitals of Leuven, Belgium

³Department of Development and Regeneration, University of Leuven, Belgium; Department of Obstetrics and Gynecology, University Hospitals of Leuven, Belgium

⁴Department of Public and Occupational Health, EMGO+, Institute for Health and Care Research, VU University Medical Centre, the Netherlands

⁵Institute of Metabolic Science, Addenbrookes Hospital, Cambridge, England

⁶European Community's 7th Framework Program

Introduction: DALI is a European FP7 study investigating the effect of a lifestyle intervention on the development of gestational diabetes mellitus (GDM). The aim of this sub-study was to look at the effect of lifestyle coaching on diet and physical activity (PA) scores in obese pregnant women.

Methods: Pregnant women at risk of GDM (BMI \geq 29 kg/m²) were included. Women without baseline GDM were randomized into one of the three intervention groups (diet, PA or combination). They received 5 face-to-face and 4 telephone sessions by a lifestyle coach. At baseline, T2 (24–28 wks) and T3 (35–37 wks), diet and PA behavior was evaluated according to the transtheoretical model*. Mixed model tests were performed to assess the evolution of diet and PA scores over time and between groups.

Results: 92 women (33.7% diet, 38.0% PA, 28.3% combination) completed the full study process and did not develop GDM. Baseline characteristics did not differ between groups. Compared to the baseline measurement, the mean nutrition score increased by 0.30 at T2 (score=4.18; $p < 0.001$) and by 0.43 at T3 (score=4.30; $p < 0.001$). There was no difference between groups. The mean PA score increased by 0.74 at T2 (score=3.8889; $p < 0.001$) and by 0.41 at T3 (score=3.5649; $p < 0.001$) compared to the baseline score. The PA group had better mean exercise scores than the diet ($p = 0.01$) and the combination ($p = 0.048$) group, without any time effect.

Conclusion: Follow-up by a trained coach was associated with significant increases in readiness to change lifestyle.

* 1 = precontemplation, 2 = contemplation, 3 = intention, 4 = action, 5 = maintenance

T2:PO.066

Weight bias internalization, self-efficacy, and physical activity in bariatric surgery candidates

Claudia Hübner¹, Markus Zenger², Sabrina Baldofski¹, Beate Herbig³, Wolfgang Tigges⁴, Christian Jurowich⁵, Stefan Kaiser⁶, Christine Strohm⁷, Arne Dietrich¹, Almut Rudolph¹, Anja Hilbert¹

¹Leipzig University Medical Center, Integrated Research and Treatment Center AdiposityDiseases

²University of Leipzig, Department of Medical Psychology and Medical Sociology

³Schön Klinik Hamburg Eilbek Bariatric Clinic

⁴Department of General Surgery, Asklepios Clinic Hamburg

⁵Department of General Surgery, University Hospital Würzburg

⁶Department of Visceral, Pediatric and Vascular Surgery, Hospital Konstanz

⁷Department of General, Abdominal and Pediatric Surgery, SRH Municipal Hospital Gera

Introduction: For bariatric patients, physical activity is essential for postsurgical long-term weight reduction, but previous research revealed patients' insufficient physical activity. Studies on psychosocial determinants observed positive associations between self-efficacy and physical activity in different samples. Moreover, recent studies reported an influence of weight bias internalization on crucial health related aspects. Thus, the purpose of the present study was to investigate the influence of general self-efficacy and weight bias internalization on physical activity.

Methods: Within the Psychosocial Registry for Bariatric Surgery (PRAC), N = 179 morbidly obese bariatric surgery candidates were examined. Their general self-efficacy, weight bias internalization, and different aspects of physical activity were assessed by self-report questionnaires. Structural equation modeling was used to analyze the assumed mediational relationship.

Results: After controlling for sociodemographic variables, the association between general self-efficacy and moderate-intense as well as vigorous-intense physical activity was completely mediated by weight bias internalization. Low general self-efficacy predicted greater weight bias internalization, which in turn predicted a smaller amount of moderate-intense and vigorous-intense physical activity. Fit-indices indicated good model-fit.

Conclusion: In bariatric surgery candidates, the association between general self-efficacy and different aspects of physical activity is completely mediated by weight bias internalization. Results suggest the importance of interventions for the reduction of weight bias internalization in order to postoperatively establish an active lifestyle and long-term weight reduction in these patients.

T2:PO.067

Pre-pregnancy Body Mass Index and Quality of Life during pregnancy

Marie Harte, Celine Murrin, Cecily Kelleher

UCD School of Public Health, Physiotherapy, and Population Science

Introduction: Quality of Life (QOL) as a measure of health may be particularly useful in assessing the health of pregnant women. Increasing weight status has a negative effect upon physical and mental health during pregnancy. This study examined whether weight status before pregnancy was associated with QOL during pregnancy.

Methods: Prepregnancy height and weight was reported by 924 mothers of the Lifeways Cross-Generation Cohort. During early pregnancy mothers completed the World Health Organisation Quality of Life Brief instrument (WHOQOL-BREF). Mean scores for four domains of the WHOQOL-BREF were dichotomised to high versus low scores. Four separate binary logistic regression analyses were conducted for each domain with BMI as the independent variable while adjusting for sociodemographic and lifestyle variables.

Results: Participants with a BMI of ≤ 24.99 kg/m² had significantly higher mean QOL scores in the physical, psychological and environmental domains compared to those with a BMI of ≥ 25 kg/m². No significant differences were observed in the social domain. Univariate regression analysis showed overweight/obese women were less likely to have a high QOL score in the Physical (OR 0.63 95% CI: 0.47 to 0.85); Psychological (OR 0.61 95% CI: 0.44 to 0.82); and Environmental domains (OR 0.74 95% CI: 0.055 to 0.99). Fully adjusted models revealed that level of partner support, self-reported depression and self-reported health status were the strongest predictors of QOL.

Conclusion: Quality of life during pregnancy was associated with weight status but is more strongly determined by immediate psychosocial factors.

T2:PO.068

Perceived stress, coping and eating behaviours in Maltese adolescents: Developing an effective online intervention

Daniela Cassola, Anne de Looy, Ray Jones

Plymouth University

Introduction: Prevalence rates of overweight and obesity in Maltese adolescents are amongst the highest in the world. We examined the relationship between perceived stress, coping and eating behaviours in Maltese adolescents. We found that emotional eating behaviours in Maltese adolescents may be decreased by reducing perceived stress and dysfunctional coping strategies (*self-controlling* and *escape-avoidance*) and increasing self-efficacy and functional coping strategies (*seeking social support* and *pleasant problem solving*) (Cassola, de Looy & Jones, 2012).

Methods: Based on these findings, an online intervention (ACES), consisting of five, weekly, interactive modules, for the reduction of perceived stress and emotional eating was devised and tested via a feasibility study (one-group pretest-posttest design).

Results: Forty-six out of 125 participants (36.5%) completed ACES and all outcome measures. This is a better completion rate than many online interventions. Satisfaction with the intervention was very high (100% of completers), it was considered visually appealing (91%), easy to use (93%), perceived as useful (91%) and relevant (98%), interesting (100%), and trustworthy (98%). All completers would recommend ACES to their peers. Preliminary effectiveness findings indicated that ACES led to decreases in perceived stress ($p = 0.008$) and emotional eating ($p = 0.004$) but the estimated effect sizes were small (-0.46 and -0.42 respectively).

Conclusion: This study demonstrated that an online intervention, incorporating behaviour change techniques and focusing on teaching functional coping skills (e.g. problem solving and seeking social support), is a feasible avenue for the reduction of perceived stress and emotional eating with potential implications for obesity prevention or management in adolescence.

T2:PO.069

Comparison of individual and group cognitive behavioral therapy for binge eating disorder. A randomized, two-year follow-up study

Tatsiana Ramanouskaya

Belorussian State Medical University

Introduction: Binge eating disorder (BED) is a syndrome characterized by frequent and persistent overeating episodes that are accompanied by feelings of loss of control and marked distress, in the absence of regular compensatory behaviors. Few long-term follow-up studies evaluated the response to psychotherapeutic interventions in binge eating disorder (BED). The effectiveness of individual and group cognitive-behavioral therapy, and the possible predictors of outcome were evaluated in a randomized controlled trial.

Methods: At the beginning, at the end of treatments, and two years after the end of treatments, 286 patients affected by threshold or sub threshold

BED were assessed using a clinical interview and self-reported questionnaires evaluating the eating attitudes and behavior, emotional eating, and general psychopathology. The following outcome measures were considered: recovery at two-year follow-up, weight loss, treatment resistance, relapse, and diagnostic change.

Results: Both treatments showed similar response in terms of all outcome measures in the long-term, and determined a significant reduction of binge eating frequency, and reduction of weight. Overweight during childhood, full blown BED diagnosis, and high emotional eating were predictors of treatment resistance. The absence of a history of alcohol derivatives consumption, lower emotional eating and binge eating severity at baseline were predictors of full recovery in the long-term. A low emotional eating was found to be the only predictor of weight reduction.

Conclusion: Treatments considering the relationships between binge eating and emotional eating could improve the outcome of BED patients.

T2:PO.070

CBT of weight regain compared with initial weight loss process

Roman Tyutev, Elena Efimova

Doctor Bormental Weight Loss Center

Introduction: Prevention and therapy of weight regain is a very important problem. We've created the new CBT method and studied the effectiveness before (1): research was conducted with an experimental group of 288, initial average weight was 95.44 ± 18.34 kg, the average weight reduction was $5.86 \pm 2.28\%$ from initial body mass in 1 month and $11.23 \pm 7.62\%$ in 6 months (down to average weight 84.72 kg). The purpose of the new study is to find out the effectiveness of this approach in case of weight regain.

Methods: The purpose is to begin the new phase of weight reduction. New research was conducted with an experimental group of 207, who actively participated in the programme from January 2012 to November 2013 in Tomsk, Siberia.

Results: At the moment of second intervention (after the very first initial weight reduction and weight regain) the average body mass was 80.79 ± 23.81 kg. After 1 month, the average weight loss was $4.34 \pm 3.06\%$ from the "secondary" initial body mass. In total, 179 of 207 participants began to reduce weight after 1 month.

Conclusion: The second weight reduction was effective for 86,47% of participants, but the body mass dynamic was lower versus the initial process. We suppose that successful weight reduction is able to be a good predictor for second treatment in case of weight regain. Assessing the 1-Year Long Effectiveness of Psychotherapeutic Approaches to Weight Loss in Russia – Tyutev RA // *Obes Facts* 2013;6 (Suppl. 1) T.5 P.119

T2:PO.071

Reliability and validity of the Norwegian version of obesity-related problems scale

Anny Aasprang¹, John Andersen², Villy Våge³, Ronnie Kolotkin⁴, Gerd Natvig⁵

¹Faculty of Health Studies, Sogn og Fjordane University College, Førde, Norway

²Faculty of Health Studies, Sogn og Fjordane University College, Førde, Norway Department of Surgery, Førde Central Hospital, Norway

³Department of Surgery, Førde Central Hospital, Norway

⁴Faculty of Health Studies, Sogn og Fjordane University College, Førde, Norway Department of Surgery, Førde Central Hospital, Norway Obesity and Quality of Life Consulting, Durham, NC, US Duke University School of Medicine, Durham, NC, US

⁵Department of Global Public Health and Primary Care, University of Bergen, Norway

Introduction: The aim of this study was to translate the Obesity Related Problem Scale (OP-scale) according to standardized guidelines into Norwegian and test its reliability and validity in bariatric surgery patients.

Methods: Patients accepted for bariatric surgery completed questionnaires before and one year post-surgery: OP-scale, SF-36 (generic health status), and Cantril's Ladder (life satisfaction). Cronbach's α was used to test internal consistency reliability. Associations between OP-scale and other variables were tested with Pearson's r and an independent t-test. Since higher scores on the OP-Scale represent greater impairment, we hypothesized negative correlations between the OP-Scale and SF-36 mental and physical component scores (MCS/PCS), Cantril's Ladder, and change in BMI, and positive correlation with baseline BMI.

Results: 56 men and 86 women were included in the study (mean age = 43.1 (\pm 12); mean BMI = 45.29 (\pm 7.1). Cronbach's α was 0.89 at baseline and 0.87 post-surgery. Floor effect was 0.7% at baseline and 4.2% at one year. Ceiling effect was 0% at baseline and 9.1% at one year. As in the original OP-Scale women had lower OP scores than men ($p = 0.049$). Correlations between OP-scale at baseline and PCS were -0.374 ($p < 0.001$), MCS -0.558 ($p < 0.001$) and Cantril's Ladder -0.561 ($p < 0.001$) and BMI 0.223 ($p = 0.007$). Correlations between change in OP scale and changes in the following change variables were: PCS -0.170 ($p = 0.150$), MCS -0.232 ($p = 0.049$), Cantril's Ladder -0.337 ($p = 0.003$) and BMI -0.284 ($p = 0.012$).

Conclusion: The Norwegian OP-scale seems to have satisfactory reliability and validity.

T2:PO.072

Three-year weight management in overweight women: A signal detection analysis of behavioural and psychological predictors

Inês Santos¹, Jutta Mata², Eliana Carraça¹, Marlene Silva¹, Luís Sardinha¹, Pedro Teixeira¹

¹Exercise and Health Laboratory, Faculty of Human Kinetics, University of Lisbon

²Center for Adaptive Rationality, Max Planck Institute for Human Development

Introduction: Identifying predictors of successful weight management is essential for improving obesity interventions. This study examined behavioural and psychological predictors of 3-year weight loss maintenance in overweight women.

Methods: 154 overweight women (age: 38.7 \pm 6.6 years; BMI: 29.7 \pm 4.2 kg/m²) engaged in a 1-year behavioural weight management intervention with a 2-year follow-up (RCT). Signal detection analyses were used to identify predictors of 3% and 5% weight loss maintenance two years after the end of the intervention.

Results: Perceived barriers for exercise best differentiated the successful and non-successful 3% weight loss maintainers. Of those with low barriers for exercise, 58% achieved at least 3% weight loss maintenance (vs. 27% of women with higher barriers). Still, among women with higher barriers, those with a high quality of life were significantly more likely to achieve 3% weight loss maintenance (63% vs. 17% success in women with low quality of life). Self-ideal body image discrepancy best distinguished successful 5% weight loss maintainers from non-maintainers. Of those with a more positive body image, 54% met the 5% weight loss maintenance criterion (vs. 23% in women with poorer body image). In women with poorer body image, having high exercise intrinsic motivation was somewhat compensatory for high body image discrepancy and increased the likelihood of achieving 5% weight loss maintenance (41% vs. 10% success in women with low intrinsic motivation).

Conclusion: During treatment, reducing perceived barriers for exercise, improving body image, and increasing quality of life and exercise intrinsic motivation likely results in enhanced long-term weight management in overweight women.

T2:PO.073

Perceived stress, coping and eating behaviours in Maltese adolescents: Developing an effective online intervention

Daniela Cassola, Anne de Looy, Ray Jones

University of Plymouth

Introduction: Prevalence rates of overweight and obesity in Maltese adolescents are amongst the highest in the world. We examined the relationship between perceived stress, coping and eating behaviours in Maltese adolescents. We found that emotional eating behaviours in Maltese adolescents may be decreased by reducing perceived stress and dysfunctional coping strategies (*self-controlling* and *escape-avoidance*) and increasing self-efficacy and functional coping strategies (*seeking social support* and *planful problem solving*) (Cassola, de Looy & Jones, 2012).

Methods: Based on these findings, an online intervention (ACES), consisting of five, weekly, interactive modules, for the reduction of perceived stress and emotional eating was devised and tested via a feasibility study (one-group pretest-posttest design).

Results: Forty-six out of 125 participants (36.5%) completed ACES and all outcome measures. This is a better completion rate than many online interventions. Satisfaction with the intervention was very high (100% of completers), it was considered visually appealing (91%), easy to use (93%), perceived as useful (91%) and relevant (98%), interesting (100%), and trustworthy (98%). All completers would recommend ACES to their peers. Preliminary effectiveness findings indicated that ACES led to decreases in perceived stress ($p = 0.008$) and emotional eating ($p = 0.004$) but the estimated effect sizes were small (-0.46 and -0.42 respectively).

Conclusion: This study demonstrated that an online intervention, incorporating behaviour change techniques and focusing on teaching functional coping skills (e.g. problem solving and seeking social support), is a feasible avenue for the reduction of perceived stress and emotional eating with potential implications for obesity prevention or management in adolescence.

T2:PO.074

Relationships between psychological features of adults seeking weight-loss treatment (eating disorders, depression and self-aggression) and metabolism level and body composition. How we can change our energy level

Varvara Leschinskaya¹, Oleg Grishin², et al.

¹MD, PhD, Institute of Clinical Immunology, SB RAMS

²MD, PhD, Institute of Physiology SB RAMS

Introduction: The aim of this study was to reveal relationships between psychological features (type of eating behavior, depression, self-aggression) and their influence on rest energy expenditure and body composition among adults seeking weight-loss treatment

Methods: A total 75 men and women age 30–55 were evaluated for physical parameters – Body Mass Index, BMI, metabolism level (rest energy expenditure) and body fat percentage (body composition), and psychological features – depression (Beck Depression Inventory, BDI), self-aggression (Buss-Durky Hostility Inventory) and eating behavior (Dutch Eating Behavior Questionnaire, Eating Disorder Inventory-2, EDI-2)

Results: The decreased metabolism level and high body fat percentage was related to poor body weight control, self-aggression and high level of dietary “restraint” type of eating behavior even in overweight and normal weight adults. We revealed significant associations between type of eating behavior, depression, self-aggression and metabolism level and body fat percentage among overweight and obese patients.

Conclusion: The high level of dietary eating behavior might induce influence on decrease metabolism level and might have consequences like increase of body fat percentage. The findings might also help to understand the mechanisms that lead to body weight gain and changes in metabolism level and develop some biofeedback based behavioral methods in weight-loss treatment

T2:PO.075

The long-term impact of physical activity patterns on future quality of life in adults: Results from the MONICA/KORA cohort studies

Silke Wolfenstetter¹, Christina Teuner¹, Rolf Holle¹, Andreas Mielck¹, Annette Peters², Matthias Hunger¹

¹Helmholtz Zentrum München – German Research Center for Environmental Health, Institute of Health Economics and Health Care Management

²Helmholtz Zentrum München – German Research Center for Environmental Health, Institute of Epidemiology II

Introduction: The aim of this study is to analyse the correlation between physical activity (PA) patterns over time and future health related quality of life (HRQL) in an adult population.

Methods: Data from 5,246 participants of two population-based health-surveys (1994/95;1999/2001) and their follow-up studies (2004/05;2006/08) conducted within the KORA-research-platform in Augsburg, Germany, were used. HRQL was measured at follow-up by the SF-12 questionnaire providing a mental component scale(MCS) and a physical component scale(PCS). PA was assessed in standardized interviews at baseline and follow-up. Generalized linear regression models adjusted for sex, age, socioeconomic status and BMI were calculated.

Results: People who reported more than 2 hours (h) of regular PA per week at baseline had significantly higher HRQL (PCS:1.18;MCS:1.50) at follow-up than physically inactive people. This positive association could also be shown for people with 1h of regular PA per week (PCS:0.47;MCS:0.57) and for those who were only irregularly physically active (PCS:0.38;MCS:0.20). This trend abated when only participants in good physical condition at baseline were included in the analysis (N=4,294; physical active regularly >2h/week:PCS:0.69(n.s.);MCS:0.96). Participants who were regularly physically active at baseline and follow-up or increased their PA showed higher HRQL compared to people who were physically inactive at both time points or who reduced their PA. These results differ between BMI-classes.

Conclusion: In sum, there is a trend that regular PA over time is associated with higher HRQL in the future. This is the first longitudinal analysis which estimates the correlation between future HRQL and PA patterns considering the physical condition at baseline.

T2:PO.076

Quality of life perception among obese people compared to non-obese ones

Daniel Ríos García, Manuel Pena Arnaiz, Meritxell Caldero Sole, Virginia Sanchez Fernandez, Mar Alvarez Ceballos, Gemma Pascual Sol, Eladi Miguel Llordes, Rosa Llovet Font, Neus Miró Vallvé, Marina Roca Monsó, Marc Olivart Parejo, Juan Carlos Salamanca Cedeño, Juanjo Perez Amador

ABS Pla d'Urgell. CAP de Mollerussa. Lleida

Introduction: *Objective:* to compare the quality of life perceived among obese and nonobese people.

Methods: A total of 406 people were included in the study recruited from Primary Care attendance level. The sample was selected through a consecutive random selection process. It is a cross-sectional study. Each patient was asked for filling the perceived quality of life questionnaire EuroQol-5D (EQ-5D). This test consists of two parts. The first part evaluates five different specific dimensions of quality of life. The resulting score is a numerical scale from 0 (worst quality of life perceived) to 1 (best quality of life perceived).

The second part consists of a general numerical scale and the resulting score can range from 0 (worst quality of life) to 100 (best quality of life). Body Mass Index (BMI) was taken from the computerized clinical history.

Results: Among obese people (N=125) the average punctuation in EuroQol-5D multidimensional part (the first part) was 0.68, SD ± 0.25.

Among non-obese people (N=123), it was 0.73 SD ± 0.28. The differences between both groups were not statistically significant ($p > 0.05$). Among obese people the average punctuation in EuroQol-5D numerical scale (2nd part) was 64, SD ± 21.4. Among non-obese, it was 70, SD ± 22.1. The difference were not statistically significant.

Conclusion: In our study, obese people did not show a worse perception in quality of life compared to non obese people, suggesting that the concept of quality of life is complex and multifactorial. Not only obesity but other factors such as biological, psychological or social aspects should be taken into account.

T2:PO.077

Evaluation of anxiolytic-like effects of a satiating extract from green leaves, called thylakoids, in mice

Egecioglu Emil¹, Yoshikawa Masaaki², Erlanson-Albertsson Charlotte¹

¹Experimental Medical Sciences, Lund University

²Division of Food Science and Biotechnology, Kyoto University

Introduction: Dietary thylakoids, extracted from spinach, bind to lipids, lipase/co-lipase and the luminal side of the intestinal wall, causing prolongation of digestion, absorption of nutrients and alter the secretion of gastrointestinal hormones. In rodents supplementation with thylakoids suppress food intake, decrease body weight and body fat. Studies in humans show that thylakoids improve glucose homeostasis, decrease hunger sensation and craving for palatable foods following acute and long-term treatment.

Methods: C57Bl/6 mice (n = 11 per group) were given an isocaloric diet with or without thylakoids (1g/day/mouse) for 2 weeks. Anxiety-like behaviour was evaluated in the morning using the elevated plus maze. %open arm entries, %time on the open arms and total number of entries into the open and closed arms was evaluated.

Results: Mice supplemented with thylakoids increased the %time spent on the open arms (control; 26.6 ± 8.9% vs thylakoid; 52.0 ± 9.2%, $p < 0.05$, Mann-Whitney) and tended to increase the %open arm entries (control; 49.0 ± 7.8% vs thylakoid; 44.7 ± 7.1%, $p = 0.067$, Mann-Whitney) without effecting total number of entries (control; 12.1 ± 1.4 vs thylakoid; 14.5 ± 1.0%, ns) compared to controls.

Conclusion: Dietary supplementation of thylakoids has anxiolytic effects in mice. In addition to improving appetite control in humans thylakoids may also have an impact on mood.

T2:PO.078

Effect of Agrimonia eupatoria tea consumption on markers of oxidative status in overweight subjects

Neshe Nazifova-Tasinova, Yoana Kiselova-Kaneva, Oskan Tasinov, Diana Ivanova

Medical University – Varna, Bulgaria Department of Biochemistry, Molecules Medicine and Nutrigenomics

Introduction: *Agrimonia eupatoria* (agrimony) is widely used in the traditional medicine for various treatments, including liver diseases, diarrhea, pulmonary and gastrointestinal inflammations, even in diabetes and obesity. The herb is a source of antioxidants and has been established to exert anti-inflammatory properties.

This intervention study aimed to assess the effect of *Agrimonia eupatoria* tea (AET) on oxidative status parameters in overweight subjects (BMI>25).

Methods: The intervention included 16 volunteers, aged between 20 and 60 years. They consumed AET (2,5g dried plant material in 250ml boiling water) once a day for a period of 25 days. Blood samples were collected before (day 0) and at the end (day 25) of the intervention. Plasma antioxidant capacity was measured by ABTS cation radical decolorization

method. Commercial kits were used to measure reduced glutathione, total thiols and total protein plasma levels.

Results: Plasma antioxidant capacity of volunteers increased about 10% ($P < 0.001$) after the intervention and reduced glutathione levels increased by more than 80% ($p < 0.001$). In the same time, 30% decrease in the total thiol levels was established ($p < 0.001$) as a result of AET consumption. Total protein concentrations decreased about 6% ($p < 0.001$).

Conclusion: AET consumption contributes to elevated plasma antioxidant capacity and glutathione levels in overweight subjects. This effect may be attributed to absorbed plant constituents exerting antioxidant activity *in vivo*. Further studies are needed to elucidate the effect of the AET on total thiol balance.

T2:PO.079

A novel measure of self-discrimination in binge eating disorder and obesity

Almut Rudolph, Anja Hilbert

Leipzig University Medical Center, IFB AdiposityDiseases

Introduction: Stigmatized obese individuals tend to internalize the pervasive weight stigma which might lead to self-discrimination, and increased psychopathology. Explicit and implicit weight stigma can be assessed using self-report questionnaires and Implicit Association Tests (IAT), respectively. However, the assessment of self-discrimination solely relied on self-report, i.e., explicit discrimination.

Methods: The present study sought to develop an IAT measuring implicit self-discrimination (SD-IAT) in samples of obese individuals with and without binge-eating disorder (BED). Participants were recruited from the community and individually matched in three groups (each $N=26$): Obese participants with BED, obese participants without BED (OB), and a normal weight control group without eating disorder psychopathology (CG). All participants answered the SD-IAT and self-report measures relevant for validation.

Results: Significantly higher implicit self-discrimination was found in the BED group when compared to both OB group and CG. Furthermore, the SD-IAT significantly correlated with weight, weight stigma, depressive symptoms, and implicit self-esteem. Finally, the SD-IAT predicted eating disorder psychopathology over and above group membership, and self-reported weight stigma.

Conclusion: We provided first evidence of the validity of a SD-IAT. Assessing implicit self-discrimination might help to understand weight stigma and its significance for psychosocial functioning among obese individuals with BED.

T2:PO.080

Relationship between Body Mass Index (BMI) and Quality of Life in Lleida (Spain)

Manuel Pena Arnaiz, Daniel Ríos García, Meritxell Caldero Sole, Virginia Sanchez Fernandez, Gemma Pascual Sol, Mar Alvarez Ceballos, Rosa Llovet Font, Josep Montserrat Capdevila, Eladi Miguel Llordes, Marina Roca Monsó, Neus Miró Vallvé, Juan Carlos Salamanca Cedeño, Marc Olivart Parejo

ABS Pla d'Urgell. CAP de Mollerussa. Lleida

Introduction: *Objective:* the aim of this study was to determine the relationship between the Body Mass Index (BMI) and the punctuation in quality of life questionnaire EuroQol-5D.

Methods: cross-sectional study. A total of 406 people were included from Primary Care population. The sample was selected through a consecutive random process.

Each patient was asked for filling the "quality of life questionnaire EuroQol-5D" (EQ-5D). This test consists of two parts. The first part evaluates five different specific dimensions of quality of life. The resulting score

is a numerical scale from 0 (worst quality of life perceived) to 1 (best quality of life perceived).

The second part consist of a general numerical scale and the resulting score can range from 0 (worst quality of life) to 100 (best quality of life) Body Mass Index (BMI) was taken from the computerized clinical history.

Results: The correlation coefficient (Pearson test) between BMI and the punctuation in the specific multidimensional part of EQ-5D was: -0.09 ($p > 0.05$).

The correlation coefficient (Pearson test) between BMI and the punctuation in the generic numerical scale of EQ-5D was: -0.13 ($p < 0,05$)

Conclusion: Obesity is becoming an important problem in developed countries due to its high prevalence in general population, and its significant impact on morbidity.

In our study, we found a weak relationship between obesity (measured through BMI) and the perception of patients about their quality of life (measured through EQ-5D questionnaire). Further studies are needed to clarify the relationship between the obesity and the quality of life.

T2:PO.081

Assessing the 1-Year Long Effectiveness of Psychotherapy to Weight Loss in Russia

Roman Tyutev, Andrey Bobrovskiy, Veronika Pirogova

Doctor Bormental Weight Loss Center

Introduction: Obesity remains one of the most urgent and widespread health problems in Russia and currently affects approximately 23% of the population. Our weight loss programme has been in place for 12 years and has been taken to over 80 cities and towns across Russia.

Methods: The programme consists of complex group psychotherapy using CBT, low-calorie diets, elements of trance and transpersonal techniques. Research was conducted with an experimental group of 252, who actively participated in the programme from January 2010 to December 2012 in Novokuznezk, Siberia.

Results: Initial average weight was $95,81 \pm 20,05$ kg. Participants achieved significant body mass dynamics (Table1). In addition, among 64 persons with zero body mass dynamic or weight regain after 1 year 10 women became pregnant and had natural weight regain process.

Conclusion: The use of this short-term psychotherapeutic programme provides good weight loss results. At the present time, further studies are being done to assess the effectiveness of the given approach over a longer period (more than 1 year).

T2:PO.082

Body ideals and evaluation practices among normal weight and moderately overweight individuals

Nina Nissen¹, Charlotte Baarts², Lotte Holm³

¹University of Copenhagen, Department of Food and Resource Economics

²University of Copenhagen, Department of Sociology

³University of Copenhagen, Department of Institute for Food and Resource Economics

Introduction: In research, little attention has been given to individuals that are not in any extreme weight category. But normal weight and moderately overweight individuals make up a highly relevant group in a health promotion perspective because they are either the potentially future obese or the good cases that succeed in their weight maintenance practices. This study examined body ideals and body evaluation practices among normal weight and moderately overweight individuals.

Methods: The study was based on qualitative methods in the form of in-depth interviews combined with observations. Recruitment was done by telephone digit dialing and the 24 participants were normal weight and moderately overweight weight with different socio-demographic characteristics. Data were analyzed by identifying relevant themes and subsequently systematizing the material according to the identified themes

Results: Findings suggested that normal weight and moderately overweight persons are much concerned about own body size and this concern relates to regimes of health and beauty and eventually to a search for control and social acceptance. Study participants' evaluation practices and ideals are not only based on the simple biometric measurements that are recommended, but also on size, shape and texture of the body, and individuals have complex evaluation practices for monitoring their bodies.

Conclusions: Individuals that are not in any extreme weight category appear to be much concerned about own body size, and they have strong, complex ideals and evaluation practices for their bodies.

T2:PO.083

Correlates of Health-Related Quality of Life in Overweight and Obese Adults with Cardiovascular Disease

Alessandra Pokrajac-Bulian¹, Miljana Kukic¹, Alen Ruzic²

¹Department of Psychology, Faculty of Humanities and Social Sciences, University of Rijeka

²School of Medicine, University of Rijeka

Introduction: Previous studies agree that cardiovascular disease (CVD) significantly influences the quality of life. The aim of this study was to describe and examine conceptually relevant correlates of health related quality of life in overweight and obese patients with CVD.

Methods: The study included 34 men and 8 women during the first year after acute myocardial infarction (MI). The average age of participants was 59.67 years (from 36 to 75 years), average BMI 31.53 (from 26.50 to 39.08). All patients completed Hospital Anxiety and Depression Inventory (HADS), and The Medical Outcome Study Short-Form 36 (SF-36). Because of the significant correlation between anxiety and depression symptoms ($r=.85$) a negative emotionality variable was formed. We used only four scales related to physical functioning of SF-36 (physical functioning, limitations due to the physical health, pain, and general health). We didn't use the mental component of SF-36 due to its high correlation with negative emotionality ($r=.85-.86$).

Results: In the sample, 11.9% of the patients showed anxiety symptoms, while 7.1% were depressed. We did not obtain a significant difference in quality of physical functioning between patients of different gender, obesity degrees, and metabolic syndrome. Age and negative emotionality are significant predictors of poor physical functioning, but only negative emotionality predicted limitations due to the physical health, pain, and general health.

Conclusion: Negative emotionality is a significant psychological determinant of poor physical functioning in overweight and obese CVD patients that inevitably have effect on the overall approach to the treatment.

T2:PO.084

Implementation of the therapeutic education program to obese patients in Romania and its placing in the criteria for evaluating the quality of care

Stafie Celina

University Of Medicine Gr.t.popa IASI, Department of Ambulatory Family Care

Introduction: Education of patients should enable patients to acquire and preserve their capacity and skills to help them live in an optimum manner, with a chronic disease. Therefore it is a continuous process, integrated and patient-centered care.

Methods: There were groups of 20 doctors. The trainer team includes a physician, a psychologist, an actor(patient).The motivational consult has been implemented. During the sessions of therapeutic education, the activities were designed to place the physician in a position to rethink and reconsider the manner of organizing the consultations and even reconsider the doctor-patient relationship.

Results: The results appeared as: establishing a real communication- feedback assessments; taking into account the patient's experiences; helping the patient to understand what happens to him; helping the patients to manage their treatment and lifestyle and accompanying patient in long-term as well as increasing the patient's quality of life.

Conclusion: Therapeutic education implies organized activities of raising awareness, informing, teaching and offering psychological support for patients regarding the disease,the treatment prescribed, the medical care, but also about the behavior concerning the disease or health state.

The dynamic of obesity is still increasing, and the tendency seems to evolve to consider it only an aesthetic obstacle,in which genetic and alimentary behavior have quite major, fixed roles. Nevertheless, education should be the turning point for changing these main determinants.

T2:PO.085

Is there a relationship between dynamic postural balance and muscular fitness in obese adults?

Maythe Nascimento¹, Liu Yi², Bruna Martinez³, Cintia Ferreira⁴, Ricardo Sanches¹, João Fidalgo¹, Vanessa Poli¹, Amanda Moraes¹, Danielle Caranti⁵

¹Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos, Brazil; Obesity Study Group (GEO), Federal University of São Paulo – UNIFESP – Santos, Brazil

²Department of Biosciences, Federal University of São Paulo – UNIFESP – Santos, Brazil

³Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos, Brazil

⁴Post Graduate Program of Interdisciplinary Health Sciences, Federal University of São Paulo – UNIFESP – Santos, Brazil

⁵Obesity Study Group (GEO), Federal University of São Paulo – UNIFESP – Santos, Brazil; Department of Biosciences, Federal University of São Paulo – UNIFESP – Santos, Brazil.

Introduction: Important functional activities such as sitting and standing can be influenced by obesity. Overweight leads to an alteration in body mass center, which can interfere in dynamic postural balance and the muscle fitness to do these activities. The aim of this study was to verify the relationship between dynamic postural balance and muscle fitness in obese adults.

Methods: In this study, thirty-three obese adults with ages between 30 and 50 years old and Body Mass Index (BMI) between 30 and 40 Kg/m² that have been engaged in an interdisciplinary lifestyle therapy were assessed. The Dynamic postural balance was assessed with the Star Excursion Balance Test (SEBT) and the muscle fitness by the sitting-rising test (SRT). The correlation between dynamic postural balance and muscle fitness was performed by the Pearson correlation coefficients.

Results: The Pearson correlation coefficients and significance levels between SEBT of the right lower limb and SRT for sitting and standing test were, respectively $r = 0,17$; $p = 0,32$ and $r = 0,004$; $p = 0,98$; and between SEBT of the left lower limb and SRT for sitting and standing were: $r = 0,28$; $p = 0,10$ and $r = 0,02$; $p = 0,90$.

Conclusion: There is no relationship between dynamic postural balance and muscular fitness in obese adults.

T2:PO.086

Learning styles of eating behavior in individuals older than 50 years

Kopitko Marina¹, Volkova Liudmila², et al.

¹Vl'dimirovna

²Yur'evna

IntroductionTo study the styles of eating behavior in older adults living in Moscow.

Methods: Interviewed 67 people aged 50 years and older (w-94%, m-6%). Evaluation of feeding behavior was carried out using a DEBQ. Statistical analysis was performed using MS Excel.

Results: The most common type is restrictive eating behaviors (64%), which is expressed in significant self-restraint and strict diets. Rarely observed externalities type of feeding behavior (61%), which is characterized by increased reaction to external stimuli. Emotiogenic type of eating behavior was detected in 51% for whom an incentive for eating becomes emotional stress and discomfort. 22% have associated deviations of three types of eating disorders. Emotiogenic combination of externalities and types of eating behavior – 16%. Restrictive and externalities type of eating behavior – 13%. 9%, restrictive and emotiogenic type of eating behavior. Externalities only eating behavior – in 7%, while emotiogenic – 3%, restrictive type of food commandment – 19%. Harmonious (rational) feeding behavior observed in 7%.

Conclusion: Eating disorders are found in the vast majority (93%) surveyed residents of Moscow over the age of 50 years. Eating disorders are often combined nature (22% have abnormalities in three main types of eating behavior, 38% – on two types of bias). It may be a risk factor for developing nutrition-related diseases, including overweight and obesity, and negatively affect the quality of life in this age group.

T2 – Dietary Patterns

T2:PO.088

Impact of probabilistic food replacement: Substitution of meat with oily fish consumption in the UK diet

Sandrine Pigat

Creme Global

Introduction: This analysis looks at the impact of substituting red and processed meat with oily fish in the UK diet. Creme Nutrition® enables analysis of dietary intakes and modelling scenarios (e.g. food replacement scenarios) to assess the impact on a population's diet. Consumption of oily fish can reduce the risk of heart disease. Currently this consumption is below the recommended level of at least 140g per week.

Methods: Assessments are performed by combining food consumption diaries and food composition data from the NDNS Adults Rolling Survey with mathematical models. Red and processed meat is substituted by oily fish consumption using a probabilistic food replacement model, with a replacement probability of 0.2. Nutrient composition of oily fish is set by discrete data distributions using nutrient composition from oily fish consumed in the UK. 40,350 subjects' diaries are simulated.

Results: After modelling oily fish replacement, mean daily intake of oily fish increases from 9g/d to 22g/d, thereby reaching the recommended intake of oily fish. Cis n-3 fatty acid intake increases from 1.01% to 1.12% of total Energy ($p < .00001$), saturated fat intake decreases from 12.21% to 12.11% ($p < .00001$) and vitamin D intake increases significantly from 3.7ug/d (± 0.1) to 4.6ug/d (± 0.1) ($p < .00001$).

Conclusion: Substituting consumption of red meat and processed meat for oily fish may lead to a more beneficial fatty acid intake profile and increased vitamin D intake. The impact of such a scenario on a population can be accurately predicted using the Creme Nutrition® model.

T2:PO.089

Italian adolescents: Adherence to the mediterranean diet and active lifestyle

Romana Roccaldo, Laura D'Addezio, Laura Censi, Myriam Galfo

Agricultural Research Council, Food and Nutrition Research Centre (CRA-NUT) – Rome, Italy

Introduction: The Mediterranean diet (MD) is widely recognized as healthy but little is known about the adherence to this diet of Italian adolescents. This study determined the level of adherence and its association with an active lifestyle in an Italian collective.

Methods: A cluster sample of 373 adolescents, aged around 15 years, in the second class of secondary school in the region of Lazio was investigated. Body weight and height were measured. The level of adherence to the MD was assessed by the KIDMED index. Accelerometers and questionnaires were used.

Results: Only 17.4% of the sample was classified as high adherers of MD, while 61.1% and 21.4% had an average and a poor score respectively. When active, the subjects showed a higher optimal adherence rate (yes:23.1%; no:12.7%) and a lower poor rate (yes:17.2%; no:25.0%). If they did sport the rates were better, too (yes: high 21.2%;average 63.1%;low 15.8% vs no: high 10.6%;average 57.6%;low 31.8%). The rates improved at the increasing of the sport sessions per week and when the snack after the sessions was fruit/fruit juice rather than sandwich/pizza or crisps/biscuits.

Conclusion: The sample showed a very low adherence to the Mediterranean dietary patterns. However, the degree of adherence increased with a more active lifestyle and when choosing as a snack, a key Mediterranean food, like fruit. Motivating and supporting youth to start and continue physical activity together with the introduction of healthy changes in their eating habits is therefore necessary to lead adolescents to a variety of health benefits.

T2:PO.090

Nutritional value of snacks according to the preschool children weight status

Abreu Abreu¹, Pedro Moreira², Jorge Mota¹, Luísa Soares-Miranda¹, Susana Vale¹

¹Research Centre for Physical Activity, Health and Leisure, Faculty of Sport, University of Porto, Porto, Portugal

²Research Centre for Physical Activity, Health and Leisure, Faculty of Sport, University of Porto, Porto, Portugal Faculty of Nutrition and Food Science, University of Porto, Porto, Portugal

Introduction: It has been described that during morning and afternoon snacks, children have a greater possibility to consume energy-dense, nutrients-poor foods, which may increase the total daily energy intake and affect weight status. The objective of this study was to analyze the nutritional value of snacks according to the children weight status.

Methods: A cross-sectional study was conducted with 446 Portuguese children (52% of boys) aged 3–5. Cole's cut-points were used to categorize normal weight (NW) and overweight/obesity (OW/OB). Dietary intake was assessed using a 3-day food record completed by parents and teachers. For the purpose of this study only morning snacks consumed at school was considered.

Results: Compared to NW, OW/OB children had higher intake of total fat, monounsaturated fatty acids, polyunsaturated fatty acids (PUFA), cholesterol, potassium, sodium and fluoride at morning snacks ($P < 0.05$, for all). Mean percentage of energy from morning snacks to total energy intake was $12.8 \pm 5.6\%$ and $13.2 \pm 4.7\%$ ($P=0.488$) for NW and OW/OB, respectively. Concerning the percentage of nutrients from morning snacks to the total daily dietary intake, OW/OB children had higher contribution of total fat, PUFA and cholesterol than their lean counterparts ($P < 0.05$, for all).

Conclusion: In our sample, OW/OB children seem to have morning snacks higher in fat than NW children. Further studies are needed to examine the role of the nutritional value of snacks in the development of obesity.

T2:PO.091

Do patients attending the Rotherham Institute for Obesity gain weight over the Christmas period?

Caroline Steele, Matthew Capehorn

Rotherham Institute for Obesity

Introduction: The Rotherham Institute for Obesity (RIO) is specialist centre for weight management, with a multi-disciplinary team approach, based in a primary care setting. This study set out to look at whether

patients continued to lose weight during the Christmas period or gained weight.

Methods: A retrospective analysis of adult data was performed, to identify those patients who had completed 3 continuous months of attendance at RIO beginning between Oct-Dec 2012. Data was analysed, by month, for the period Nov-Feb in order to establish whether there was any significant variation over the Christmas period.

Results: 132 patients started the 6m RIO programme between Oct-Dec 2012 and had completed 3 continuous months of attendance thereafter.

Of these patients, the average weight loss per month was:

Nov 1.36kg; Dec 0.99kg; Jan 0.45kg; Feb 1.24kg, with wide ranges for each month.

Measurements recorded during January 2013 demonstrated the worst results with 76 patients having lost weight, but 54 patients having gained weight.

Analysis of those patients who gained weight over the 3m period actually showed the monthly weight gain was on average less during the Christmas period than during the other months.

Conclusion: This study suggests that on average patients attending RIO still manage to maintain weight loss during the Christmas period. However, on average weight loss is reduced, and nearly as many patients gained weight during this period as those who lost weight.

T2:PO.092

Consumption of almonds as a snack moderates appetite and glycemia without increasing energy intake

Richard Mattes, Sze Tan

Purdue University

Introduction: Acknowledging that increased eating frequency is a lifestyle choice many adopt and may promote weight gain, it is important to identify snack foods that elicit strong energy compensation. Additionally, snacks are often high in sugar and have been implicated in undesirable changes in glycemia. Almonds hold high satiety properties, do not promote weight gain when consumed in moderation and blunt post-prandial glycemia. This study examined the effects of almonds on appetitive sensations, energy compensation and glycemia when consumed with meals or alone as a snack.

Methods: A four-week randomized, parallel-arm study was conducted with 137 (48m and 89f) adults at elevated risk for diabetes. Participants consumed almonds (43g/d, ~250kcal) with breakfast or lunch, alone as a morning or afternoon snack, or no almonds. An oral glucose tolerance test and acute feeding trial were conducted at baseline followed by almond consumption for four weeks at the designated times. An OGTT and acute feeding trial were conducted at the end of the study. Anthropometric, biochemical, and appetite responses were monitored throughout the study.

Results: Almond consumption led to precise energy compensation so body weight did not change between groups. Reduced hunger and enhanced satiety sensations were noted especially when almonds were consumed as snacks. Glycemia was significantly lower with almond consumption, particularly when consumed as a snack.

Conclusion: These data suggest the inclusion of 43g of almonds in the daily diet as a snack is associated with moderations of appetite and glycemia as well as no change of energy intake.

T2:PO.093

Healthy eating has beneficial effects on subjective wellbeing in overweight women: Increasing fibre intake confers additional benefits

Kyriaki Myrissa, Fiona Croden, Diana Camidge, Arief Gusnanto, Jenny Walton, Alexa Hoyland, Louise Dye, Clare Lawton

University of Leeds

Introduction: The role of dietary fibre on subjective wellbeing is equivocal. This study assessed the relative effects of two 12 week dietary in-

terventions; general healthy eating alone (HE) and general healthy eating plus advice to increase fibre intake (HE+F) to at least 25g/day (mainly derived from cereal or wheatbran), on physical and psychological wellbeing in overweight women.

Methods: Overweight low fibre consuming (<15g/day) premenopausal women (n = 71) were randomised to HE or HE+F. At baseline and during the intervention women completed a daily symptom checklist, comprised of physical and psychological wellbeing symptoms; subjective ratings of feeling slim, feeling fat, feeling happy, stress, difficulty concentrating, mental alertness, mental tiredness, physical tiredness, feeling energetic, breast tenderness, constipation, wind, indigestion, bowel pain, bloating and headaches. All were scored on a five point Likert scale from 0 (none) to 4 (extreme).

Results: Women following HE+F significantly increased their fibre intake up to 25g/day whereas those following HE did not. Both groups lost similar significant amounts of body weight (average 0.91 kg, SE 0.28). Multiple ordinal logistic regressions showed that wellbeing symptoms improved significantly, irrespective of diet. However, those following HE+F felt significantly less fat, less bowel pain and less indigestion than those following HE. They also felt slimmer than those on HE after 4–5 weeks of the intervention

Conclusion: Both diets promoted significant physical and psychological benefits. Adding fibre to a healthy eating diet provides additional health benefits and offers an acceptable strategy to better manage body weight and improve physical and psychological wellbeing.

T2:PO.094

Evidence of gut microbial species differential colonization under a model of high-fat sucrose dietary intake: A high-throughput approach by 16S rDNA pyrosequencing

Usune Etxeberria¹, Noemi Arias², Maria Teresa Macarulla³, Maria Puy Portillo³, J Alfredo Martinez⁴, Fermin I Milagro⁴

¹Department of Nutrition, Food Science and Physiology, University of Navarra, Pamplona, Spain

²Nutrition and Obesity group, Department of Nutrition and Food Sciences, Faculty of Pharmacy, University of the Basque Country (UPV/EHU), Vitoria, Spain

³Nutrition and Obesity group, Department of Nutrition and Food Sciences, Faculty of Pharmacy, University of the Basque Country (UPV/EHU), Vitoria, Spain

⁴Department of Nutrition, Food Science and Physiology, University of Navarra, Pamplona, Spain

Introduction: Gut microbiota (GM) is recognized as the bacterial community that colonizes the gastrointestinal tract (GI). These commensal microbes perform essential metabolic functions for the host, while modifications on the composition of microbial population are known to influence the susceptibility to several diseases such as obesity. Westernized diets, rich in fat and sucrose macronutrients, could produce gut microbiota dysbiosis resulting in growth or inhibition of both pathogenic or beneficial bacterial species. The aim of the present study was to characterize gut microbial changes produced as a consequence of feeding rats with a diet rich in fat and sucrose (HFS).

Methods: Comparison of the faecal microbiota composition at baseline and after a 6-week HFS intervention was performed. DNA extracted from rat faeces was analysed by the amplification of the V4-V6 region of the 16S rDNA (ribosomal DNA) gene flanked on each end with the Roche multiplex identifiers by 454 pyrosequencing.

Results: HFS diet feeding not only produced an increase in animal weight and adiposity-related markers, but also displayed statistically significant differences in gut microbiota composition. At phylum level, *Firmicutes*, *Bacteroidetes* and *Proteobacteria*, were markedly affected and an important “bloom” in *Erysipelotrichi* class was found at the end of the dietary intervention. Species from *Veillonellaceae*, *Prevotellaceae* and *Clostridiaceae* families were the most influenced after the HFS diet consumption.

Conclusion: This study illustrates the potential of culture-independent methods to characterize and more precisely identify members of the gut microbiota as influenced by diets enriched in fat and sucrose involving acquired overweight.

T2:PO.095

Effect of Weight loss due to Mediterranean Style Diet in Patients with Acute Coronary Syndromes

Singh Singh¹, Teodora Darlenska², Svetoslav Handjiev³, Krasimira Hristova⁴

¹Halberg Hospital and Research Institute

²Department of Pharmacology, Medical University in Sofia

³BASORD

⁴National University Heart Hospital, Sofia, Bulgaria

Introduction: Obesity increases the mortality due to acute coronary syndromes (ACSs). This study examined that weight reduction with Mediterranean foods may be protective.

Methods: A randomized, single blind, controlled trial was carried out on 406 patients with ACS diagnosed by WHO criteria. Intervention group received low energy Mediterranean diet and control group; fat modified according to the NCEP Step 1 diet. Main outcome measures were compliance with diets and weight loss at one year and all cause mortality after two years.

Results: The experimental group received significantly greater amount of Mediterranean foods and lower amount of Western foods compared to control group at one year of follow up. Total adherence score to Mediterranean style diet and prudent diet were significant in both the groups resulting in to greater weight loss in the intervention compared to control group. Total mortality was 14.7% in the intervention group and 25.2% in the control group ($P < 0.01$), after two years. The association of weight loss with mortality showed a gradient in both the groups independently. A greater weight loss from 1–10 Kg was associated with a significantly lower mortality.

Conclusion: A low energy Mediterranean style diet is effective in causing decline in body weight, leading to lower cardiovascular and all cause mortality compared to prudent diet in the secondary prevention of ACS.

T2:PO.096

Flos Lonicera Ameliorates Obesity and associated Endotoxemia in Rats through Modulation of Gut Permeability and Intestinal Microbiota

Hojun Kim¹, Jun-hwan Lee², et al.

¹Dongguk Univ

²Korea Institute of Oriental Medicine

Introduction: Increasing evidence has indicated a close association of host-gut flora metabolic interaction with obesity. The aim of this study was to evaluate whether *Flos Lonicera* could exert a beneficial impact to combat obesity and related metabolic endotoxemia.

Methods: Obesity and metabolic endotoxemia were induced separately or together in rats through feeding a eight-week high fat diet either alone or in combination with a single LPS stimulation. While, the mechanism of action of the *Lonicera* formulations was explored *in vitro* using RAW 264.7 and HCT 116 cell lines

Results: In cell-based studies, treatment with both unfermented and fermented *Flos Lonicera* formulations resulted in suppression of LPS-induced NO production and gene expression of vital proinflammatory cytokines (TNF- α , COX-2, and IL-6) in RAW 264.7 cells, reduced the gene expression of zonula occludens-1 and claudin-1, and normalized trans epithelial electric resistance and horseradish peroxidase flux in HCT-116 cells. In an animal study, treatment of HFD as well as HFD + LPS groups with UFL or FFL resulted in a notable decrease in body and adipose tissue weights, ameliorated total cholesterol, HDL, triglyceride, aspartate transaminase and endotoxin levels in serum, reduced the urinary lactulose/

mannitol ratio, and markedly alleviated lipid accumulation in liver. In addition, exposure of HFD as well as HFD + LPS groups with UFL or FFL resulted in significant alteration of the distribution of intestinal flora, especially affecting the population of *Akkermansia* spp. and ratio of Bacteroidetes and Firmicutes.

Conclusion: This evidence collectively demonstrates that *Flos Lonicera* ameliorates obesity and related metabolic endotoxemia via regulating distribution of gut flora and gut permeability

T2:PO.097

Assessment of the Food Guidelines for Lunch Packs among Mexican Elementary School Children

Glenda Diaz-Ramirez, Montserrat Bacardi-Gascon, Roberto Espinoza-Gutierrez, GLP Lopez-Barron, A Jimenez-Cruz
Universidad Autonoma de Baja California, Mexico

Introduction: The Mexican guidelines for lunch packs (LP) recommend 263 to 290 kcal, plain water, fresh fruit and vegetables, and a prepared food (sandwich). The aim of this study was to assess the content of LP of second and sixth grade elementary school children.

Methods: Four public schools from a low income district were selected. The food content of LP was assessed during three non-consecutive days using a previously validated check list. The caloric and macronutrient composition of the foods included in the LP was calculated with the Nutritionist Pro v 5.2 and from the food nutrition label.

Results: Nine hundred and seventy three children (53% girls) attending the days of the assessment participated in the study. Seventeen and twenty-nine percent of 2nd and 6th graders respectively did not bring LP, and 35% and 17% of them brought LP the three assessed days ($p = 0.0001$). The mean caloric content of the lunch packs was 296 (range 27–1064) and 273 kcal (47–812) in 2nd and 6th graders respectively ($p = 0.036$). Fifty six percent of the children had LP that met the recommendation of having less or equal to 290 kcal per pack. Sixty seven percent of the children did not have fruits nor did vegetables, 47% have no water. Twenty three per cent had both plain water and a fruit or vegetable in their LP.

Conclusion: Most LP did not meet the food guidelines for LP. Forty four percent of the children had more than 290kcal per pack, and only 23% had LP containing water, fruit and vegetables.

T2:PO.98

Feeding-related overt and covert control practices among parents of preschoolers in Sweden – a validation study of the Overt and Covert Control Questionnaire

Paulina Nowicka¹, Derek Hales², Carl-Erik Flodmark³, Myles Faith²

¹Division of Pediatrics, CLINTEC, Karolinska Institute, Stockholm, Sweden

²Department of Nutrition, Gillings School of Global Public Health, University of North Carolina – Chapel Hill, USA

³Childhood Obesity Unit, Childhood Centre Malmö, Skåne University Hospital, Malmö, Sweden

Introduction: Overt and covert control (OCC) (Odgen, 2006) were introduced as novel constructs representing two different parental feeding practices with regard to the child's ability to detect them. In this study, we report the first validation of the original OCC questionnaire outside the UK in a large sample of parents of preschoolers.

Methods: Based on records from the population register, all mothers of 4-year-olds ($n = 3\ 007$) from the third largest city in Sweden, Malmö, were contacted by mail. Out of those 869 who returned the translated OCC questionnaire together with a background questionnaire and the Child Feeding Questionnaire (CFQ), 563 mothers responded again, in a short time frame, enabling test-retest evaluation. Responders resembled the Malmö population with regard to education (60% > 12 years of school), BMI (31% with BMI > 25), and country of origin (30% born

abroad). The children were on average 4.5 years old; 48% were girls, 12.8% were overweight/obese.

Results: The fit for the original 9-item model (4 overt and 5 covert items) was poor. After dropping 3 items, confirmatory factor analysis supported the new, short version (CFI= 0.977, TLI =0.957, RMSEA=0.047, SRMR= 0.027). Reliability evidence was strong for single administration of each scale; the associations with the CFQ were moderate and in expected directions.

Conclusion: This study demonstrates strong psychometric properties of a short version of the OCC questionnaire in a multiethnic sample from Northern Europe. Future studies are needed to establish causal associations between OCC and the obesity related outcomes.

T2:PO.99

Socioeconomic determinants of dietary patterns in low and middle income countries: A systematic review

Ana-Lucia Mayen-Chacon, Pedro Marques-Vidal, Silvia Stringhini
Institute of Social and Preventive Medicine (IUMSP)

Introduction: Socioeconomic status (SES) is related with a healthier diet in high income countries, but whether the same pattern occurs in low and middle income countries (LMICs) is a matter of debate.

Objective: Systematic review to assess the relationship between SES and dietary intake in LMICs.

Methods: Pubmed, Scielo, Google scholar, and reference lists were searched. Population based studies carried out in LMICs, with cohort or cross-sectional design and including adults were included. Positive/negative associations between SES or urban/rural condition and dietary intake were assessed.

Results: 34 studies from 16 LMIC conducted between 1989 and 2010 were included. Most studies were conducted in Brasil (8), China (5), and Iran (5). Low SES was significantly associated with lower intake of: calories, protein, total fat, cholesterol, PUFA, SFA, MUFA, Vitamins A and C, iron, fruit and/or vegetables. It was also significantly associated with lower diet quality, diet diversity, unhealthier diet, lower carbohydrate and fiber intake. Rural location was significantly associated with lower intake of energy, protein, total fat, PUFA, MUFA, Vitamins A and C, fruit and/or vegetables, and higher diversity. It was also significantly associated with increased fiber and carbohydrate intake.

Conclusion: Our findings suggest a lower intake of protein, fat, fruits/vegetables, an unhealthier diet and lower diet diversity by the high SES/geolocation group. However, a higher intake of carbohydrates was observed. Such findings stress the need to focus on the prevention of NCDs in LMICs.

T2:PO.100

Circadian energy intake of the Portuguese

Silvia Pinhão¹, Rui Poínhos², Cláudia Afonso³, Pedro Moreira³, Vítor Hugo Teixeira³, Catarina Durão⁴, Olivia Pinho³, Diana Silva⁵, José Pedro Lima Reis⁴, Manuel Teixeira Veríssimo⁴, Bruno Oliveira⁶, Sandra Gonçalves⁷, Diva Melim⁸, Maria Daniel Vaz de Almeida³, Flora Correia⁹

¹FCNAUP, Centro Hospitalar São João, EPE Porto

²FCNAUP

³FCNAUP, SPCNA

⁴SPCNA

⁵FCNAUP, Centro Hospitalar São João, EPE Porto, SPCNA

⁶FCNAUP, LIAAD – INESC Tec, Porto, Portugal ;

⁷Nutritionist Intern

⁸Nutritionist Intern

⁹FCNAUP; SPCNA; Centro Hospitalar São João – Porto-EPE; Unidade de investigação em Nefrologia FMUP.

Introduction: Meal patterns are of extremely importance when comprehensively describing dietary habits in a population.

Methods: We aim to describe number of meals, most frequent meals and daily energy distribution along the day, in a representative sample of Portuguese adults by sex, age, BMI, waist circumference (Wc); and correlate all variables with number of meals and total daily energy intake. Trained interviewers interviewed the representative sample of 3047 adults, face-to-face at home with a questionnaire designed for the study “Portuguese Population’s Food Habits and Lifestyles” (led by SPCNA). Dietary intake was estimated by a single 24h-recall, converted into nutrients with Food Processor[®].

Results: Portuguese made 4.8 meals daily, women do more meals than men, number of meals decreases significantly with increasing age. Most common meals are lunch and dinner, less frequent is supper. 53% of men fail mid-morning-snack and 28% the mid-afternoon-snack. Younger Portuguese fail breakfast and older fail supper, more frequently. The total energy value (TEV) is spread by: 16.7% breakfast, 8.4% mid-morning-snack, 34.9% lunch, 14.5% mid-afternoon-snack 14.5%, 30.7% dinner, 8.3% supper. The contribution of lunch for men is higher than for women (36.7 vs 33.3%) and women have higher intake of energy at breakfast than men (15.6 vs 17.7%). Total number of daily meals is positively correlated with the TEV, and negatively with BMI and Wc. BMI and Wc have higher correlation with lunch contribution to TEV in men and with breakfast to women.

Conclusion: Attention to meal patterns is important for health promotion and preventive programs, for a variety of reasons.

T2:PO.101

Diet Composition and diet habits in different BMI and age groups

Martin Matoulek¹, Stepan Svacina¹, Aneta Lochmanova¹, Jan Lajka², Lucie Zackova²

¹3rd Medical Department, 1st Medical Faculty, Charles University, Prague, Czech Republic

²STEMMARK Agency Prague

Introduction: It is assumed that obese people consume fat and less fibre. We tried to confirm this statement and also to test the hypothesis that dietary pattern differs in different age groups.

Methods: A survey was performed in standardized random sample of population – 2058 subjects. Reported were 8 categories of food (cereal products, potatoes meat, proceeded meat, very fat meals, fruit, vegetables, milk products, sweets), in 4 frequency categories(almost daily, several times per week, several times per months, once per months or less), in 4 BMI categories (underweight, normal weight, overweight, obesity)and in 4 age categories (18–29 years, 30–49, 50–64, 55 and more) . Chi-Square test was used to test the influence BMI and age on diet pattern (p<= 0.05)

Results: Significant influence of BMI categories was found in meat intake 92% weekly consumption in lean and normal weight to 98% in obesity, in proceeded meat 31% to 65%, fat meals 42 to 72%, inverse relationship in vegetables 77% to 60% and in fruit 62% to 28%. No significant difference in cereal, milk and sweet products intake was found. Analysis of age categories found less significant results. Younger people eat more sweet, proceeded meat, fat meals, older people less fruit, vegetables, milk products and meat.

Conclusion: The BMI categories differ more in food consumption than age categories. Eating fat meals, proceeded meat and less fruit and vegetables is an important factor in relation to BMI. Most significant difference in the age is in proceeded meat consumption (high in younger age). This could be an important factor moving diabetes to younger age categories.

T2:PO.102

Risk assessment of nutritional and anthropometric imbalance of women in reproductive age in Bulgaria

Donka Baykova¹, Dimiter Markov¹, Peter Markov²

¹Faculty of Public Health, Medical University, Sofia

²Medical Faculty, Medical University, Sofia

Introduction: Imbalanced nutrition is a well-known health risk factor for inadequate body mass control and reproductive failure in young women. The aim of the study is to assess the health risks related to imbalanced nutritional pattern, food consumption and altered anthropometric status of young women (aged 19–30 years) in Bulgaria.

Methods: The “24 hour recall of food consumption” method for data collection and the Body Mass Index (kg/m²) as indicator for assessment were used. Overall 329 young women participated in the study. Prevalence of underweight women was 17.3%, of normal weight – 59.8%, of overweight – 22.8%.

Results: There was an inadequate daily intake of animal protein, complex carbohydrates, food energy, calcium, iron, vitamins B-group, vitamin C and fibres in the study population. Mean daily intake of fat was high (37% from total food energy, vs. up to 30% in recommendations). The predominating food consumed was white bread, pastry, fat meat products (sausages) and sweets. Consumption of milk and milk products, vegetables, fruits fish was insufficient.

Conclusion: The nutritional pattern of women aged 19–30 years in Bulgaria is imbalanced. Consequently, there are increased health risks for the immune system, folic acid and iron supplementation, lipid status metabolism, bone density, anthropometric parameters, reproductive system and pregnancy complications. Optimization of nutritional pattern in young women in Bulgaria, as well as a specific problem-oriented national government policy is required.

T2:PO.103

Dietitians and nutritionists play a key role in weight management globally

Kappelhof, Meyer

Eat Well Global, Inc.

Introduction: Dietitians and nutritionists around the world work to improve the health and nutritional status of their clients and often address weight management issues. Differences between countries and cultures exist in how they make recommendations, use information, and influence their clients and communities. Understanding these differences and the role dietitians and nutritionists play on a local level may help governments, health organizations and food and nutrition companies reach people more effectively.

Methods: A comprehensive e-mail survey was fielded with 63 dietitians and nutritionists from 14 countries to begin understanding their views on the role and influence of the profession and their perspectives on local nutrition concerns, preferences and recommendations.

Results: Weight management and obesity-related health issues were identified as the primary topics on which dietitians and nutritionists most often counsel clients. Although their overall health and nutrition recommendations are similar worldwide, dietitians and nutritionists differ in their approaches and specific advice to achieve optimal cultural and individual relevance.

Conclusion: Dietitians and nutritionists play a crucial role in translating guidelines and recommendations from governments and health organizations into concrete actions that are relevant and feasible to populations and individuals. As the profession continues to evolve worldwide, dietitians and nutritionists may be a growing health influencer group and should be considered an essential tool in addressing obesity globally.

T2:PO.104

The effect of increased protein intake on body composition in weight reduction program

Halmy Eszter, Halmy László

Platon Health Advising and Services Ltd.

Introduction: Aim: To study the change of body composition in caloric restricted obese patients supplied with increased protein intake in order to evaluate whether is the program suitable for body fat reduction without significant muscle mass reduction or not.

Material and methods: In obese persons (n:22, mean age: 42.8y, BMI: 40.9 kg/m², duration: 21 week) body composition was determined bi-weekly by InBody 720, measured the waist (WC) and hip (HC) circumferences, systolic (SBP) diastolic (DBP) blood pressure and heart rate (HR). The caloric intake was 1500–1800 kcal/day by two meals with special formula diet. The fluid intake was 2000–2500 ml/day.

Results: Body-weight kg 122.5(SD:31.5) – 108.5(29.6) p < 0.001, –11.1%, body fat mass kg 55.7(22.0) – 44.2(20.0) p < 0.001 –20.4%, body fat percent 44.4(8.56) – 39.5(8.78) p < 0.001, visceral fat area cm² 195.3(68.6) – 167.4(58.5) p = 0.0029, body muscle mass kg 37.4(8.4) – 35.9(8.2) p = 0.002 –3.8%, WC cm 121.7(20.7) – 110.8(19.5) p < 0.001 and HC cm 132.5(20.4) – 123.1(19.0) p < 0.001 decreased. SBP Hgmm 148.5(22.4) – 127.2(11.8) p < 0.001, DBP Hgmm 93.0(14.2) – 82.2(7.9) p = 0.001 blood pressure values normalized, HR/min 82.7(14.4) – 79.4(10.1) N.S. did not changed.

Conclusion: The caloric restricted and increased protein intake in weight reduction program was effective on decrease of body weight, body fat mass, body fat percent, visceral fat area, waist and hip circumferences but there was not biologically significant change in body muscle mass.

T2:PO.105

Food behavior and eating habits in school children

Fouzia Tebbani¹, Hayet Oulamara², et al.

¹Institute of nutrition, food and food technologies, Constantine ¹University, Algeria

²Institute of nutrition, food and food technologies, Constantine ¹University, Algeria

Introduction: Estimate the prevalence of overweight and obesity in our study population.

Assess the nutritional status of children by studying their food behavior and eating habits.

Methods: A study was conducted on a sample of 340 children (153 girls and 187 boys) aged 6 to 12 years old, enrolled in the commune of Constantine in 2011. Data included anthropometric measurements, dietary habits and socioeconomic status. The IOTF criteria were used to assess overweight and obesity. Statistics were performed using the software StatviewTM. The significance level was set at 0.05.

Results: The overall prevalence of overweight is 21.76%. That of obesity is 5%. A significant association was observed between obesity and female gender (p = 0.007). Overweight and obesity are more common in families of low socio-economic level (51.35%, 52.94%) compared to the average (12.16%, 23.53%) and the high level (33.78%, 17.65%). Most obese children do not have breakfast compared to children of normal weight (23.53% vs 11.65%, p < 0.0001). They are more likely to take their lunch twice a day (64.70% vs 59.84%, p < 0.05). Dinner is consumed by 97% of children at home. A percentage of 30.52% of normal weight children, 27.03% overweight and 29.41% obese children eat their meals in front of the television. Carbonated soft drinks are taken by 15.59% of children more than five times a week.

Conclusion: Our study reveals the existence of behaviors associated with an increased risk of overweight and obesity, including unhealthy eating habits and low socioeconomic status.

T2:PO.106

Estimation of the contribution of beverages to energy intake in Greece using 7 day diaries

Aleks Pepa¹, Olga Malisova¹, Ekavi Georgousopoulou², Maria Kapsokefalou¹, et al.

¹Department of Food Science and Human Nutrition Unit of Human Nutrition Agricultural University of Athens

²Department of Science of Dietetics-Nutrition Harokopio University

Introduction: The contribution of beverages, particularly of sugar sweetened beverages, has been the subject of debate in recent years. Our objective was to evaluate the contribution of beverages to energy intake in a sample of the general population in Greece.

Methods: Men (n = 19) and women (n = 40) aged 20–65 y were recruited to the study in summer 2013. Anthropometric data were measured at first visit. The volunteers recorded detailed information on their food and beverage intake for 7 consecutive days in food diaries. Data were entered in Diet Analysis software and analysed with SPSS.

Results: Mean energy intake from all dietary sources was 1822.24 ± 674.25 Kcal/day and 1750.17 ± 480.04 kcal/day in men and in women, respectively (P>0.05). Mean energy intake from beverages was 199.49 ± 119.25 kcal/day and 218.51 ± 125.78 kcal/day in men and in women, respectively (P>0.05). Coffee, coffee drinks, milk, chocolate milk and alcoholic beverages contributed approximately 80% of energy from beverages. Sugar-sweetened beverages, including soft drinks and fruit juice based beverages, as well as fruit juice were consumed less frequently contributing approximately 20% of beverage energy intake.

Conclusion: Beverages contribute approximately 10% of total energy intake depending on the energy content of the beverage and the frequency of consumption. Coffee, dairy and alcoholic beverages were the main energy contributors.

T2:PO.107

Evaluation of dietary habits of medical students regarding obesity

Maja Nikolić¹, Aleksandra Stanković², Bojana Vuković Mirković³

¹Faculty of medicine University of Niš Department of Social medicine and hygiene with medical ecology. Faculty of medicine University of Nis Bul. dr Zorana Djindjica 18000 Nis

²Faculty of medicine University of Niš

³Faculty of medicine Universitz of Niš

Introduction: In the past year Serbia has been experiencing a nutritional transition in food choices from the traditional diet to the fast food pattern. As a consequence, overweight and obesity are increasingly being observed among the young. The purpose of the study was to investigate the dietary habits of students and to identify factors that may contribute to the development of obesity.

Methods: A cross-sectional survey of 269 students (33.6% male and 66.4% female), aged 22.2 ± 0.76 years, were chosen randomly from the School of medicine University of Nis, Serbia during the fall 2012 semester. Students were asked to fill out a self-reported 24-hour dietary recall. Also, their weight, height, and body mass index were determined. Statistical analyses were performed using the program Microsoft Office Excel.

Results: In the present study, obese students accounted for only 4.5% in our sample. Frequent consumptions of alcoholic drinks, sweet beverages, dairy products, and eggs were associated with a significantly higher risk of obesity/overweight, whereas frequent consumption of fruits and integral cereals were associated with a low risk. Irregular food intake and skipping breakfast were more significant factor for the development of obesity than intake of junk foods among students.

Conclusion: Even the prevalence of obesity was not high among the Serbian medical students, promotion of healthy food consumption, with abundant fibres, whole grains, low-fat dairy products, and low energy-dense foods is needed.

T2:PO.108

Antioxidants in the traditional nutrition of the Balkan countries – the Balkan diet

Svetoslav Handjiev¹, Aneliya Kuzeva², Kaloyan Takov³, Tea Alexandrova², Teodora Handjieva-Darlenska⁴

¹BASORD, Medical University – Sofia Prof. Svetoslav Handjiev, MD, PhD President of Bulgarian Association for the Study of Obesity and Related Diseases (BASORD)

²AMSB-Sofia, Medical University-Sofia

³University of Edinburgh, UK

⁴BASORD, Medical University-Sofia

Introduction: Our recent studies have shown that the traditional Balkan cooking from the end of the 19th century and the first half of the 20th century is similar to the Mediterranean diet. The nutritional habits in all of the Balkan countries are stressing on the exclusive closeness. This fact is giving the right to define the Balkan healthy food or the Balkan diet. The traditional nutrition in the Balkan counties is responding to many of the major aspects of healthy food. From the nutritional prevention point of view, the results, related to the risks of developing a disease and their connection to the dietetic models, seem to be promising. The traditional Balkan nutrition is rich on antioxidants. The Balkan healthy food contains the highly active antioxidants resveratrole and pycnogenol. The diet is rich on alpha-tocophenol, ascorbic acid, beta-carotene, selenium, biflavonoids, and many other biologically active substances.

Methods: Review of the BASORD studies on the Balkan diet in the last 10 years.

Results: Conclusion: Discussion and conclusions: The traditional for the Balkan cuisine meals are distinguished with various and rich content on biologically active components. Besides the Bulgarian yoghurt and the typical source kinds of cheese, here belong the traditional vegetables – a rich source of various flavonoids and carotenoids. The specific character of the culinary treatment preserves the biological activity of the contents. With its rich content of healthy ingredients the Balkan diet is a circumstance for developing of various preventive and curative regimens.

TRACK 3 – Childhood and Lifelong Perspectives

T3 – Guided Posters

T3:PO.001

Age, period and cohort effects in anthropometric development of youth in Singapore from 1990 to 2011: The Singapore Longitudinal and Life Course Cohort (SLLCC)

Xuanhao Chan

London school of hygiene and tropical medicine

Introduction: The Singapore Longitudinal and Life Course Cohort (SLLCC) consists of an individual-level linked dataset of repeatedly measured anthropometric data, from about 2.7 million students, collected through routine school-based health screening programs in Singapore from 1990 to 2011.

Methods: Three basic approaches were used to evaluate age, period and cohort effects on BMI z-scores of the subjects. Cross-sectional: weight status classification of students in 2-year age groups was compared in each year. Time series: mean percentage obesity, overweight, normal weight, Grade 1, 2 and 3 Thinness at each age was compared across selected periods. Longitudinal: mean percentage weight classifications within different birth cohorts were followed over time.

Results: At baseline (1997), 11.6% of students aged 6 to 18 were classified as overweight using sex-specific BMI-for-age cut-offs (WHO child growth standards). 4.2% were considered obese. After 14 years of follow-up, the prevalence of overweight and obesity were increased to 15.9% and 6.7% respectively. Prevalence of overweight and obesity across all ages increased from older to more recent periods. Youth born in later cohorts (2003) were presumed to have successively higher body weights than earlier-born cohorts based on the trends observed in cohort-stratified age trends of percentage obesity and overweight rates.

Conclusion: Previous findings based on cross sectional surveys underestimate the increase in BMI with ageing without considering period and cohort effects. Prevention of weight gain should adopt a population-wide, life-course approach.

T3:PO.002

Breast-Feeding and Adult Body Fat: The Missing Confounding Factor

Sandrine Péneau, Valentina Andreeva, Serge Herberg, Marie-Françoise Rolland-Cachera

Université Paris 13, Sorbonne Paris Cité, Equipe de Recherche en Epidémiologie Nutritionnelle, Centre de Recherche en Epidémiologies et Biostatistiques (EPIBIOS), Inserm (U1153), Inra, Cnam, Université Paris 5, Université Paris 7, F-93017 Bobigny, France

Introduction: There are conflicting results about the protective effect of breast-feeding on obesity. This may be due to yet unaccounted factors such as early nutritional intakes. We aimed at examining the association between breast-feeding and adult body fatness, adjusting for nutritional intakes in early childhood.

Methods: Nutritional intakes of 73 healthy infants, participating in the two-decade-long ELANCE study were estimated at the ages of 10 months and 2 years. At 20 years, weight, height, subscapular skinfold (SF) and fat mass assessed via bioelectrical impedance analysis were measured.

Results: 64% of the children had been breast-fed. In linear regression models, adjusted for mother's body mass index and father's profession, breast-feeding was not associated with any of the body fat measurements at 20 years (all $P > 0.05$). After adding nutritional intake variables to the models (total energy and % energy from nutrients), breast-feeding became significantly associated with lower SF thickness at 20 years. In particular, breast-fed subjects had significantly lower %SF at 20 years after adjustment for energy and % fat intakes at 2 years, ($\beta = -28.25\%$ SF, 95% CI = -50.28 to -6.21 , $P = 0.013$) or when adjusting for energy and % carbohydrates at 2 years (-28.27% SF, -50.64 to -5.90 , $P = 0.014$).

Conclusion: Breast-feeding was not associated with adult body fatness taking into account the usual confounding factors. However, after additionally adjusting for nutritional intake covariates, a protective effect of breast-feeding emerged. Early nutrition needs to be taken into account when examining the long-term health effects of breast-feeding.

T3:PO.003

Why do families drop out of obesity treatment programmes? Programme factors may be more important than family factors

Shaza Abo'ouf Hammed¹, Charlotte Wright¹, David Morrison¹, Anne Gebbie-Diben²

¹Glasgow University

²NHS Greater Glasgow & Clyde

Introduction: The effectiveness of treatment in childhood obesity remains limited by low recruitment and high rates of attrition. We studied a new community based weight management programme to prospectively examine factors that predicted family engagement and retention in the programme.

Methods: We surveyed families participating in a 12-week family-based, multidisciplinary cognitive-behavioral group weight management inter-

vention for children aged 5 to 15, including healthy eating and physical activity lifestyle change, set up in 2009–10. Data was collected using all families joining the programme between 2010 – 2013. Respondents were classified as non-completers if attendance was less than 7wks.

Results: Baseline characteristics and attendance date were collected for 486 families and 275 of these families completed exit questionnaire. The mean age at baseline was 10.85 ± 2.7 and 158 (57.9%) were female. Body Mass Index (BMI) z score at baseline was 2.86 (SD 0.66) and 107 (39.3%) were from the most deprived socio-economic background.

Gender, BMI and socioeconomic status did not significantly predict programme completion. Study period, parents and child satisfaction and perceived barriers were significantly associated with attendance. The adjusted odds of participants completing the programme in 2013 were 10 times higher (OR=10.4, CI 3.9 – 28.2) than in 2010. Parent and child perceived barriers (rated at exit) were also associated with completion (OR=0.20, 0.09 – 0.42) and (OR=0.05, 0.02 – 0.16).

Conclusion: Retention and satisfaction increased markedly over time and this effect was a much stronger predictor than any child or family characteristic. This suggests that family engagement can be increased by improving programme delivery.

T3:PO.004

Preliminary results from the ADONUT study: Weight status of Greek adolescent boys

Maria Grammatikopoulou¹, Dimitrios Poulimeneas², Iro Gounitsioti², Konstantina Gerothanasi², Maria Tsigga², Efstratios Kiranas²

¹Department of Nutrition & Dietetics, Alexander Technological Educational Institute

²Alexander Technological Educational Institute

Introduction: ADONUT was a national study assessing weight status and nutritional intake in Greek adolescents. The present study presents the preliminary results, concerning adolescent boys weight status in order to stress the differences compared to previous national studies.

Methods: The study included a representative sample of 18761 adolescent boys aged 12–19 years old, recruited from schools throughout Greece, during the years 2010–12. Body weight (BW) and stature were recorded and Body Mass Index (BMI) was calculated for each participant. Weight status was assessed with the BMI cutoffs suggested by the IOTF (Cole et al., 2000; Cole et al., 2007).

Results: The majority of the participants were of normal BW (59.8%), 3.6% were underweight, 27.8% were overweight and the remaining 8.8% were obese. The highest prevalence of obesity was recorded among 13 year old boys (10.8%) and the highest prevalence of overweight at the 12 years of age (33.8%). Entrance in adulthood was characterized with the highest prevalence of normal BW (62.9%).

Conclusion: Approximately 36.6% of Greek adolescent boys appear to be overweight/obese. This prevalence is higher compared to the previous National Study (Tzotzas et al., 2008), posing an alert for adolescent weight control and intervention to address overweight.

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T3:PO.005

Glucose homeostasis and insulin resistance: prevalence and gender differences in Czech adolescents

Hana Zamrazilova, Irena Alhoon Hainerova, Lenka Dusatkova, Barbora Sedlackova, Petr Hlavaty, Marie Kunesova, Richard Hampl, Vojtech Hainer

Institute of Endocrinology, Prague

Introduction: Adolescence, due to the transient pubertal insulin resistance (IR), is associated with a higher risk for disturbances of glucose metabolism. The homeostasis model assessment of insulin resistance (HOMA-IR) is simple method to measure IR. The aim our study was 1) to investigate the prevalence of disturbances of glucose metabolism, and 2) to define gender specific HOMA-IR thresholds associated with increased cardiometabolic risks.

Methods: In 1,518 Czech adolescents of general population, 615 normal weight, 230 overweight and 683 obese adolescents aged 13.0–17.9 years levels of blood glucose, insulin, C-peptide, C-peptide to insulin ratio and HOMA-IR were assessed and gender differences were compared. The prevalence of impaired fasting glucose (IFG) and type 2 diabetes was assessed. Risky HOMA-IR thresholds based on components of metabolic syndrome were investigated

Results: In general population, the prevalence of IFG and type 2 diabetes was 7.0% and <0.5%, respectively. Significantly higher levels of insulin and C-peptide in girls than in boys were demonstrated in general population and normal weight cohorts. Boys regardless of weight presented significantly higher levels of blood glucose and higher prevalence of IFG than girls. Obese boys had significantly higher levels of insulin and HOMA-IR and significantly lower C-peptide to insulin ratio than obese girls. HOMA-IR thresholds of 3.6 for girls and 4.4 for boys were associated with increased cardiometabolic risks.

Conclusion: Obese adolescent boys were at greater risk for IR and for IFG in comparison with obese adolescent girls. The type 2 diabetes even in obese adolescents was rarely diagnosed.

T3:PO.006

Developmental trajectories of body mass index (BMI) from birth to late childhood and their relation with paternal and child nutrients intake

Hala Khalil¹, Celine Murrin², Karien Viljoen², John O'Brien², Ricardo Segurado², Cecily Kelleher²

¹MSc, Doctoral researcher

²School of Public Health, Physiotherapy, and Population Science, University College Dublin, Ireland

Introduction: Children may become overweight through different patterns of BMI growth, referred to as trajectories. The aim of this study was to 1) identify the developmental trajectories of BMI during childhood and 2) identify dietary factors associated with trajectory membership

Methods: The study uses longitudinal data from the Lifeways Cross-Generation Cohort Study. Measurements for 194 children at birth, 5 years, and 9 years of age were used to calculate BMI; birth length and weight were obtained from medical charts, while height and weight at 5 and 9 years were measured. Semiparametric mixture modelling was applied to create BMI trajectories. Dietary data were obtained from food-frequency questionnaire data. Comparisons were made across BMI trajectory groups and parental mean macronutrient intake at pregnancy and year-5 follow-up using ANOVA

Results: Three BMI trajectories were identified in the Lifeways cohort: (A) steady BMI (n = 90; 46%) (B) moderately rising BMI (n = 81; 41.6%) (C) high rising BMI (n = 23; 12.4%). Mothers of children in group (C) had significantly higher intake of fat during pregnancy compared to group (A) and (B) (P = 0.05). At year-5 follow-up, mothers and children in group (B) had significantly higher intake of fat (P = 0.025 and 0.02) and protein (P = 0.012 and 0.006), compared to group (A) and (C)

Conclusion: A rapid rise in BMI during childhood is associated with maternal fat intake during pregnancy. On the other hand, a slower increase in BMI is associated with later dietary habits shared by the family

T3:PO.007

Predictors of insulin resistance in adolescents

Vojtech Hainer, Hana Zamrazilova, Lenka Dusatkova, Barbora Sedlackova, Petr Hlavaty, Martin Hill, Richard Hampl, Marie Kunesova, Irena Aldhoon Hainerova

Institute of Endocrinology, Prague

Introduction: Adolescence is known to be associated with transient insulin resistance (IR). Multiple anthropometric, hormonal and metabolic factors are probably involved in the development of pubertal IR. The aim of our study was to reveal the major predictors of IR in Czech adolescents.

Methods: The cohort included 1,528 Czech adolescents (615 normal weight, 230 overweight, 683 obese) aged 13.0–17.9 years. IR was defined by the homeostasis model assessment of insulin resistance (HOMA-IR) that was calculated by the following formula: [fasting plasma insulin (mU/l) x fasting glucose (mmol/l)]/22.5. In total, seventy anthropometric, hormonal and biochemical parameters together with titres of adenovirus 36 antibodies and scores of the Eating Inventory were evaluated in the prediction model. To detect relationships between the studied parameters and HOMA-IR, a multivariate regression with reduction of dimensionality was applied.

Results: In both genders, major predictors of IR were triglycerides, leptin, free triiodothyronine/free thyroxine ratio, plasminogen activator inhibitor-1, glucagon, liver enzymes and BMI – all of them increased the risk of IR while age, ghrelin and SHBG decreased the risk of IR. Testosterone was related to decreased risk of IR only in boys while adiponectin only in girls. The predictive model for HOMA-IR explained 40.4% of its variability in boys and 21.6% in girls.

Conclusion: Several anthropometric, hormonal and metabolic predictors of insulin resistance have been revealed in adolescents; some of them were common for both boys and girls, some of them were gender specific.

T3:PO.008

Assessment of the hypothalamus-pituitary-adrenal axis with low dose short synacthen tests in adults with Prader-Willi syndrome

Graziano Grugni¹, Andrea Corrias², Stefania Di Candia³, Danilo Fintini⁴, Luigi Gargantini⁵, Lorenzo Iughetti⁶, Letizia Ragusa⁷, Alessandro Salvatori⁸, Alessandro Sartorio¹, Luciano Beccaria⁹, Giuseppe Chiumello³, Antonino Crinò⁴

¹Division of Auxology, Italian Auxological Institute, Research Institute, Verbania, Italy

²Division of Pediatric Endocrinology, University of Turin, Turin, Italy

³Department of Pediatrics, S. Raffaele Hospital, Research Institute, Milan, Italy

⁴Autoimmune Endocrine Diseases Unit, Bambino Gesù Children's Hospital, Research Institute, Rome, Italy

⁵Department of Pediatrics, Civic Hospital, Treviglio (BG), Italy

⁶Department of Pediatrics, University of Modena and Reggio Emilia, Modena, Italy

⁷Department of Pediatric Endocrinology, Oasi Maria SS, Research Institute, Troina (EN), Italy

⁸Department of Pediatrics, University of Insubria, Varese, Italy

⁹Department of Pediatrics, A. Manzoni Hospital, Lecco, Italy

Introduction: It has been claimed that central adrenal insufficiency (CAI) might lead to an increased risk of sudden death in Prader-Willi syndrome (PWS). Nevertheless, data about the prevalence of CAI in PWS are still debated, varying from 0% to 60% of patients. These discrepancies can partially be explained by the methods employed. Recently a normal but delayed peak response of cortisol (F) after insulin tolerance test was

reported in 36 PWS subjects. The aim of this study was to analyse the F response to a prolonged low dose short synacthen test (LDSST).

Methods: Fifty-nine PWS subjects, 34 females, aged 18–41.5 yrs underwent a LDSST. Blood samples for F determination were taken at –15, 0, 30 and 60 min. In order to diagnose CAI we selected a F cut-off point of <18.1 µg/dl.

Results: The mean peak F after LDSST were 22.5 ± 5.1 µg/dl at 30 min and 23.0 ± 6.8 µg/dl at 60 min (mean \pm SD). The maximum F level during LDSST was attained at 30 min in 24 patients, while 35 subjects achieved a maximum F response by 60 min. The LDSST produced 10 abnormal F responses after 30 min. The pathological F peak response was confirmed at 60 min in only 6 of them.

Conclusions: Our results suggest that in the LDSST, sampling at 0 and 30 min shouldn't be appropriated for diagnosing CAI in PWS patients. In fact, the classification into pass or fail was affected when the 30 min F value was used together with the 60 min F value.

T3 – Childhood epidemiology

T3:PO.009

Prevalence of childhood obesity among (0–15 years) paediatrics in Oman: A retrospective chart review

Shadya Al-Harthy¹, Tahiya Al-Habsi², Stephen Fallows³

¹University of Chester, UK Sultan Qaboos University Hospital, Oman

²Sultan Qaboos University Hospital, Oman

³University of Chester

Introduction: The prevalence of childhood obesity in Arabian Gulf region is high reaching up to 42.4% among Bahraini girls (IASO, 2012). However, the prevalence data in Oman is scarce. The aim of this research was to investigate the prevalence of overweight and obesity among paediatrics aged (0–15) years at Sultan Qaboos University Hospital, (SQUH) between 2007 and 2012.

Methods: A retrospective chart review of 3,657 patients 0–15 year olds who consulted SQUH paediatric services between 2007 and 2012 were included in the analysis. Data was abstracted from the electronic medical records database. The WHO reference cut-offs BMIs (> +1 and > +2 standard deviation scores) were used for overweight and obesity respectively.

Results: The overall prevalence of childhood overweight was (11.3%) and obesity (9.4%) in all age groups. There was no significant difference ($P=0.564$) between boys and girls. A significant increase of overweight (8.0% vs 12.4%, $P=0.001$) and obesity (4.2% vs 12.9%, $P=0.001$) was found between younger age group (3–5 years) and the older (10–15 years) age group. Between 2007 and 2011 an annual increasing trend of obesity (6.2%, 7.8%, 9.3%, 10.5% and 11.5%) was evident ($P=0.029$), with a slight decrease (9.9%) in 2012. However, findings also suggest underweight prevalence of 14.2% among paediatrics of which 4.5% were severely underweight.

Conclusion: The prevalence of childhood overweight and obesity is increasing among SQUH paediatrics. The present study provides useful insight to establish better monitoring system, management and prevention efforts. However, underweight remain a problem that equally requires further attention and intervention.

T3:PO.010

Obesity of portuguese preschool children and associations with family characteristics and child behaviours

Cristina Padez¹, Augusta Gama², Isabel Mourão³, Helena Nogueira¹, Vitor Marques¹, et al.

¹Research Centre for Anthropology and Health, Portugal

²Research Centre for Anthropology and Health

³University of Tras-os-Montes e Alto Douro, Portugal

Introduction: The prevalence of obesity among children has steeply increased over the past several decades. Portuguese children followed this trend.

Methods: A cross-sectional study was done in a sample of 9847 children, aged 3.0–7.0 y. Weight and height were measured, and parents filled out a questionnaire about family such as parental educational level and parental obesity and child characteristics. Overweight and obesity, using cut-off points as defined by the IOTF, were used. Data was analyzed using the chi-square test and the multivariate logistic regression analysis adjusted for age and sex.

Results: The prevalence of obesity (including overweight) in boys was 21.3% and in girls was 28.3%. The prevalence of obesity increased by time of TV viewing: < 2h, 22.0% and \geq 2 h, 25.7%; decreased by active play < 2 h, 23.6% and \geq 2 h, 28.6%; increased with breakfast skipping, yes 24.4% and no, 32.9%, increased with father obesity – father overweight, 26.9 and father obesity, 36.3% – and mother obesity, mother overweight, 31.1% and mother obesity, 38.2%; decreased with father educational level, 4 years, 29.0%, 6 y, 27.9%, 9y, 25.7%, 12y, 24.8% and > 12 years, 19.7% as well as mother educational level, 6 y, 30.1%, 6 y, 28.7%, 9y 26.2% 12y, 24.4% and > 12 y, 21.6%. The logistic regression analysis showed significant associations with children obesity and all the other factors.

Conclusion: We conclude that Portuguese schoolchildren showed a highest percentage of obesity and sedentary behaviors as well as parental characteristics are significantly associated with children obesity values.

T3:PO.011

Childhood obesity – a new challenge for basic health units in Brazil

Pedro Souza, Lucas Maychak, Monica Ferreira

Universidade Cidade de São Paulo

Introduction: Obesity is closely related to an increased incidence of cardiovascular disease, hyperlipidemia, hypertension, diabetes, among others.(1) Epidemiological studies show a trend of increasing weight of the population of both developed and developing countries. In the last 20 years in almost all age groups, there was an increase in the prevalence of obesity (2), including among children 3 to 12 years of age (3,4).

Methods: Conducted a cross-sectional, descriptive, observational study. The sample consisted of 800 children classified into two age groups. Anthropometric variables were measured to calculate BMI (kg / m²). Weight was measured in single outlet with mechanical scale platform type with a capacity of 150 kg and 100 g precision. To measure the height, the measurement was taken in triplicate to calculate the average value, using a stadiometer aluminum tape type set to balance.

Results: The nutritional status of the total study population (n = 800) brought us the following percentages; 0.5% of severe thinness, 2% of underweight, 72.5% of eutrophic, 4.37% risk for overweight, 11% overweight, 7% were obese and 2.63% of severe obesity. The results corroborate the trend of childhood obesity observed in developed countries, which already shows significant increase also in developing countries.

Conclusion: The results demonstrated that the curves for Body Mass Index (BMI) proposed by the World Health Organization (WHO) (5) are sensitive to the nutritional profile screening in children, highlighting the global trend of increasing childhood obesity .

We will establish an oriented plan to be carried out by multidisciplinary team in the Basic Health Unit Cabuçu Guarulhos – SP responsible for the care of these children.

T3:PO.012

Prevalence of Measured Overweight among 10–12 year old South Asian and Non-South Asian Children

*Ananya Banerjee*¹, *Parminder Flora*², *Michelle Stone*³, *Guy Faulkner*⁴

¹Women's College Research Institute

²University of Saskatchewan

³Dalhousie University

⁴University of Toronto

Introduction: The prevalence of childhood overweight is increasing throughout the past decades in Canada. However, few studies have quantified ethnic variation in the prevalence of overweight among children. The objective of this study is to describe the prevalence and prediction of measured overweight among 10–12 year old South Asian children in comparison to Non-South Asian children.

Methods: This was a cross-sectional study of 734 children (260 South Asian and 475 non-South Asian) who provided valid data on measured overweight at ages 10–12 years. The prevalence of overweight and obesity were calculated in the sample overall and in strata according to ethnic group and gender. In addition, logistic regression was used to predict overweight among children based upon ethnicity in a series of two models.

Results: The prevalence of measured overweight was significantly higher among South Asian children when compared to non-South Asian children (36.9% vs. 23.0%; $p < 0.001$). Unadjusted, South Asian children exhibited increased prevalent odds for being overweight (OR=1.96; CI=1.41–2.73; $p < 0.0001$). The association did not remain significant after the adjustment for all socio-demographic and behavioural co-variables. The adjusted prevalent odds for being overweight was significantly higher among South Asian boys compared with those among their non-South Asian counterparts (OR=2.75; CI=1.33–5.71; $p < 0.0001$).

Conclusion: The prevalence of measured overweight differs by ethnic group and gender. South Asian boys have an increased prevalent odds of being overweight compared to non-South Asian boys. Children of South Asian origins should receive priority in public health initiatives to reduce overweight and the associated metabolic consequences.

T3:PO.013

Parental marital status and childhood overweight and obesity: A nationally representative study

*Anna Biehl*¹, *Ragnhild Hovengen*², *Else-Karin Grøholt*², *Jøran Hjelmæsæth*³, *Bjørn Heine Strand*², *Haakon E Meyer*⁴

¹Division of Epidemiology, Norwegian Institute of Public Health, Oslo, Norway
²The Morbid Obesity Centre, Vestfold Hospital Trust, Tønsberg, Norway

²Division of Epidemiology, Norwegian Institute of Public Health, Oslo, Norway

³The Morbid Obesity Centre, Vestfold Hospital Trust, Tønsberg, Norway

⁴Division of Epidemiology, Norwegian Institute of Public Health, Oslo, Norway
Department of Community Medicine, Faculty of Medicine, University of Oslo, Oslo, Norway

Introduction: Socio-demographic changes in Norway and other western industrialised countries, including family structure and an increasing proportion of cohabiting and divorced parents, might affect the prevalence of childhood overweight and obesity. We aimed to examine whether parental marital status was associated with general- and abdominal obesity among children. We also sought to explore whether the associations differed by gender.

Methods: Height, weight and waist circumference were measured in 3166 third graders (mean age 8.3years) in the nationally representative Norwegian Child Growth-study of 2010. The main outcome measures were general overweight (including obesity) ($BMI \geq 25 \text{ kg/m}^2$) using IOTF cut-offs and abdominal obesity (waist-to-height ratio ≥ 0.5) by gender and parental marital status. Prevalence ratios, adjusted for possible confounders, were calculated by log-binomial regression.

Results: General overweight (including obesity) was 1.54 (95% confidence interval (CI): 1.21–1.95) times more prevalent among children of divorced parents compared to children of married parents, and the corresponding prevalence ratio for abdominal obesity was 1.89 (95% CI: 1.35–2.65). Formal tests of the interaction term parental marital status by gender were not statistically significant. However, in gender-specific analyses the association between parental marital status and adiposity measures was only statistically significant in boys ($p = 0.04$ for general overweight (including obesity) and $p = 0.01$ for abdominal obesity). The estimates were robust against adjustment for maternal education, family country background and current area of residence.

Conclusion: General- and abdominal obesity were more prevalent among children of divorced parents. This study provides valuable information by focusing on societal changes in order to identify vulnerable groups.

T3:PO.014

Health profiles of overweight and obese young people in general practice

*Winifred Paulis*¹, *Millicent Palmer*², *Patty Chondros*², *Sylvia Kauer*², *Mariénke van Middelkoop*¹, *Lena Sancé*²

¹Department of General Practice, Erasmus MC, University Medical Center, Rotterdam, the Netherlands

²General Practice and Primary Health Care Academic Centre, The University of Melbourne, Melbourne, Australia

Introduction: Background Primary care is indicated as an appropriate setting for weight management programs. For effective management, it is essential for GPs to understand the health profile of their patients.

Aim The aim was to identify health profiles of underweight, overweight and obese young people attending general practice and compare them to normal weight youth. In addition, opportunities for treatment were sought by comparing eating and exercise behaviour and willingness to change these behaviours among youth of different weight categories.

Methods: This study used a cross-sectional design with data of 683 young people (14–24 years of age) presenting to general practice. Through computer assisted telephone interviews (CATIs) data were obtained on number and type of health complaints and consultations, emotional distress, health related quality of life and eating and exercise behaviour and willingness to change these behaviours.

Results: Overweight (β : 1.57, 95% CI [0.08, 3.05]) and obese youth (β : 3.00, 95% CI [0.74, 5.27]) consult their GP significantly more often but not for different health problems than normal weight youth. The reason for presentation was seldom a weight issue. The majority of overweight and obese youth (58.4%) are willing to change their eating behaviour and approximately 40% are willing to change exercise behaviour.

Conclusion: In order to utilize primary care for weight management optimally, GPs need to initiate the discussion about weight with youth. The increased number of consultations and the relatively large percentage of young people willing to change their behaviour can be seen as an opportunity to start this discussion.

T3:PO.015

Childhood overweight trends in Norway: Growing social inequalities. A nationally representative study

Ragnhild Hovengen¹, Bjørn Heine Strand²

¹Norwegian Institute of Public Health

²Norwegian Institute of Public Health

Introduction: The Norwegian Child Growth Study is a nationwide study monitoring the prevalence of overweight and obesity among third graders (8–9 years). The aim of the study is to observe growth trends and investigate how growth differs by determinants such as geographic areas and maternal education.

Methods: Health nurses at 127 schools were trained to measure height, weight and waist circumference (WC) in a representative sample of 3500 third graders in 2008, 2010 and 2012. Anthropometric measures were stratified by area of residence (urbanity) and maternal education in the data analyses in 2010. Log-binomial regression was used to model the association between overweight and background variables.

Results: For both sexes combined, 16 percent of eight-year-olds were overweight (BMI ≥ 25 kg/m²), and the proportion did not increase during the period 2008 to 2012. Waist circumference showed a similar trend. Furthermore, the interaction term urbanity by maternal education was significant ($p = 0.01$ for both BMI and WC), indicating that children from rural residence backgrounds of low-educated mothers were particularly at risk for being overweight and having a high waist circumference.

Conclusion: The prevalence of overweight among third graders in Norway seems to have stabilized in recent years. Nevertheless, there is an urgent need in Public Health to be aware of the increased risk of overweight and obesity in groups of vulnerable children to prevent social inequality in health already in early childhood.

T3:PO.016

Assessment of overweight and obesity in Albanian schoolchildren

Jolanda Hyska, Genc Burazeri, Ehad Mersini

Institute of Public Health

Introduction: In Albania, overweight and obesity are important risk factors for noncommunicable diseases and these factors may be present since childhood. The data shows that about 22% of children under the age of five years were overweight or obese; and 15.2% of children aged 9–10 years were overweight, of whom 3.8% are obese

Methods: A cross-sectional study was conducted in Albania including a nationally representative sample of 5810 children aged 7–10 years. The data were collected from the beginning of February through the last week of March 2013.

Results According to the limit values of Cole JT et al. 14.4% of children aged 7–10 years were overweight, of whom 3.3% were obese. Using WHO BMI limit values, the data reveals that 21.6% of children aged 7–10 years are overweight and of these, 7.7% were obese.

Conclusion Despite the different limit values used for evaluation, the trend of overweight and obesity by gender and age appears the same. The prevalence of overweight and obesity is clearly higher in children aged 8–9 years than in any other age group; it is higher in urban than in rural areas and higher in males than in females. The prevalence of overweight (21.6%) in Albanian children aged 7–10 years based on WHO limit values is very close to the average of European children aged 6–10 years, emphasizing that overweight and obesity in school-aged children is an important public health issue.

T3 – Complications and Management

T3:PO.017

Metabolic syndrome components and oxidative stress level in obese children

Pawel Matusik¹, Zofia Prokopowicz¹, Magdalena Olszanecka-Glinianowicz², Jerzy Chudek³, Ewa Malecka-Tendera¹

¹Department of Pediatrics, Pediatric Endocrinology and Diabetes, Medical University of Silesia, Katowice Poland

²Health Promotion and Obesity Management Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

³Pathophysiology Unit, Department of Pathophysiology, Medical University of Silesia, Katowice, Poland

Introduction: Oxidative stress seems to be involved in the pathophysiology of atherosclerosis, diabetes and cardiovascular complications in obesity. The aim of our study was to evaluate the level of oxidative stress markers in obese children in respect of metabolic syndrome (MS) criteria.

Methods: Oxidative stress markers (total oxidative status (TOS), total antioxidative capacity (TAC), glutathione peroxidase (GPx), oxLDL and TOS/TAC ratio), were determined in 69 (37 boys) obese children in the mean age of 14.0 ± 2.7 years. Anthropometrical status by BMI and waist/height ratio (WHtR) calculation and body composition analysis (TANITA BC-418 MA) was assessed in all children. Metabolic syndrome criteria were diagnosed by OGTT, insulin, HOMA IR, lipid profile and BP assessment.

Results: 30 (43.5%) of children met MS criteria but they had no significantly different levels of oxidative stress markers comparing with no-MS children. MS group did not differ in respect of anthropometrical status and body composition parameters. Abdominal obesity expressed as WHtR and adiposity assessed by BIA correlated significantly with TOS and TOS/TAC ratio. TOS/TAC ratio was significantly higher in insulin resistant children (HOMA IR > 3.5). GPx activity was significantly lower in children with hypertriglyceridemia (TG > 200 mg/dl).

Conclusion: Metabolic syndrome diagnosis probably does not predict the early changes as oxidative stress leading to cardiovascular complication in obese children. The better prognostic value seems to have adiposity level, insulin resistance and hypertriglyceridemia themselves.

T3:PO.018

Impact of mothers nutrition and nutrition of offspring on glucose levels in male offspring

Marić, Perić Kačarević, Vrsejla, Perković, Radić

School of Medicine University J. J. Strossmayer, Osijek, Croatia

Introduction: Rates of overweight and obesity in women of childbearing age continue to increase world-wide. In response to maternal overnutrition in pregnancy it is now well established that the children are more likely to increase susceptibility to obesity, cardiovascular disease, and glucose intolerance in later life. The aim of the study is to determine the effect of maternal diet on glucose levels in male offspring.

Methods: Ten female Sprague Dawley rats were at the age of 21 days divided in two groups, one was fed with high-fat diet (HFD; $n = 5$), the other one had free access to standard laboratory chow (CD; $n = 5$). At the age of 12 weeks, the rats were mated, and their offspring were randomly divided in 3 groups after the lactation period (CD-HFD $n = 35$, HFD-CD $n = 35$, HFD-HFD $n = 35$). In all three groups at the age of 36 days, the offspring were sacrificed and blood samples were collected.

Results: HFD-CD and CD-HFD rats had the lowest weight after birth, but their weight increased the most compared to control and HFD-HFD rats. HFD-CD group had lowest median in compared to weights of other groups. Blood glucose levels were lowest in the HFD-CD group (5.5 ± 0.90), while CD-HFD (10.3 ± 1.72) and HFD-HFD (9.0 ± 1.32) groups had similar levels of blood glucose.

Conclusion: These data are consistent with thrifty phenotype hypothesis which proposes that poor nutrition in early life produces permanent changes in glucose-insulin metabolism by maximizing the chances of survival in conditions of on-going nutritional deprivation.

T3:PO.019

The effect of weight loss magnitude on pro-/anti-inflammatory adipokines and carotid intima-media thickness in obese adolescents engaged in interdisciplinary weight loss therapy

Deborah Masquio¹, Aline de Piano¹, Priscila Sanches¹, Flávia Corgosinho¹, Raquel Campos¹, June Carnier¹, Patrícia da Silva¹, Danielle Caranti¹, Lian Tock², Lila Oyama¹, Cláudia Oller do Nascimento¹, Marco Túlio de Mello¹, Sergio Tufik¹, Ana Dâmaso¹

¹Universidade Federal de São Paulo – UNIFESP

²Weight Science

Introduction: Obesity is a chronic disease characterized by a low-grade inflammation related to increase in the carotid intima-media thickness (cIMT) and cardiovascular risks factors. To verify the effect of weight loss magnitude on inflammatory profile and cIMT in obese adolescents engaged in an interdisciplinary therapy.

Methods: 77 postpubertal obese adolescents of both genders, between 14–19 years (16.74 ± 1.59) and with a BMI greater than the 95th percentile (37.18 ± 5.14), were submitted to 1-year period of interdisciplinary intervention (nutrition, psychology, physical exercise and clinical support). Blood samples were collected to analyze glucose, lipid and adipokines concentrations. Body composition, anthropometric profiles and cIMT were measured. The results are presented according to quartiles of weight loss: 1st – Low (≤5·80 kg); 2nd – Low-to-Moderate (5·80–10·90 kg); 3rd- Moderate (10·90–15·90 kg) and 4th – Massive (>15·90 kg).

Results: Leptin, leptin/adiponectin ratio and plasminogen activator inhibitor 1 (PAI-1) were decreased significantly in the low-to-moderate weight loss. The cIMT was reduced in the moderate weight loss. However, adiponectin was increased only after massive weight loss. Additionally, change in body mass was an independent predictor of changes in leptin level, adiponectin/leptin ratio (A/L ratio) and PAI-1, after adjustment for age and gender. Furthermore, changes in A/L ratio were independent predictors of cIMT alterations.

Conclusion: Interdisciplinary therapy can reduce cIMT and cardiovascular risk factors among adolescents depending on degree of weight loss and their inflammatory profile.

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T3:PO.020

Higher cardiovascular risk in treatment seeking severely obese adolescent than in children

Samira Lekhal¹, Jens Hertel², Beate Benestad², Jøran Hjeltnes²

¹Morbid Obesity Center, childrens department, Vestfold Hospital Trust, Tønsberg, Norway

²Morbid Obesity Center, Vestfold Hospital Trust, Tønsberg, Norway

Higher cardiovascular risk in treatment seeking severely obese adolescent than in children

Introduction: We aimed to compare cardiometabolic risk factor levels and prevalence among severely obese children and adolescents.

Methods: Cross-sectional study including 99 children (≤12 years) and 212 adolescents (>12 yrs) with severe obesity who were referred to a

tertiary care obesity outpatient clinic. Cardiovascular risk factors were assessed by components of the metabolic syndrome including anthropometric measures, blood pressure, fasting blood glucose and lipid status.

Results: The child and adolescent groups had a mean (SD) age of 8.5 (2.0) yrs and 14.7 (1.7) yrs. Compared to the child group, the adolescents had a significantly lower BMI SDS 3.5 (0.82) vs 4.1 (1.21), $p = 0.002$. Waist-to-height ratio did not differ between groups 0.64 (0.05) vs 0.67 (0.06). The levels of fasting blood glucose; 5.0 (1.3) vs 4.7 (0.3) mmol/l, insulin 173 (104) vs 114 (79) pmol/l, and triglycerides 1.5 (0.7) vs 1.3 (0.7) mmol/l were significantly higher among adolescents, while HDL-cholesterol 1.2 (0.3) vs 1.4 (0.2) mmol/l was significantly lower (all $p < 0,014$). The adolescents had a significantly higher prevalence of all cardiovascular risk factors compared to children (elevated triglycerides 28% vs 6%, hypertension 18% vs 10%, decreased HDL-cholesterol 18% vs 10%, high blood glucose 6% vs 0%).

Conclusions

Although treatment seeking severely obese children had a significantly higher BMI SDS than adolescents, they had a clearly more beneficial cardiovascular risk profile.

T3:PO.021

Nonalcoholic fatty liver disease (NAFLD) in obese children

Zofia Prokopowicz, Paweł Matusik, Ewa Małacka-Tendera

Department of Pediatrics, Pediatric Endocrinology and Diabetes. Medical University of Silesia, Katowice, Poland

Introduction: With the increasing prevalence of obesity in children, there is a growing number of its comorbidities as nonalcoholic fatty liver disease (NAFLD).

The aim of this study was to evaluate the prevalence of NAFLD in a group of obese patients and to identify additional risk factors for NAFLD development in the examined population.

Methods: We examined 88 obese children (41 boys) mean age 14.4 (± 2.6) hospitalized in our department in 2013. The analysis evaluated anthropometric parameters, body composition, calculated indicators: body mass index (BMI), waist-hip ratio (WHR) waist-height ratio (W/HtR) and the components of the metabolic syndrome (MS). The assessment of liver function and steatosis was assessed by ALT and ultrasound respectively.

Results: MS was diagnosed in the 26 (29.54%) of children. 24 (27.27%) of patients had fatty liver on ultrasound. MS was more often diagnosed among children with hepatic steatosis compared to a normal liver group (50% vs 27.2%). Among the anthropometric parameters only WHR significantly correlated with the occurrence of fatty liver in the ultrasound image. Liver hyperechogenicity level correlated significantly with fasting insulin level, insulin and glucose in 120 minutes of OGTT and HOMA-IR index. There was the significant correlation between concentration of ALT and the sum of the MS components.

Conclusion: Obese children who met MS criteria have to be screened for the NAFLD. Hyperinsulinemia and insulin resistance seem to be the prognostic factors indicating rigorous liver function assessment in obese children.

T3:PO.022

The new adipokine progranulin – relation to obesity, cardiometabolic risk factors and selected hormones in adolescents

Barbora Sedlackova, Hana Zamrazilova, Lenka Dusatkova, Irena Aldhoon Hainerova, Josef Vcelak, Petr Hlavaty, Marie Kunesova, Richard Hampl, Vojtech Hainer
Institute of Endocrinology, Prague

Introduction: Progranulin is a new adipokine associated with obesity, chronic inflammation, impaired glucose metabolism and insulin resis-

tance. Aims of our study were: (1) to determine plasma progranulin concentration in cohorts of obese and normal weight adolescents (2) to investigate relationships of progranulin to anthropometric parameters, body fat and cardiometabolic complications.

Methods: The studied cohort included 155 girls (97 overweight/obese, BMI \geq 90th percentile; 58 normal weight, BMI 25th–75th percentile) and 123 boys (67 overweight/obese; 56 normal weight) from project COPAT (Childhood Obesity Prevalence And Treatment) aged 13.0–14.9 years. Plasma progranulin levels were determined by ELISA (ELISA Kit Human Progranulin, BioVendor). Body mass index, body composition (bioimpedance Tanita BC 418 MA), blood pressure, hormonal and biochemical parameters were assessed in all individuals. Statistics: t-test, Mann-Whitney test, Spearman's correlation (software NCSS 2004).

Results: In girls were observed positive correlations of progranulin levels with total and LDL cholesterol and fT3 while negative correlations were demonstrated with testosterone, DHEAS and progesterone ($p < 0.05$). In boys progranulin positively correlated with SHBG and negatively with systolic blood pressure, uric acid, DHEAS, estradiol and progesterone ($p < 0.05$). Progranulin levels were significantly higher in boys (28.3 pg/ml) than in girls (26.4 pg/ml; $p < 0.001$). However, no differences in progranulin levels were observed between overweight/obese and normal weight adolescents.

Conclusion: Our findings in adolescents did not confirm previously reported progranulin associations with obesity and insulin resistance. However, significant gender specific associations of progranulin with several biochemical and hormonal markers (cholesterol, LDL cholesterol, DHEAS, uric acid, progesterone, testosterone and SHBG) were demonstrated.

T3:PO.023

Neonatal adiposity in the obese and non-obese pregnant women: Birth-weight and neonatal anthropometry measurements, preliminary results of a multicenter European study

Sander Galjaard¹, Goele Jans², Juergen Harreiter³, Alexandra Kautzky-Willer³, Roland Devlieger¹, DALI DALI Core Investigators Group⁴

¹Department of Development and Regeneration, Katholieke Universiteit Leuven (KUL); Department of Obstetrics and Gynecology, University Hospitals of Leuven, Belgium

²Department of Development and Regeneration, Katholieke Universiteit Leuven (KUL)

³Department of Obstetrics and Gynecology, Medizinische Universitaet Graz, Austria

⁴European Community's 7th Framework Program

Introduction: DALI is an European FP7 study investigating the effect of a lifestyle intervention on the development of gestational diabetes mellitus (GDM) and gestational weight gain (GWG). The aim of this sub-study is to define neonatal adiposity in the obese and non-obese pregnancy.

Methods: We examined 63 pre-gestational obese (OB) versus 29 non-obese women (n-OB) longitudinally in their pregnancy for fetal-neonatal growth with novel and routine measurements. The neonatal adiposity was determined by the birth-weight (BW), birth-length (BL), ponderal index (PI) and skinfold (SF) measurements of the triceps (T-SF), subscapular (S-SF), flank (F-SF) and thigh (T-SF) region, within 48h after birth. In the obese pregnancy a lifestyle intervention program was applied and both groups were screened for GDM. Total GWG was registered in both groups.

Results: The BW and PI did not differ in both groups ($p = 0.187$ and $p = 0.836$). The BL showed a trend for longer babies within the OB ($p = 0.102$). The T-SF ($p = 0.002$), S-SF ($p = 0.020$), F-SF ($p = 0.001$) and the T-SF ($p = 0.002$) were all increased with the OB group. Also the total GWG differed significantly with OB and n-OB ($p < 0.001$, resp. 8.9kg vs 15.0kg). There were 10 women with GDM in the OB group and none in the n-OB.

Conclusion: In this longitudinal comparative study, the neonatal adiposity, but not birth-weight, was higher in the obese pregnant women group. These preliminary results stresses the use of other parameters than BW to define neonatal adiposity. The ponderal index or neonatal skinfolds seem to better determine the high risk infant for the metabolic syndrome.

T3:PO.024

A case of partial Prader-Willi syndrome due to mosaic maternal UPD of chromosome 15 detected by SNP microarray

Anita Morandi¹, Stéphane Lobbens², Marco Carotenuto³, Emanuele Miraglia del Giudice⁴, Claudio Maffei¹

¹Regional Center for Pediatric Diabetes, Clinical Nutrition and Obesity, University of Verona, Verona, Italy

²UMR 8199, Pasteur Institute and Biology Institute of Lille, CNRS, Lille, France

³Center for Childhood Headache, Clinic of Child and Adolescent Neuropsychiatry, Department of Mental Health, Physical and Preventive Medicine, Second University of Naples, Naples, Italy

⁴Department of Pediatrics, Second University of Naples, Naples, Italy

Introduction: Few cases of Prader-Willi syndrome (PWS) with mosaic maternal uniparental disomy of chr-15 (mat-UPD 15) have been described. Recently the SNP microarray technology has been proposed to detect mosaic mat-UPD 15, distinguish iso from hetero mosaic mat-UPD 15 and detect possibly associated small percentages of trisomy or monosomy of chr-15.

Methods: We describe a 17-years-old girl with severe obesity (BMI=45.3), short stature (147 cm versus 165 of genetic target), moderate mental retardation and negative perinatal history. She was diagnosed with a partial PWS and underwent an MS-PCR of SNRP gene showing a maternal band more intense than the paternal band, raising the suspicion of mosaic mat-UPD 15. She then underwent SNP microarray (Illumina Omni1-Quad), standard karyotype and FISH of 15q11.2.

Results: The SNP microarray suggested no chromosomal aberration and the presence of iso mat-UPD 15 in about 50% of cells. Karyotype and FISH were normal. The presence of mosaic iso mat-UPD15 in absence of monosomic cell line suggested a post-zygotic error. Our case is clinically and genetically intermediate between the two cases previously described with PWS and mosaic mat-UPD15 without copy number variations: a complete PWS with 85–90% of cells with mat-UPD, and a mild PWS (obesity and short stature without mental retardation) with 30% of cells with mat-UPD15.

Conclusion: The SNP microarray allows for the detection of the type and level of mosaic mat-UPD15 and possible associated copy number variations of chr-15 and may help the genetic counseling about the disease recurrence risk and future genotype-phenotype correlation studies.

T3:PO.025

Psychosocial outcomes, Physical Activity and Physical Fitness measures from the BOB study – pilot study assessing the use of an intragastric balloon and a lifestyle support program to promote weight loss in severely obese adolescents

Lindsey Reece¹, Pooja Sachdev², Copeland Copeland¹, Neil Wright², Jerry Wales²

¹Sheffield Hallam University

²Sheffield Children's Hospital

Introduction: Severe obesity in adolescents, BMI $>3.5SD$, is associated with significant physical morbidity. The psychopathology of obesity in adolescents is concerning with many experiencing poor quality of life, low self-esteem and limited physical functioning. Importantly here, severely obese children have been shown to have health related quality of life scores comparable to those with a cancer diagnosis. Obese young peo-

ple are also more likely to be socially isolated than their healthy weight counterparts, are at an increased risk of bullying by peers, experience depressive symptoms and thoughts of suicide. This data forms part of a pilot study assessing the use of an intragastric balloon, alongside a lifestyle support program, to promote weight loss in severely obese adolescents at six months. The focus here concentrates on the impact of the intervention on psychosocial measures, physical activity and physical fitness.

Methods: 12 obese adolescents (7 females 5 males; average age 15yrs; BMI >3.5SD; puberty stage 4 or more) were recruited. Changes in psychosocial measures (Self-perception, Health related quality of life, Assessment of planned behaviour) physical activity and physical fitness from baseline to six months following balloon and lifestyle therapy are presented. Psychosocial measures and physical activity was captured through questionnaires and physical fitness was measured using the modified Balke protocol.

Completed pre and post follow up for the treadmill (n = 5) shows a mean increase in time to exhaustion of 7.5mins.

Conclusion: This suggests a positive impact on physical fitness levels of the adolescents at 6months post intervention. Intervention results are expected March 2014.

T3:PO.026

Regular aerobic Physical Activity (PA) has a preventive role in the development of Insulin-Resistance (IR) and Metabolic Syndrome (MS) in overweight/obese (ow/ob) children

Mosca, Mercurio, De Lucia, Piedimonte, Roma, Giacomini, Malara, Vania

Dept. of Paediatrics and Paediatric Neuropsychiatry, "Sapienza" University of Rome, Italy

Introduction: From the age of 11 many Italian children(1) reduce their Physical Activity (PA) and become more sedentary. Besides, due to the widespread obesity epidemics, they become more prone to IR and MS. Although PA is beneficial to IR, its role alone, with no caloric restriction, on ow/ob children remains unclear(2–3).

Methods: On 925 ow/ob children (55.7%F, age: 10.5 ± 3.74) not previously under caloric restriction, anthropometry (z-BMI 1.95 ± 0.64 , WtHR 0.58 ± 0.05), lifestyles (hrs/day of both sedentariness and PA) and main metabolic values (SBP,DBP,TG,CHOL,HDL,LDL,GLU,IRI,IR-HOMA) were assessed

Results: 38.05% had no PA, 61.95% had regular aerobic PA about thrice/week. Regularly trained children were slightly but significantly younger (10.37 ± 2.75 vs. 11.19 ± 3.78 years), less sedentary (3.25 ± 1.97 vs. 4.61 ± 1.70 hrs/day), with lower values of SBP,TG,IRI,IR-HOMA, although z-BMI (1.99 ± 0.54 vs. 1.93 ± 0.69) and WtHR (0.61 ± 0.05 vs. 0.57 ± 0.07) did not differ from non-PA children.

Main aerobic PAs chosen by Italian children have similar Energy Expenditure (soccer:8, swimming:6, ballet:4.5 Kcal*Kg/h). Do they protect children differently from the development of IR? Soccer (chosen by 78.8% of M), compared to swimming (by 75.10% of all) and ballet (by 35.5% of F), is more easily present as the preferred PA in ow/ob children who show significantly lower IRI and IR-HOMA values.

Conclusion: Our results seem to support the evidence that regular aerobic PA can be a stand-alone measure in preventing (and treating?) IR and MS, at least in ow/ob children.

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T3:PO.027

Accuracy of anthropometric variables as markers of metabolic impairment in obese children

Anita Morandi¹, Emanuele Miraglia del Giudice², Marco Marigliano¹, Beatrice Moro³, Paola Peverelli⁴, Claudio Maffei¹

¹Regional Center for Pediatric Diabetes, Clinical Nutrition and Obesity, University of Verona, Verona, Italy

²Department of Pediatrics, Second University of Naples, Naples, Italy

³Department of Pediatrics, Piove di Sacco Hospital, Padova, Italy

⁴Department of Pediatrics, San Martino Hospital, Belluno, Italy

Introduction: Few studies have investigated the association between anthropometric variables and metabolic complications among obese children, and no study has assessed the accuracy of anthropometric variables as markers of metabolic impairment in this category of patients. We assessed the accuracy of SDS-BMI and waist-to-height ratio (WtH-r) in selecting obese children with fasting metabolic impairments or impaired glucose tolerance (IGT).

Methods: In two cohorts of 6-to-18 years old obese Italian patients, one from Campania (N=577) and one from Veneto (N=417), we assessed the association of SDS-BMI and WtH-r with traditional metabolic complications of obesity (impaired fasting glucose, IGT, hypertension, high triglycerides, low HDL-cholesterol), defined according to the criteria of the American Academy of Pediatrics. The SDS-BMI was calculated based on national growth charts. The accuracy of SDS-BMI and WtH-r as markers of metabolic impairment was assessed by ROC curve analysis.

Results: Both WtH-r and SDS-BMI showed low to moderate accuracy in discriminating obese children with at least two metabolic impairments. In the sample from Campania the WtH-r showed ROC curves of 0.62[0.52–0.72] and 0.69[0.59–0.79] in boys and girls respectively, while the SDS-BMI showed ROC curves of 0.69[0.60–0.79] and 0.65[0.54–0.76] in boys and girls respectively. In the sample from Veneto the WtH-r showed ROC curves of 0.51[0.41–0.61] and 0.63[0.52–0.73] in boys and girls respectively, while the SDS-BMI showed ROC curves of 0.58[0.48–0.69] and 0.68[0.58–0.78] in boys and girls respectively.

Conclusion: Neither the SDS-BMI nor the WtH-r are satisfactory markers of metabolic impairment in obese children.

T3:PO.028

Temperature probe entrapment during laparoscopic sleeve gastrectomy: A preventable complication. A case report and literature review

Guru Raghavendra¹, Shlokarth Balupuri²

¹Queen Elizabeth Hospital

²Sunderland Royal Hospital

Introduction: National Institute of Clinical Excellence recommends continuous monitoring of core body temperature using an insertable temperature probe is part of monitoring in major operations (NICE DG6). We report a case where the temperature probe migrated intraoperatively into the stomach and was inadvertently stapled across while performing laparoscopic sleeve gastrectomy.

Methods: A 54 year morbidly obese lady was worked up for bariatric surgery and an elective Laparoscopic Sleeve Gastrectomy was performed. She had a BMI of 42 and was a diabetic.

As expected her drain, soon showed gastric content effluent. At present, she is being weaned of her tracheostomy with a double lumen nasojugal tube for feeding and decompression of gastric juices with an aim of facilitating closure of her perforation.

Results: The aim of reporting this avoidable complication is to create awareness of appropriate action that needs to be taken when sleeve gastrectomies is performed. Moreover a clear insight into the possibility of stapling needs to be appreciated by anaesthetists to prevent similar mistakes.

Conclusion: The manufactures need to include a scale on the probe to know what length is inside and include a fixation devise to prevent inadvertent slippage. The probes should always be fixed to a safe length when in use. Use alternate ways to insert the probe and alternate measurement methods if possible in upper gastro-intestinal procedures.

Surgeons and anaesthetists diligence and awareness is of at most importance throughout the procedure and especially during the crucial steps of stapling.

T3:PO.029

Correct lifestyles in overweight/obese (ow/ob) paediatric subjects: How many months are needed?

Piedimonte, Mercurio, Mosca, De Lucia, Roma, Giacomini, Malara, Vania

Dept. of Paediatrics and Paediatric Neuropsychiatry, Sapienza University of Rome, Italy

Introduction: Compliance to correct lifestyles improves anthropo-metabolic parameters in ow/ob subjects(1–2). More difficult to understand when improvements start, and which tools help evaluating the compliance. We present here the data from a semi-quantitative questionnaire coupled with anthropo-metabolic values.

Methods: 278 random ow/ob children (F 157, aged $9,93 \pm 2,65$) were evaluated at T0, after 3 (T1), and 6 months (T2) of a slight hypochaloric, well balanced diet and the introduction of lifestyles changes.

Results: Anthro-metabolic parameters: at T1 no significant changes of could be shown. At T2 Z-BMI, CHOL, sedentariness had improved significantly ($p < 0.05$); HDL, LDL, TG had also improved, but not significantly; WtHR, GLU, IRI, sport (hours/week) had remained unchanged; number of children with no sport had reduced from 75 to 16. **Eating habits:** at T1, diet composition had improved, especially for quali-quantitative errors. Major changes, however, appeared only at T2: patients' percentage with regular 5-meals diet remained unchanged, but main meals' composition was more adequate (T0 vs. T2: Breakfast: 72% \pm 82%; Lunch: 39% \pm 44%; Dinner: 37% \pm 48%). Also quali-quantitative errors were significantly lower: we found a considerable reduction of patients having extra snacks (76% \pm 48%) and of number of sweet soft-drinks/week (4 \pm 1.7).

Conclusion: Unlike adults(1–2), a 3-month period of changes in lifestyles, in children, seems insufficient to noticeable changes, at least 6 months are needed to improve (sometimes significantly) clinical-metabolic parameters, probably because interventions need the intermediate pass of parents/care-takers.

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T3:PO.030

Associations between pickiness, family-conflicts and weight development among children aged 2–6 years

Jeanett Friis Rohde, Maria Trærup, Maria Stougaard, Mina N. Händel, Louise M. Østergaard, Tine Buch-Andersen, Nanna J. Olsen, Charlotte Seeger, Berit L. Heitmann

Research Unit for Dietary Studies, Institute of Preventive Medicine; Bispebjerg and Frederiksberg Hospitals, The Capital Region, Copenhagen, Denmark

Introduction: Problematic eating behaviors, such as rejecting certain food items, are sources of concerns for parents, and if prolonged can influence the child's growth. The purpose was to examine the association between pickiness and conflicts around children's mealtime and to investigate if pickiness and family conflicts were associated with subsequent weight development.

Methods: Information was obtained from the baseline survey of the randomized intervention study "Healthy Start" and included 543 children

from 2–6 years. Logistic regression was used to examine the association between pickiness and conflicts after considering potential child-, diet- and family-related confounders. Among the control children ($n = 255$), linear regression was used to examine if pickiness and family conflicts at baseline were associated with BMI Z-score at baseline and after 1½ year follow-up

Results: Analyses showed a strong association between pickiness and conflicts before (OR:3.15, $p = 0.000$) and after (OR:4.14, $p = 0.000$) adjustment for possible confounders. There were no significant differences in mean BMI Z-score between picky and not picky children, at baseline ($p = 0.53$) and after 1½ year follow-up ($p = 0.96$). Direct association were seen between conflicts at mealtime and BMI Z-scores at baseline, after adjusting for parental BMI ($p = 0.02$). No association were seen after follow-up ($p = 0.51$).

Conclusion: It seems that conflicts around mealtime and pickiness are highly related. Moreover, conflicts seems to be associated to overweight, however, neither pickiness nor conflicts seemed related to the development in BMI.

T3:PO.031

The circadian rhythms of carbohydrate metabolism hormonal regulation at the women with different types of obesity

Ani Karapetyan, Boris Pinkhasov, Vera Selyatitskaya, Elvira Astrakhantseva, Natalya Minina

Scientific Centre of Clinical and Experimental Medicine, Novosibirsk, Russia

Introduction: To investigate the features of the circadian rhythms of carbohydrate metabolism hormonal regulation at the women with different types of obesity using the oral glucose tolerance test (OGTT).

Methods: The study involved women aged 20 to 50 years. The type of obesity was assessed by the waist-to-hip ratio (WHR). Women with WHR value < 0.85 were relegated to Group 1 with the lower type of fat distribution ($n = 23$), women with the WHR value ≥ 0.85 – to Group 2 with the upper type of fat distribution ($n = 10$). Non obese women were relegated to Group 3 ($n = 22$). The standard 75-gr OGTT was performed in the morning (8.00 – 10.00 a.m.) and in the evening (18.00 – 20.00 p.m.). Normal glucose tolerance was diagnosed according to the criteria of the American Diabetes Association.

Results: At non obese women (Group 3) impaired glucose tolerance observed during the evening OGTT, accompanied by increasing insulin serum level. Regardless to the time of day, in obese women (Group 1) was remarked a sharp decrease of glucose and insulin serum levels in the 120 minute OGTT, accompanied by hypoglycemia relatively to the glucose level at non obese women. In obese women (Group 2) remarked impaired glucose tolerance, which was only in the morning time countervail pronounced rise in insulin serum level.

Conclusion: These results indicated the circadian features in the mechanisms of regulation and utilization of carbohydrates at energy metabolism in women with different types of fat distribution.

T3:PO.032

Effects of Vitamin D on Cardiovascular Risk in Non-Alcoholic Fatty Liver Disease Obese Adolescents

Raquel Campos¹, Deborah Masquio¹, Ana Paula Clemente¹, Flávia Corgosinho¹, Joana Carvalho-Ferreira¹, Bárbara Dal Molin Netto¹, Carolina Ackel-D'Elia¹, Lian Tock², Sergio Tufik¹, Marco Túlio de Mello¹, Ana Dâmaso¹

¹Universidade Federal de São Paulo – UNIFESP

²Weight Science

Introduction: Obesity is a worldwide problem, with a dramatically prevalence increase in children and adolescents. Recently low vitamin D level

has been associated with comorbidities and development of cardiovascular risk in obese population. To investigate the effects of vitamin D (serum and intake) on cardiovascular risk in non-alcoholic fatty liver disease obese adolescents submitted in a long-term interdisciplinary therapy.

Methods: For this study, it was involved 25 post-puberty obese adolescents with age of 15–19 years with primary obesity, body mass index (BMI) greater than >95th percentile of the CDC reference growth charts. Measurements of inflammatory biomarkers, body composition, vitamin D (serum and intake) and diagnoses of non-alcoholic fatty liver disease (NAFLD) were performed. The adolescents were randomized in two different groups (non-NAFLD and NAFLD) that were submitted to an interdisciplinary therapy during a long-term.

Results: Improvement in body composition and plasminogen activator inhibitor-1 (PAI-1) were observed in both groups. Vascular cell adhesion molecule (VCAM) and hepatic enzymes ameliorated only in NAFLD group. Negative correlations were showed between vitamin D with PAI-1 and VCAM. Positive correlations between PAI-1 with VCAM and visceral fat were observed.

Conclusion: We were able to show that low vitamin D is associated with increase in cardiovascular risk factors, independently the presence of NAFLD in obese adolescents.

Conflict of interest: Nothing to disclose.

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T3:PO.033

Obesity in preschoolers: Clinical and metabolic characteristics

Elena Pavlovskaya, Tatiana Strokova, Alexander Surkov, Elena Kutyreva, Boris Kaganov

Research Institute of Nutrition, Russian Academy of Medical Sciences

Introduction: Obesity in preschooler children is an important problem that impairs health and quality of life, and increase cardiometabolic risk in later life. Moreover, pediatricians often does not pay necessary attention to obese preschoolers. We aimed to reveal clinical and metabolic characteristics of obesity in preschooler children.

Methods: Fifty-two children 2.5–7 (6.2 ± 0.1) years old (20 boys) were examined. Obesity was diagnosed using CDC criteria. We measured levels of biochemical parameters, include lipid profile, and insulin level. Insulin resistance were assessed with HOMA index. The resting energy expenditure and macronutrient oxidation rate were measured by indirect respiratory calorimetry (n = 27).

Results: Mean BMI in examined children was 25.5 ± 0.7 kg/m², CDC percentile – 98.2 ± 0.2, Z-score – 2.46 ± 0.07. The abdominal obesity was registered in 38 (73.1%) preschoolers. Nonalcoholic fatty liver disease was diagnosed in 9 (17.3%) children, among them 2 had steatohepatitis. Four children (7.7%) had obesity as a part of genetic syndromes. Dyslipidemia was revealed in 13 (25%) children, and more often manifested as high cholesterol level (n = 7) and low HDL level (n = 6). The mean cholesterol level in examined preschoolers was 4.48 ± 0.12 mmol/l, insulin level – 12.9 ± 1.4 mcIU/ml, mean HOMA – 2.77 ± 0.3. Insulin resistance was revealed in 20 (38.5%) children. We found the negative correlation of insulin level and HOMA with breastfeeding duration (r = –0.38 and –0.37, respectively, p < 0.05). The resting metabolic status characterized by low energy expenditure (52%), low fat (48%) and carbohydrate (32%) oxidation rate.

Conclusion: Obese preschoolers needs a thorough attention of pediatricians due to high risk of metabolic disturbances and comorbidities.

T3:PO.034

Relationship between Body Mass Index (BMI) and birth weight, and spontaneous preterm labor

Maryam Kashanian, Fatemeh Sharifzadeh, et al.

Iran University of Medical Sciences.

Introduction: The purpose of the present study is to find the relationship between pre pregnancy maternal body mass index (BMI) and spontaneous preterm labor and birth weight.

Methods: Maternal BMI was determined at the first prenatal visit between 8–12 weeks of gestation, the women were then monitored up to delivery. Gestational age at the time of delivery and neonatal weight were recorded.

Results: 396 women out of 576 women finished the study. The women in all BMI groups did not differ significantly according to age, height, history of abortion and employment.

21 women (5.3%) were underweight, 198 women (50%) were normal weight, 117 women (29.5%) were overweight and 60 (15.2%) were obese. There were no cases of morbidly obese (BMI > 40 kg/m²).

More underweight women were anemic (P=0.002), but there were no significant differences between birth weight (P=0.734), and gestational age at the time of delivery (P=0.124), in women with or without anemia.

Obesity in women had positive correlation with higher gestational age at the time of delivery (r = 0.213, P= 0.015) and a heavier birth weight (r = 0.361, P= 0.008).

In contrast, low birth weight had correlation with low maternal weight (r = 0.157, P=0.041).

Macrosomia was greater in obese women (P=0.022), and BMI had positive correlation with macrosomia (r = 0.224, P=0.034).

Preterm labor showed a negative correlation with BMI (r = – 0.124, P= 0.004) and the women with lower BMI had more preterm labor (P=0.035).

Conclusion: Overweight women were more at risk for macrosomia, while low birth weight (LBW) and spontaneous preterm labor were seen more in underweight mothers.

T3:PO.035

Risk factors and peculiarities of bronchial asthma (BA) in children with obesity

Revyakina¹, Kuvshinova², Monosova², Timofeeva²

¹Institute of Nutrition RAMS Job location – Institute of Nutrition RAMS, Moscow Department – Department of Allergology Position – Head of the Department of Allergology Research interests – Children's Allergy, Immunology, children's obesity

²Institute of Nutrition RAMS

Introduction: There are risk factors of obesity in children with bronchial asthma (BA).

Methods: Analysis of anamnesis, clinical examination, body mass index (BMI), bioimpedance body composition analysis, sIgE antibody of food allergens, pulmonary function.

Results: We examined 98 children aged 6–16 years with BA and obesity. 14 children (14,2%) had overweight (BMI –85–94 percentile) and mild BA (1st group). 84 (85,8%) children had I-II degree of obesity (BMI >94 percentile) and moderate and severe BA (group 2).

In 2 group we found significantly higher frequency of genetic predisposition to allergic diseases through the maternal line compared to 1st group (P < 0.01). These children had significantly more frequent risk factors such as high birth weight (>4000g), chronic eating disorder in the first year of life, low social level of the family, passive smoking. The BA in children of second group characterized daily night attacks suffocation, sleep disruption, decreased exercise tolerance. 56,1% of children had sIgE antibody to food allergens, as compared with children of 2 groups.

We studied the indicators of respiratory function in children with bronchial asthma and obesity and found a violation of bronchial obstruction. They had low lung volume: FEV1–72,1+3,75%, FEF 25–75 46,2+3,67,

FEF 25 –61,1+3,94, FEF 50 to 49.4+3, 94, FEF 75 –36,8+3,59, low functional activity of the respiratory muscles, reduction excursion of chest.

Conclusion: The appointment of a low calorie diet with regard to the intolerable food for children with bronchial asthma and obesity leads to a more rapid loss of weight and control the symptoms of BA.

TRACK 4 – Prevention, Public Health and Epidemiology

T4 – Guided Posters

T4:PO.001

Referral process and its impact on programme outcomes of families on a children's weight management programme

*Kentish*¹, *Gately*²

¹University of Hertfordshire

²Leeds Metropolitan University

Introduction: Obesity is a major public health problem; therefore a critical element of a health professional's service is to engage with patients at risk of related co-morbidities to ensure access to effective interventions. This study set out to compare the outcomes of self and professionally referred candidates onto a childhood obesity intervention.

Methods: 230 children (boys 214, girls 216, aged 5–17 years, above the 85th centile for BMI) were enrolled onto a children's community weight management service run by MoreLife in London. Anthropometric data, was collected pre and post the intervention. Participation rates following enrolment were also captured.

Results: The intervention was effective with a statistically significant ($p < 0.01$) reductions in the primary variable BMI SDS (0.065 ± 0.15). We found no differences in programme outcomes between professional or self-referrals. However there was a statistically significant ($p < 0.001$) difference between the dropout rates of the different referral groups. 56% of professionally referred families dropped out compared to 33% of self-referred families.

Conclusion: These findings show that the intervention works well for those who complete the programme irrespective of referral process. However it is clear additional efforts must be made to engage with referrers to ensure greater completion rates so that all participants benefit consistently.

T4:PO.002

The impact of obesity on medical costs associated with lifestyle-related diseases

*Fuminori Katsukawa*¹, *Kazuya Shimojima*²

¹Sports Medicine Research Center, Keio University

²Kitahara Neurosurgical Institute

Introduction: This study is to examine the impact of obesity on medical care costs, both associated with lifestyle-related (LRD) and non-related diseases (NRD).

Methods: A cohort study to clarify obesity costs for a worksite population between 2008 to 2012. Subjects were 9,910 men and 7,655F women aged 19–59 years. Their medical costs were divided into two categories: LRD and NRD, according to the ICD-10 code by linkage with the employee insurance claim history files. Their average values of BMI and waist circumference were obtained from their annual worksite health check-up data.

Results: Since the individual medical expenditure showed a positively skewed distribution with the highest two percentile (>5000 EUR/year)

covered 25 percent of the whole cost, we excluded these subjects from the analysis. There was a U-shaped association between BMI and total medical costs with a nadir found at BMI of 18.5 to 22.9. However, LRD costs showed a positive association with BMI with the lowest value found at BMI<18.5 (70 EUR/y) and the highest at BMI≥30 (540 EUR/y). Positive associations were also found between waist and LRD costs both in men and women. Obesity (BMI≥30) also showed an increased risk of paying the highest two percentile medical expenditure (odds ratio: 1.97 (1.27 to 3.06)).

Conclusion: Obesity and overweight are associated with increased medical costs, especially those related to LRD.

T4:PO.003

Modelling the effect and potential cost saving of obesity prevention: The case of increased physical activity in a primary school setting

*Vidar Halsteinli*¹, *Rønnaug Ødegård*², *Hanne Skjåkødegård*³

¹PhD, Department of Public Health and General Practice, Faculty of Medicine, Norwegian University of Science and Technology

²MD PhD, Department of Laboratory Medicine, Children's and Women's Health, Faculty of Medicine, Norwegian University of Science and Technology

³MScI, Haukeland University Hospital

Introduction: The aim of this paper is to show how results from effect and cost studies might be applied in a common model for policy evaluation purposes. Increased every day physical activity for pupils 9 to 12 years of age is compared with current level of physical education in Norwegian primary schools.

Methods: A simple decision tree model has been developed. Input is the distribution of normal, overweight and obese pupils at age 9 and probabilities of either remaining within the same BMI category or moving to a lower/higher BMI-category in subsequent years. Outcome is the BMI distribution at age 12. Input values are based on published results. Health care cost savings associated with the number of avoided overweight or obese children is estimated based on published cost-of-illness estimates.

Results: The number of overweight and obese children avoided is sensitive to the extent of which a physical activity effect is assumed to accumulate over years. It is likely that increased physical activity will contribute to reduced number of children with overweight. Comparing effects and potential cost savings are hampered by the need of a life time perspective. Preliminary results are inconclusive whether estimated effects and cost-savings justify intervention costs.

Conclusion: The model is a promising first attempt to link published effect and cost estimates in a common model for policy evaluation purposes. Current and future intervention studies are requested to publish outcome results for BMI categories to increase the empirical basis for modelling purposes.

T4:PO.004

Which costs does childhood obesity cause? Implications for obesity prevention in Germany

*Diana Sonntag*¹, *Freia de Bock*²

¹Mannheim Institute of Public Health, Medical Faculty Mannheim of the University of Heidelberg

²Department of Pediatrics, University Medicine Mannheim; Mannheim Institute of Public Health, Medical Faculty Mannheim of the University of Heidelberg

Introduction: The increasing prevalence of overweight and obesity in children has been linked to parallel increases in associated medical comorbidities, such as the metabolic syndrome, resulting in a major public health concern. This study quantifies lifetime excess costs of obesity in Germany as a representative European country acknowledging a history of obesity in childhood.

Methods: At stage 1 of the two-stage Markov model, the distribution of BMI categories was tracked from 3–17 years. At the starting point of stage 2, cohort members were distributed across two BMI categories (having been normalweight or overweight/obese). Starting at age 18, age-specific lifetime costs were simulated using two further Markov models. The German Interview and Examination Survey for Children and Adolescents (KiGGS) and the German Microcensus 2009 provided model parameter values. Cost estimates for overweight/obesity in childhood were identified by a systematic literature review.

Results: A history of obesity in childhood leads to substantially increased excess lifetime costs for men (26,071 EUR, 3% discounted 8,468 EUR; increase by 3) and women (25,622 EUR, 3% discounted 9,470 EUR; factor 4). Transition probabilities from overweight to obesity were especially high during childhood years and most obese children remained obese during adulthood.

Conclusion: Our results confirm that early childhood years might be crucial for reducing the economic burden of the obesity epidemic. Our models can serve as a starting point for evaluating cost-effectiveness of efforts to prevent overweight and obesity in early childhood.

T4:PO.005

Patients' perceptions about obesity-related co-morbidities in primary health care in the Greek region of Thrace

Tsolaki¹, Pafili², Papatheodorou², Hartaba³, Leontidou⁴, Kiose¹, Manolis⁴, Vakas², Papanas², Papazoglou²

¹Primary Care Health Centre of Sapes, Rodopi, Greece

²Outpatient Department of Obesity and Metabolic Syndrome, Democritus University of Thrace University Hospital of Alexandroupolis, Greece

³Primary Care Health Centre of Soufli, Evros, Greece

⁴Primary Care Health Centre of Iasmos, Xanthi, Greece

Introduction

Obesity rates are consistently high in peripheral, mainly rural districts. Little is known about the opinions and beliefs of patients in primary health care about the possible complications of obesity.

Methods: Patients who visited primary health care centres for unrelated to obesity per se reasons were asked to fill out a simple questionnaire assessing their knowledge about the relation between obesity and four major complications, i.e. diabetes, hypertension, neoplasia and depression. BMI, place of living (rural or urban), educational level and religion (Christian or Muslim) were also recorded.

Results: A total of 577 patients, 239 males (43.15%) and 328 females (43.15%) with mean age 47.1 ± 14.8 years and mean BMI 27.7 ± 5.7 kg/m² participated in the study. Four out of five patients believed that obesity is related to diabetes and hypertension. Patients who responded positively to these questions had a higher educational level ($p = 0.013$ and $p = 0.001$ respectively). A smaller percentage of the participants (46.7% of males and 36.1% of females), mostly males of older age ($p = 0.016$), believed that there is a connection with cancer, while 67.7% of males and 72.1% of females responded that obesity is related to depression. BMI of patients, place of living and religion did not affect their answers.

Conclusion: Most patients in primary health care are aware about the relation between obesity, diabetes, hypertension and depression, but less about cancer. Age and educational level but not BMI, place of living or religion affected their answers. Good knowledge of patient's perceptions will help establish more effective preventive programs.

T4:PO.006

Evaluation of the impact of interventions aiming to promote healthy behaviors and weight in young people in Canada: A review

Philippe De Wals, Nathalie Dumas, Michael Gandonou Migan, Sherri Bisset

Evaluation Platform on Obesity Prevention, Quebec City Heart and Lung Institute, Laval University, Quebec City, Canada.

Introduction

In Canada, numerous interventions have been implemented to counter the rise of child obesity. These interventions involve considerable resources: human and financial.

Methods: The goal of this study was to systematically review the Canadian evidence surrounding the nature, quality and usefulness of evaluated studies, of interventions for obesity prevention published in peer-reviewed journals during the period from January 2000 to december 2013. A systematic search in 7 databases with 10 research strategies was performed with a focus on primary interventions that used different tools for protecting healthy individuals under the age of 18-years by promoting healthy behaviors and body weight.

Results: Out of a total of 31, 089 citations, 42 publications pertaining to 34 interventions were retained: 28/34 were implemented in school setting; four were based on policy and 30/34 interventions were promotion programs; 14/34 targeted eating, 11 targeted physical activities and 9 covered both. Five studies followed a cluster-randomized desing and four were quasi-experimentations with concurrent or historic controle groups. Most evaluations were short-term and did not include biological or antropometric parameters. Often, study desings and tools were far from ideal to identify a statistical significant and unbiased effect.

Conclusion: Compared to the vast amount of resources invested in Canadian interventions, limited investment in the impact evaluation has contributed to few learning outcomes and lessons learned for the scientific community. The reasons are discussed and some avenues for improvement are proposed.

T4:PO.007

Cost-effectiveness of primary care referral to a commercial provider for weight loss treatment, relative to standard care—a modelled lifetime analysis

Nicholas Fuller¹, Hannah Carter², Deborah Schofield², Hans Hauner³, Susan Jebb⁴, Stephen Colagiuri¹, Ian Caterson¹

¹The Boden Institute, The University of Sydney, Australia

²NHMRC Clinical Trials Centre and School of Public Health, The University of Sydney, Australia

³Eise Kroener-Fresenius-Centre for Nutritional Medicine, Faculty of Medicine, Technische Universität München, Munich, Germany

⁴MRC Human Nutrition Research, Cambridge, UK

Introduction: Due to the high prevalence of overweight and obesity there is a need to identify cost-effective approaches for weight loss in primary care and community settings. We evaluated the long-term cost-effectiveness of a commercial weight loss programme (Weight Watchers) (CP) compared with standard care (SC), as defined by national guidelines.

Methods: A Markov model was developed to calculate the incremental cost-effectiveness ratio (ICER), expressed as the cost per quality adjusted life year (QALY) over the lifetime. The probabilities and quality-of-life utilities of outcomes were extrapolated from trial data using estimates from the published literature. A health sector perspective was adopted.

Results: Over a patient's lifetime, the CP resulted in an incremental cost saving of AUD 70 per patient, and an incremental 0.03 QALYs gained per patient. As such, the CP was found to be the dominant treatment, being more effective and less costly than SC (95% confidence interval: dominant to 6 225 per QALY). Despite the CP delaying the onset of diabetes by approximately 10 months, there was no significant difference in the

incidence of type 2 diabetes, with the CP achieving less than 0.1% fewer cases than SC over the lifetime.

Conclusion: The modelled results suggest that referral to community based interventions may provide a highly cost-effective approach for those at high risk of weight-related co-morbidities.

T4:PO.008

How to Accelerate Behaviour Change in Community Based Programmes

Richard Richard¹, Mireille Roillet², Rafael Casas³, Silvia Bucur⁴, Hannah Finch¹, Jean-Michel Borys¹

¹EPODE International Network

²VIASANO, Belgium

³THAO, Spain

⁴Im living healthy too – SETS, Romania

Introduction: Inciting behavior change for a more healthy and active lifestyle represents a significant challenge for public health. It is key that the levers in order to accelerate behaviour change are better understood. The Epode International Network (EIN) is a non governmental organisation which has been created to support Community Based Programmes (CBPs) aimed at preventing obesity. Today 35 programmes from 24 countries are members of the network.

Methods: EIN conducted a study among its members, the objective of which was to identify the importance of a brand in motivating the community and to understand the specificities of communication strategies required to ensure behaviour change. This study compared the communication strategies of CPBs from 4 different countries, analysing the creation and evolution of a specific brand and local strategies (e.g. use of characters, motivational tools and social media...)

Results: The strengths and weaknesses of the communication strategies used will be presented with a specific focus on the importance of communication to incite behaviour change. The results reveal significant differences between programmes. Lessons learned from the reality on the field show that communication implemented from the outset and rigorously maintained throughout the programme has a positive impact on behaviour change, particularly when combined with strategic social marketing tools.

Conclusion: The results of this study demonstrate that motivational tools and the presence of a positive brand image are crucial to accelerate behaviour change in community based programmes.

T4:PO.010

Nutrition, lifestyle and socioeconomic variables as co-determinants of obesity. What EU statistics suggest?

Marina Mastrostefano

CNELM – Centre for Nutrition Education and Lifestyle Management – Wokingham – UK

Introduction: The analysis builds on EU statistics to characterise obesity in Europe and its determinants.

Methods: Descriptive/Quantitative analysis

Results: Descriptive analysis: In EU Member States the proportion of adult overweight/obese varied in 2008 between 36.9–56.7% for women and between 51–69.3% for men. No systematic difference exists in obesity between women and men across the EU. However, the proportion of overweight men is higher than that of women. The share of overweight/obese increases with age. For women the pattern is clear across the EU. For men the picture is less uniform. Everywhere the share of overweight/obese tends to fall with educational level. The share of the overweight/obese rose between 2002 and 2008 mainly in countries experiencing rapid economic growth and among younger generations. Regression analysis: BMI seems to be strongly correlated with consumption of vegetables in the diet and physical activity ($p < 0,005$). The functional relation between BMI and fruit consumption is uncertain and contradictory. No relation emerges between BMI and the consumption of alcohol/tobacco. BMI does

not show a definite relation with the wealth level of EU countries, but it seems higher where income is developing fast (i.e. in some newer EU Member States). *Health life expectancy* indicator are strongly correlated with BMI and physical activity ($p < 0,005$). No a clear relation could be verified between BMI and health care expenditure in EU countries.

Conclusions: Overall the analyses confirm current literature findings and indicate that the EU database is sufficiently sound for further investigations (e.g. a Bayesian model of obesity determinants).

T4:PO.011

Validity of self-reported lunch recalls in Swedish school children aged 6–8 years

Monica Hunsberger

University of Gothenburg

Introduction: Previous studies have suggested that young children are inaccurate reporters of dietary intake. The purpose of this study was to validate a single recall of the previous day's school lunch reported by 6–8 year old Swedish children and to assess teacher-recorded intake of the same meal in a standardized food journal. An additional research question was whether parents could report their child's intake of the previous day's lunch.

Methods: Subjects constituted a convenience sample from the large, multi-country study Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infantS. Validations of both children's recalls and teachers' records were made by comparing results with the duplicate plate reference method. Twenty-five children (12 boys/13 girls) aged 6–8 years participated in the validation study at one school in western Sweden.

Results: Children were accurate self-reporters of their dietary intake at lunch, with no significant difference between reported and weighed intake (Mean difference (SD): 7(50) kcals, $p = 0.49$). Teachers significantly over-reported intake (Mean difference (SD): 65(79) kcals, $p = 0.01$). For both methods, child-reported and teacher-recorded, correlations with weighed intake were strong (Pearson's correlations $r = 0.92$, $p < 0.001$ and $r = 0.83$, $p < 0.001$ respectively). Bland-Altman plots showed strong agreement between child-reported and weighed intakes but confirmed systematic differences between teacher-records and weighed intakes. Foods were recalled by children with a food-match rate of 90%. In all cases parents themselves were unable to report on quantities consumed and only four of 25 children had parents with knowledge regarding food items consumed.

Conclusion: Children 6–8 years of age accurately recalled their school lunch intake for one occasion while teachers recorded with less accuracy.

T4:PO.012

Overweight and obesity assessment of children under 5 in Sofia city using international and national standards and criteria

Lalka Rangelova, Stefka Petrova

National Center of Public Health and Analyses

Introduction: The aim of this study is to determine the prevalence of overweight and obesity in children under 5 in Sofia comparing various standards and criteria for the growth assessment.

Methods: A transversal survey on a representative sample from Sofia covering 636 children aged 0–5 years was conducted in 2007. The height and weight were measured. Children's nutritional status was assessed using the Bulgarian criteria, WHO growth standards, Cole cut-off points and the NCHS/WHO reference values.

Results: The rate of children with high values of indices Weight-for-age, Weight-for-height (WH), BMI-for-age assessed by national and international standards differs substantially.

According to the WHO standards, the prevalence of children aged 12–59 months with overweight was 5.3% (WH+2Z±+3Z), obesity – 1.0% (WH>+3Z), at risk for obesity – 15.6%. The rate of infants with overweight was 1%, at risk for overweight was 11%.

The prevalence of overweight in all studied age groups assessed on the basis of NCHS/WHO reference values were similar compared to those evaluated by WHO growth standards.

The incidence of overweight and obesity among children aged 24–59 months was evaluated higher when Cole cut-off points were applied.

An adequate assessment of overweight and obesity in children under 5 cannot be made using Bulgarian criteria because relevant indices (WH/BMI-for-age) are not available.

Conclusion: Determination of the percentage of children under five with overweight and obesity continues to be a topic of the discussion in Bulgaria. Inadequate assessments of overweight in children under five substantially improve risk of obesity in childhood.

T4:PO.013

Geographic variation of Hypertension in Sub-Saharan Africa: A case study of South Africa

Tigbe¹, Kandala¹, Manda², Stranges¹

¹University of Warwick

²University of Kwazulu-Natal South African Medical Research Council

Introduction: Developing countries are experiencing a fair share of obesity and its complications. Hypertension is becoming increasingly important in sub-Saharan Africa. The present study examined the province-level variation of hypertension in South Africa, accounting for individual-level risk factors.

Methods: The analysis was based on the South African Demographic and Health Survey, including 13,596 men and women aged 15 years and over. Individual data were collected on lifestyle habits and cardiovascular comorbidities, but were aggregated to the nine provinces of South Africa. Accounting for individual risk factors (sociodemographics, lifestyle and other cardiovascular comorbidities), a Bayesian geo-additive mixed model was used to map the geographic distribution of hypertension at the province level.

Results: Overall prevalence of hypertension was 30.4%. In multivariate Bayesian geo-additive models, current smokers (odds ratio[OR] and 95% credible region[CR]: 1.14[1.03, 1.26]), current drinkers (1.17[1.05, 1.29]), people reporting sleep problems (1.16[1.02, 1.31]), and participants with prevalent cardiovascular comorbidities, such as type 2 diabetes (2.49[1.92, 3.13]), were significantly associated with a higher prevalence of hypertension. A striking variation in hypertension prevalence across provinces was observed, the highest being in North West (1.33[1.14, 1.61]), Free State (1.32[1.08, 1.68]) and Northern Cape (1.30[1.02, 1.55]), the lowest in Limpopo (0.68[0.56, 0.84]).

Conclusion: This study showed distinct geographic patterns in hypertension prevalence in South Africa. It is most probable that differences in socioeconomic, nutritional and environmental factors at the province level explain the observed distribution of hypertension in South Africa. This study will help policy makers to target these communities with the appropriate interventions.

T4:PO.014

Five years trend in the relation of age and BMI to the prevalence and incidence of hypertension and diabetes

Stepan Svacina¹, Martin Matoulek¹, Dagmar Matejkova², Dana Mullerova², Jan Lajka³

¹3rd Medical Department, 1st Medical Faculty, Charles University, Prague, Czech Republic

²Medical Departmentt Medical Faculty, Charles University, Pilsen, Czech Republic

³STEMMARK Agency, Prague

Introduction: The prevalence of diabetes and hypertension is increasing by age and BMI. We have analysed this linkage in last 5 years to analyse the trend in this relation.

Methods: A survey of obesity was performed in standardized random sample of population – more than 2000 subjects from all regions and ages in the years 2008, 2010 and 2013. We have evaluated the prevalence of diabetes and hypertension in relation to BMI and age. We have also analysed reported age of diabetes and hypertension diagnosis.

Results: The mean age of hypertension diagnosis decreased 10 years of age during 5 years. Most common age of hypertension diagnosis was 51–60 years and it is 41–50 years now. The mean age of diabetes diagnosis moved down about 5 years. Most common age of diabetes diagnosis is still in the interval 51–60 years. The prevalence of hypertension in obesity decreased from 48 to 46% in obesity and increased from 22 to 25% in overweight. The prevalence of diabetes in obesity remains 7% in the whole population and decreased from 20 to 18 in obesity and increased from 6 to 8% in overweight. All results are significant ($p \leq 0.05$ in X² test).

Conclusion: The incidence of diabetes and hypertension moves down to younger ages. The prevalence of both diabetes type 2 and hypertension is increasing in the overweight group and decreasing in the obesity group. A hypothesis can be proposed that other lifestyle and environmental factors are more important than BMI. These factors make the population more sensitive to diabetes and hypertension already in the overweight phase.

T4:PO.015

Differential roles of free fatty acids in an experimental model of obesity

Kameliya Bratoeva¹, Albena Merdzhanova²

¹Division of Pathophysiology, Department of Physiology and Pathophysiology, Medical University of Varna

²Department of Chemistry, Faculty of Pharmacy, Medical University of Varna

Introduction: High-fructose diet causes obesity, metabolic and oxidative damage to hepatic steatosis in rodents and has been successfully used for the modeling of a fatty liver disease in humans. The latest studies of various dietary models showed that autophagy is involved in both the lipid metabolism and the limitation of the oxidative damages in the liver. Different lipid classes may also have different effects on cells function. Given the importance of lipogenesis in liver injury, the aim of this study was to determine the effects of the free fatty acids on autophagy and oxidative stress in fatty liver in fructose-induced experimental model.

Methods: Male Wistar rats were divided into two groups ($n = 7$): control group (on a standard diet), and fructose fed (35% in the drinking water, 16 weeks). Body and retroperitoneal fat weight were determined. Analysis of fatty acids was performed by GasChromatography-Mass spectrometry. Liver injury was assessed biochemically and histologically together with hepatic Beclin1 (initiating autophagy protein) expression.

Results: The results showed increase body ($p < 0.05$) and retroperitoneal fat ($p < 0.01$) weight, liver MDA levels ($p < 0.05$), microvesicular steatosis, suppressed Beclin1 expression and an increased in the ratio of very long-chain saturated to unsaturated fatty acids- C20:0-C24:0 in fructose fed rats compared with control group.

Conclusion: Fructose induces obesity and de novo lipogenesis in hepatocytes with threefold increased accumulation of very long-chain saturat-

ed fatty acids (VLCSFAs). Excess VLCSFAs coincided with suppressed autophagy, oxidative damage and steatosis, which identifies them as an important factor in liver injury in obesity.

T4:PO.016

Socioeconomic Status and Risk for Pre-diabetes and Diabetes in U.S. adults: A study of biopsychosocial pathways

Tsenkova

University of Wisconsin-Madison

Introduction: Low socioeconomic status (SES) consistently predicts higher risk for type 2 diabetes and many of its risk factors such as obesity and sedentary lifestyle. Our goal was to use structural modeling to test a hypothesized model of pathways linking SES to pre-diabetes and diabetes in U.S. adults and evaluate potential pathways such as physical activity, sleep, emotional eating, obesity, insulin, and IL6.

Methods: Data came from the MIDUS II (Midlife in the U.S.) national sample of adults (N=1255, ages 34–84). Sociodemographic covariates and behavioral data were assessed via questionnaires and during an overnight stay at a General Clinic Research Center. Glucose and HbA1c were used to create the categorical outcome measure of gluco-regulation (no diabetes/prediabetes/diabetes). Structural equation modeling was performed to examine the relationships among these variables.

Results: Our best fit model showed that low SES significantly predicted lower physical activity and sleep duration and higher stress eating (all p 's < .01) which in turn predicted higher waist circumference (all p 's < .05). Physical activity, stress eating, and waist circumference predicted higher IL-6 and insulin which in turn predicted higher risk for pre-diabetes and diabetes (all p 's < .05). All analyses were adjusted for a comprehensive set of sociodemographic and health confounders.

Conclusion: Type 2 diabetes is a multifactorial disease with established risk factors from multiple domains. Our model integrates diverse pathways to show that the social and economic environment propels unequal trajectories of health behaviors that ultimately influence health.

T4 – Community/population strategies and interventions

T4:PO.017

Is Public-Private Partnership a Key of Sustainability for Obesity Prevention Community-Based Programmes?

Jean-Michel Borys, Pierre Richard, Pauline Harper, Hugues Ruault Du Plessis, Hannah Finch

EPODE International Network

Introduction: The EPODE International Network (EIN) is a not-for-profit organisation whose mission is to build capacity and capability in implementation, evaluation and sustainability of community-based programmes (CBPs) aimed at preventing obesity and to support experience sharing at global level. The EIN gathers 35 programmes from 25 different countries.

The objective of this study was to investigate practices concerning Public-Private Partnerships of EIN members to provide an overview and valuable basis for the EIN to discuss the priorities and challenges to be addressed.

Methods: The survey was an online qualitative and quantitative questionnaire of 38 open, closed, Likert and multiple-choice questions. It was divided into 4 parts: General information, Partnership framework, PPP within programmes and Perception of PPP. The average time taken to answer all the questions was 45 minutes.

Results: The results reveal that 73% of CBP members are implementing a PPP at central level and 100% of CBPs are implementing a PPP at local level. The results reveal diverging perceptions regarding benefits and challenges of a PPP, the complexity of governance, the necessity of an ethical charter, the reasons for ending a partnership ...

Conclusion: The results demonstrate that PPP is a key pillar of sustainability. While all programmes have a PPP at local level, PPP should be promoted at central level. In the current economic climate it is urgent that a PPP framework is developed in order to guarantee the sustainability of CBPs. This is a key objective of EIN.

T4:PO.018

Prevalence of overweight and obesity among school age children in Iraq

Azad Haleem¹, Abbas Ahmed²

¹University of duhok-college of medicine-Lecturer-Pediatrician

²Hawler Medical University- Erbil-professor of pediatrics

Introduction: The Prevalence of child obesity is increasing rapidly worldwide. It is believed that childhood obese can lead to adulthood obesity. Children and adolescents who are obese are at greater risk for bone and joint problems, sleep apnea, and social and psychological problems such as stigmatization and poor self-esteem. It is also associated with several risk factors for later heart disease and other chronic diseases including hyperlipidaemia, hyperinsulinemia, hypertension, and early atherosclerosis.

Methods: A cross-sectional study was conducted among 2009 school aged 10–17 years old children in Duhok and Erbil cities/Iraq. Multistage sampling method used (Stratified sampling then Simple random sampling in phase two and three). The data were collected from 5th Februarys 2012 to 10 July 2012 using a self-administered, pretested questionnaire. Anthropometric measures were taken in schools; BMI was calculated for each child as the ratio of weight (kg) to height (m) squared (kg/m²). All measurements were performed twice depended on CDC data.

Children were classified as follows: <5th percentile underweight, 5th percentile to <85th percentile Healthy weight, 85th percentile to <95th percentile overweight and ≥95th percentile considered obese.

Results: The overall prevalence of overweight and obesity were 15.2% and 12.1%, respectively. Prevalence of obesity was higher among male, from Erbil, physically inactive & those with positive family history of overweight and obesity.

Conclusion: Based on the study results, it is recommended that weight, height and BMI should be assessed regularly in children and adolescents to identify individuals at risk.

T4:PO.019

An intervention to promote Healthy Eating and Physical Activity in Lebanese School children: Health-E-PALS, a pilot cluster randomised controlled trial

Carla Habib-Mourad¹, Lilian Ghandour¹, Helen Moore², Nahla Hwalla¹, Carolyn Summerbell², et al.

¹American University of Beirut

²Durham University

Introduction: In Lebanon, childhood obesity doubled during the past decade. School-based programmes promoting healthy lifestyles are lacking. The purpose of this study was to develop, implement and evaluate the effectiveness of a multicomponent school-based intervention to promote healthy eating and physical activity and prevent obesity, with school children aged 9–11 years in Lebanon.

Methods: The intervention was developed based on the constructs of the Social Cognitive Theory and adapted to the culture of Arab populations. It consisted of three components: class curriculum, family involvement and food service. Eight schools were purposively selected from two dif-

ferent communities in Beirut and were randomly assigned to either the intervention or control group. Anthropometric measurements were taken, and questionnaires on determinants of behavioural change, eating and physical activity habits were completed by the students in both groups at baseline and post intervention. Focus group interviews were conducted in intervention schools at the end of the study.

Results: Students in the intervention group reported purchasing and consuming less chips and sweetened drinks post-intervention compared with controls (86% & 88% less respectively $p < 0.001$). Knowledge and self-efficacy scores doubled only for the intervention group at post-test. No differences in physical activity or screen time habits were observed in either group. Focus groups interviews showed that the programme was well accepted and viewed as enjoyable. Limitations to better outcomes include the short duration of the intervention and the unchanged school environment.

Conclusion: "Health-E-PALS" is a promising theory-based, culturally sensitive intervention to promote healthy eating habits and physical activity in Lebanese school children.

T4:PO.020

Culture congruent obesity interventions: a challenge for South African health practitioners

Tendani Ramukumba

None

Introduction: Obesity has become a silent epidemic in South Africa and is the main cause of death due to non-communicable diseases such as diabetes mellitus, hypertension, strokes, cardiovascular diseases and loss of mobility. Those who do not die become chronically ill with poor quality of life. Issues of obesity management pose a challenge due to differences worldviews amongst the multidisciplinary team and the clients. The presentation aims to differentiate between the biomedical worldview and cultural worldviews regarding obesity meanings, impact and interventions.

Methods: A three phased study conducted using multiple mixed methods namely qualitative exploratory, quantitative descriptive and participatory action research. During the participatory action research phase a culture fit was negotiated to implement the weight reduction community intervention. Statistical frequency distribution and content analysis were followed.

Results: The findings of the situational analysis in Thulamela Municipality indicated that majority (82.3%) of participants were overweight, obese, severely obese to morbidly obese. Furthermore, results show that the concept of obesity does not exist among the participants, and that overweight and obesity are desirable state of body size and a sign of affluence. Decisions to reduce weight were from cultural context when competing with biomedical worldviews proves to be barriers to subsequently decision to reduce weight.

Conclusion: Health practitioners are to introduce obesity interventions from the client's point of view. The challenge of obesity intervention is diverse worldviews held by individuals; the multifactorial issues demand multifocal approach.

T4:PO.021

A randomised feasibility trial of Weight Watchers groups with additional dietetic support compared to Weight Watchers groups only in women treated for breast cancer: The *Breast Cancer Healthy Weight (BRIGHT) Study*

Rumana Newlands¹, Leone Craig², Julia Clark³, McNeill McNeill⁴, Pat Hoddinott⁵, Steven Heys⁶

¹PhD student, Public Health Nutrition Group

²Research Fellow, Public Health Nutrition Group, University of Aberdeen

³Research dietitian, Public Health Nutrition Group, University of Aberdeen

⁴Chair, Public Health Nutrition Group, University of Aberdeen

⁵Chair, School of Nursing, Midwifery and Health, University of Stirling, Stirling FK9 4LA

⁶Chair in Applied Medicine, University of Aberdeen, Aberdeen AB25 2ZD

Introduction: Women who are overweight or obese at breast cancer diagnosis and/or after treatment are at higher risk for disease recurrence. Weight loss interventions are important to produce positive health outcomes in these women. Following three preliminary studies; a systematic review, questionnaire survey and qualitative research among patients, a weight management programme was designed for breast cancer patients and a pilot trial is being conducted to evaluate the feasibility and acceptability to inform the design of a future trial.

Methods: Participants will be randomised to one of three groups for 12 weeks: (A): Weight Watchers (a community based commercial weight management programme) with additional breast cancer tailored dietitian-led group (BCTG), (B): Weight Watchers only group and (C): Wait-list control group. The wait-list control group has no additional contact after an initial baseline meeting until they attend the end-point visit when they will receive Weight Watchers vouchers. Weight and quality of life (QoL) will be measured at baseline and trial end-point. At trial end, semi-structured interviews will be conducted to explore participants' views and experiences. To date, 18 of the target 90 women are enrolled and randomly assigned to one of the 3 groups using minimisation on age, BMI and time since diagnosis.

Results: Changes in body weight and QoL will be reported at the end of the study. The feasibility and acceptability of the trial will also be evaluated.

Conclusion: This weight management intervention, designed to meet the preferences of women treated for breast cancer, could inform future clinical practice.

T4:PO.022

The South Yorkshire Cohort (SYC): A new research platform for obesity research

Haywood¹, Green¹, Relton¹, Smith², Goyder¹, Bissell¹

¹University of Sheffield

²Barnsley Hospital

Introduction: The South Yorkshire Cohort (SYC) is a longitudinal observational study set up both to collect health information on the residents of South Yorkshire, England and be a facility for additional nested observational and intervention studies. It is designed with the 'cohort multiple randomised controlled trial' approach, allowing multiple randomised controlled trials within a large cohort study, overcoming traditional issues facing study recruitment. An aim of the SYC is to focus on obesity and weight management, particularly the relationship of obesity to long-standing health conditions.

Methods: Patients from 43 general practices across South Yorkshire were invited to participate and were sent a questionnaire. Data were collected on a wide range of variables including demographic characteristics, current and long-term health, health care and health-related behaviours.

Results: Questionnaires were returned from 27,806 adults and 22,179 consented to be contacted again to take part in further studies. 22,150 also

consented for record linkage with NHS held clinical data. How the cohort has been applied in the field of obesity research will be discussed.

Conclusion: The SYC builds upon other population cohort studies which are less relevant to fulfilling the needs of the NHS for community-based obesity research. It presents a wide range of data for exploring patterns in obesity longitudinally. The cohort multiple randomised controlled trial approach provides the potential for the SYC to be a useful research platform. The SYC actively encourages researchers to utilise the sample through the embedding of randomised controlled trials, other controlled trials and qualitative studies.

T4:PO.023

Grey literature in nutrition, health and food safety – an explorative study into size, needs of scientists and retrievability

Liliana François¹, Miriam Haakma¹, Astrid van der Harst¹, L. Cristobal Monraz Gomez¹, Maartje Schreurs¹, Roderick Gielis², Nick Vos², Renger Witkamp¹, Hans Verhagen²

¹Wageningen University, the Netherlands

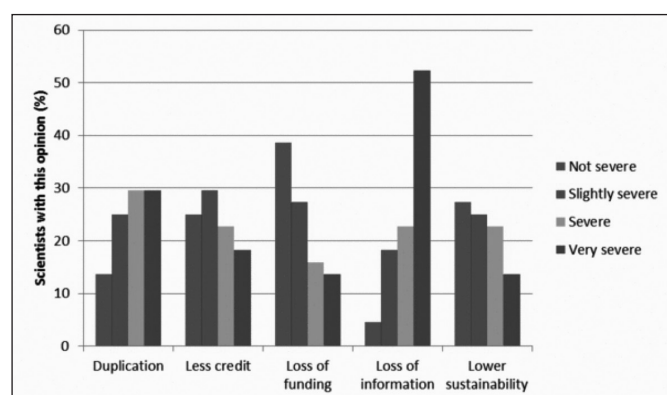
²National Institute for Public Health and the Environment (RIVM), the Netherlands

Introduction: Grey literature covers all reports from public research institutes, which are not peer-reviewed scientific papers. We explored the grey literature in the field of nutrition, health and food safety. The work focusses on the size, the needs for scientists to publish grey literature, as well as to retrieve grey literature.

Methods: We performed an explorative descriptive, semi-quantitative study. A questionnaire was sent to scientists in the field of nutrition, health and food safety. The scientists were employed in governmental institutes, academic institutes or research institutes.

Results: Scientists recognized the issue of grey literature, but had mostly no idea about the size (amount and extent) within their own institutes. Also, the number reported by scientists did not match the number found on websites of the institutes. Although there are various repositories especially for the storage of grey literature, most scientists are not aware of them. The results also gave some insight in the perceived needs and problems with retrievability. Figure: Consequences of grey literature and severity.

Conclusion: This study should be considered as a first attempt to explore the grey literature in the field of nutrition, health and food safety. The main finding was that the size and impact of grey literature is not to be underestimated. Scientists indicated that they want to improve retrievability of the documentation since they are considered often very valuable to the scientific community and the general public. Increasing the awareness of the amount grey literature and ways to improve the accessibility are points of attention for further research.



T4:PO.024

Impact of an intervention taught by trained teachers on dietary quality in children

Rosário¹, Araújo², Padrão³, Oliveira³, Lopes⁴, Teixeira³, Moreira⁵, Barros³, Pereira⁶, Moreira³

¹University of Minho, School of Nursing

²University of Porto

³University of Porto, Faculty of Nutrition and Food Sciences

⁴Sport's Medical Center of Minho

⁵University of Porto, Faculty of Medicine

⁶University of Minho, School of Education, Research Centre in Child Studies

Introduction: Dietary quality, examined as a multidimensional approach, has been appealed for researchers and is used as a dietary guidance to prevent diet-related chronic diseases. We aimed to evaluate the impact of an intervention program, taught by trained teachers, on foods and nutrients components of Diet Quality Index-International among children in grades 1 to 4.

Methods: 464 children (239 female, 6 to 12 years) from seven elementary Portuguese schools participated in this randomized trial. Three schools were allocated to the intervention, and four to the control group. The intervention program was based on the Health Promotion Model and social cognitive theory. Teachers previously trained by researchers in nutrition and healthy eating implemented the intervention in the classroom from November 2008 to March 2009. Sociodemographic, anthropometric, physical activity, and dietary assessments were performed before (2007/2008) and at the end of the intervention (2009). Dietary intake was gathered by a 24-hour dietary recall and the components of Diet Quality Index-International were defined.

Results: Children from the intervention schools reported a significantly higher adequacy in vegetable consumption ($p = 0.018$) and a significantly higher moderation in sodium consumption ($p = 0.032$) compared with the controllers.

Conclusion: Our study provides further support for the success of intervention programs which aim to improve the consumption of food and nutrient components in children.

T4:PO.025

Patients' perceptions about obesity-related comorbidities in primary health care in the Greek region of Thrace

Tsolaki¹, Pafil², Papatheodorou², Hartaba³, Leontidou⁴, Kiose¹, Manolis⁴, Vakas², Papanas², Papazoglou²

¹Primary Care Health Centre of Sapes, Rodopi, Greece

²Outpatient Department of Obesity and Metabolic Syndrome, Democritus University of Thrace University Hospital of Alexandroupolis, Greece

³Primary Care Health Centre of Soufli, Evros, Greece

⁴Primary Care Health Centre of Iasmos, Xanthi, Greece

Introduction

Obesity rates are consistently high in peripheral, mainly rural districts. Little is known about the opinions and beliefs of patients in primary health care about the possible complications of obesity.

Methods: Patients who visited primary health care centres for unrelated to obesity per se reasons were asked to fill out a simple questionnaire assessing their knowledge about the relation between obesity and four major complications, i.e. diabetes, hypertension, neoplasia and depression. BMI, place of living (rural or urban), educational level and religion (Christian or Muslim) were also recorded.

Results: A total of 577 patients, 239 males (43.15%) and 328 females (43.15%) with mean age 47.1 ± 14.8 years and mean BMI 27.7 ± 5.7 kg/m² participated in the study. Four out of five patients believed that obesity is related to diabetes and hypertension. Patients who responded positively to these questions had a higher educational level ($p = 0.013$ and $p = 0.001$ respectively). A smaller percentage of the participants (46.7% of males and 36.1% of females), mostly males of older age ($p = 0.016$), believed that there is a connection with cancer, while 67.7% of males and 72.1% of

females responded that obesity is related to depression. BMI of patients, place of living and religion did not affect their answers.

Conclusion: Most patients in primary health care are aware about the relation between obesity, diabetes, hypertension and depression, but less about cancer. Age and educational level but not BMI, place of living or religion affected their answers. Good knowledge of patient's perceptions will help establish more effective preventive programs.

T4:PO.026

Peer led obesity support groups in the UK, a history, a snapshot and implications for the future

Kenneth Clare¹, Maureen Williams²

¹WLSinfo

²Merseyside Development Federation

Introduction: Since 2002 there has been a range of support groups across the UK, the authors review their evolution and current position.

Methods: Direct observation and interview with support group leaders and members across the UK.

Results: Most groups started locally based on a face to face peer led model. The development and adoption of the internet as an enabling technology changed the nature of groups. Some have coalesced into a federation model or affiliated into larger groups. There are also groups with commercial affiliations.

Conclusion: Looking at how the current picture has developed has enabled an understanding of our current position. It has raised issues of the models that can be employed to develop support groups. We have also gained insight into the training and development needs of the support group facilitator. It has also given an indication of the variety of printed materials and other resources employed and what could best be offered to further develop groups. Direct patient feedback indicates that peer led support groups offer advantages over professional led meetings. Patients prefer the peer support delivered by fellow patients. There is still a clear need for professional led support although this may be in developing a more structured educative approach.

We are pleased to offer our results to partners from other international groups for shared learning.

T4:PO.027

Relationship between central obesity and gastroesophageal reflux disease in the community-dwelling old people – Tianliao Old People (TOP) study 06

Chin-Sung Chang¹, Szu-Jen Yang², Yin-Fan Chang³, Ping-Yen Liu⁴, Shin-Jiuan Wu⁵, Ching-Ju Chiu⁶, I-Ming Jou⁷, Chuan-Yu Chen⁸, Chih-Hsing Wu³

¹Department of Family Medicine, National Cheng Kung University Hospital, Tainan, Taiwan Graduate Institute of Clinical Medicine, College of Medicine, National Cheng Kung University, Tainan, Taiwan

²Department of Medicine, College of Medicine, National Cheng Kung University, Tainan, Taiwan

³Department of Family Medicine, National Cheng Kung University Hospital, Tainan, Taiwan

⁴Department of Internal Medicine, National Cheng Kung University Hospital, Tainan, Taiwan

⁵Department of Food and Nutrition, Chung Hwa University of Medical Technology, Tainan, Taiwan

⁶Institute of Gerontology, National Cheng Kung University Medical College, Tainan, Taiwan

⁷Department of Orthopedics, National Cheng Kung University Hospital, Tainan, Taiwan

⁸Department of Community Medicine, St.Martin De Poress Hospital, Chiayi, Taiwan

Introduction: The central obesity (CO) and gastroesophageal reflux disease (GERD) are both endemic but under-evaluated health hazards in the

elderly. However, the relationship between CO and GERD is still inconclusive, especially for the elderly living in rural community.

Methods: In 2012, 546 old males and females with completed data were enrolled by whole township random sampling from the Tianliao district, southern Taiwan. Biochemical and anthropometric parameters were obtained after an overnight fast. Basic data, psycho-social and behavior factors, gastroesophageal reflux disease questionnaire (GERDQ), mini-nutritional assessment and history of chronic disease were obtained from structured questionnaires. CO was defined as waist circumference in man ≥ 90 cm or woman ≥ 80 cm. According to the score of GERDQ, subjects were divided into normal (score < 12) or GERD (score ≥ 12) groups for further analysis. Multiple logistic regression analysis was performed to disclose associated factors of GERD.

Results: Of the 546 elderly subjects, the average age was 76.0 ± 6.2 years and 46.8% was female. Prevalence of GERD and CO was 21.8% and 60.6%, respectively. Using the multiple logistic regression model, 414 participants with less than 3 kinds of medicine daily revealed CO (OR=2.41, 95% CI: 1.14-5.09), tea drinking habit (OR=5.18, 95% CI: 1.03-26.05) were positively and nutritional status (OR=0.32, 95% CI: 0.15-0.66) was negatively associated with GERD.

Conclusion: High prevalence of GERD and CO were found in old people. The independently associated factors were central obesity, tea drinking habit and nutritional status for the elderly without polypharmacy dwelling in a rural community.

T4:PO.028

Vivons en Forme (VIF) Programme: Pilot field study assessing feasibility of a questionnaire evaluating life style habits of 8–10 year old children

Monique Romon¹, Christophe Roy², Gaelle Boulic¹

¹EA 269⁴Université Lille2

²Association FLVS

Introduction: Community-based programs that affect healthy environments and policies have emerged as an effective response to high obesity levels. Their evaluation is a major challenge necessary to their evolution and adaptation. The last step of evaluation is to measure individual-level outcomes. We are still lacking self-reported individual measures feasible in community setting, reliable and valid. Vivons en Forme (VIF) is a program aiming at helping municipalities to implement actions preventing childhood obesity. We have built questionnaire on life style evaluation for 8–10 year old children and their parents. The aim of this study was to evaluate the feasibility of the questionnaire in field conditions.

Methods: The study was conducted in four schools, located in 3 different towns. Teachers were given written instruction to deliver questionnaires. The child questionnaire was completed at school and parent were asked to fill it at home.

Results: 216 questionnaires were distributed, 100% were completed by children and 88% by parents. The response rate to questions was 96% to 100%. 3 questions had a response rate lower than 80% and were changed. Some preliminary results emerge from this pilot study : 20% of children eat fruit less than once per week, 25% of children from deprived area (DA) report eating junk foods daily vs 7% of children non DA school. Fifty per cent children have at least two screens in bed room.

Conclusion: This study demonstrated the feasibility of the questionnaire and its acceptance both by families and local staff.

T4 – Obesity assessment

T4:PO.029

Is non-alcoholic fatty liver disease less frequent among women with Prader-Willi syndrome?

Alessandro Sartorio¹, Giorgio Bedogni², Graziano Grugni¹, Valerio Nobili³, Fiorenza Agosti¹, Antonella Saezza¹

¹Istituto Auxologico Italiano, IRCCS, Experimental Laboratory for Auxo-endocrinological Research & Division of Auxology, Milan and Verbania, Italy

²Liver Research Center, Basovizza, Trieste & International Center for the Assessment of Nutritional Status (ICANS), University of Milan, Italy

³Bambino Gesù Children's Hospital & Research Institute, Liver Research Unit, Rome, Italy

Introduction: Patients with Prader-Willi syndrome (PWS) have been hypothesized to be at lower risk of non-alcoholic fatty liver disease (NAFLD) because of higher insulin sensitivity. However, PWS patients have a peculiar body composition, i.e. higher fat mass and lower fat-free mass, which may confound such associations. We evaluated whether NAFLD is less frequent in PWS than in non-PWS women matched on percent body fat (PBF).

Methods: PBF was measured by dual-energy x-ray absorptiometry. Liver fat was assessed by ultrasonography. Insulin sensitivity and beta-cell function were evaluated by oral glucose tolerance testing. Coarsened exact matching (CEM) was used to match PWS and non-PWS women on PBF. General and generalized linear models taking CEM into account were used to perform comparisons between PWS and non-PWS women.

Results: 20 women with PWS were matched to 27 women without PWS on the basis of PBF (mean 53 vs. 54%, $p = 0.6$). Insulin sensitivity and beta-cell function were similar in the two groups. However, the prevalence of NAFLD was 25% in PWS vs. 59% in non-PWS women ($p = 0.04$).

Conclusion: NAFLD is less frequent in PWS than in non-PWS women but this finding is not associated with higher insulin sensitivity.

Conflict of interest: No conflict of interest

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T4:PO.030

Dietary and serum total antioxidant capacity scores in relation with normal weight obesity in university male students

Amani¹, Prohan¹, Haghhighzadeh²

¹Dept. of Nutrition, School of Paramedicine, Diabetes Research Center, Jundishapur University of Medical Sciences, Ahvaz, Iran

²Dept. of Statistics and Epidemiology, School of Public Health, Jundishapur University of Medical Sciences, Ahvaz, Iran

Introduction: Normal weight obesity (NWO), defined as the combination of normal BMI (18.5–24.9 kg/m²) and high body fat (BF) percent (≥ 66 th gender-specific percentile), is associated with signs of oxidative stress and inflammation similar to that found in typical obesity. The aim of present study was to assess the association between NWO, dietary and serum total antioxidant capacity (TAC) levels in young subjects.

Methods: Forty five age-matched male university students were subdivided as follows: 15 normal-weight (NW) (BMI < 25 kg/m²; BF% < 15 %); 15 NWO (BMI < 25 kg/m²; BF% > 15 %); 15 preobese-obese (OB) (BMI > 25 kg/m²; BF% > 15 %) subjects. A semi-quantitative food frequency questionnaire and 2-day 24-h recalls were used for dietary assessment. Dietary Torolox equivalent antioxidant capacity (TEAC) scores, BF% and TAC of serum were also measured.

Results: The OB group had significantly higher calorie intake than the NW and NWO groups ($p < 0.05$). Serum TAC was significantly lower in NWO and OB compared with NW group ($p < 0.05$). No significant differences in dietary TEAC scores were observed between the study groups.

Conclusion: Serum TAC levels were significantly lower in NWO and OB groups indicating a possible increased oxidative stress in these subjects. However, dietary TEAC scores showed no significant differences between the groups. It is concluded that the increased percentage of body fat observed among young normal weight obese and/or obese subjects is associated with lower total antioxidant status.

T4:PO.031

Obesity: Cholesterol reduction potential of *Dacryodes Edulis*

Hanson Iyawe

Ambrose Alli University, Faculty of Natural Sciences, Department of Biochemistry.

Introduction: Obesity is prevalent in both developed and developing countries of the world. There are obesity-treatment drugs available on the market. Because of dissatisfaction with high costs and potentially hazardous side-effects, the potential of natural products for treating obesity is under exploration. A variety of natural products, including crude extracts and isolated compounds from plants, can prevent diet-induced obesity. This research focuses on the examination of *Dacryodes edulis* seeds within the context of obesity. The aim is to provide empirical data that may influence the use of *D. edulis* seeds in the prevention or management of obesity.

Methods: Mineral contents of the seed were determined with Zeeman polarized atomic absorption spectrophotometer (AAS). Antinutrients were analyzed assayed with standard procedures and serum lipids were estimated with Randox kits.

Results: The average antinutrient (g%) contents of the seed was obtained as 12.62 \pm 0.33 Phytic acid, 5.08 \pm 0.04 Tannins, 0.32 \pm 0.04 Oxalate and 5.13 \pm 0.17 Trypsin Inhibitory Activity (TIA). Mineral contents (mg%) of the seed included calcium 296.65, manganese 63.75, iron 267.24, zinc 292.89 and selenium 1.70. Administration of ethanolic extract to animals showed a significant reduction ($p < 0.05$) in serum cholesterol (50.10 \pm 2.25) mmolL⁻¹ compared with control (70.60 \pm 0.15) mmolL⁻¹ and aqueous extract (68.85 \pm 0.62) mmolL⁻¹.

Conclusion: The seeds of *D. edulis* are found to contain high iron, zinc and calcium. In addition, the ethanolic extract of the seeds showed the potential to significantly reduce serum cholesterol a critical factor in the onset of obesity.

T4:PO.032

Non-Alcoholic Fatty Liver Disease (NAFLD) in Obese and Cardiometabolic Risk Factors

Kseniya Komshilova¹, Ekaterina Troshina²

¹research fellow in the group of therapy and obesity Endocrinology Research Center, Moscow, Russian Federation

²a head of group of therapy and obesity Endocrinology Research Center, Moscow, Russian Federation

Introduction: NAFLD is the chronic disease is associated with obesity, insulin resistance (IR) and cardiometabolic disorders. The aim of the study is to identify cardiometabolic risk factors at different clinical-morphological stages of NAFLD.

Methods: Examination of 80 patients with obesity included: glucose, HOMA-IR, lipids, adiponectin, C-reactive protein (CRP), plasminogen activator inhibitor-1 (PAI-1) and biopsy of the liver.

Results: NAFLD detected in 96.3% of patients: 14% had steatosis, non-alcoholic steatohepatitis (NASH) – 80%, cirrhosis – 2,5%. Dyslipidemia were 91% of patients with obesity and NAFLD, disorders of glucose metabolism – 77%, IR – 95%; with steatosis – 73%, 63%, 63%; with NASH – 94%, 77% and 95%, respectively. Patients with NAFLD had significantly lower adiponectin levels, compared with patients without NAFLD: 6 [4,5;9] vs 17 [16;17] mcg/ml, $p = 0.002$, its levels negatively correlated with the stages of NAFLD: with steatosis – 10 [8;11], NASH – 6 [4;8],

cirrhosis – 7 [5;9] mcg/ml. Patients with NAFLD showed significant elevation of CRP and PAI-1 compared with patients without NAFLD: 3 [0,3;13] vs 0,1 [0,5;0,7] mg/l, $p = 0.005$ and 98 [40;163] vs 57 [52;21] ng/mL, $p = 0.002$, respectively. In NASH CRP and PAI-1 levels were higher than in steatosis: 5 [0,6;13] vs 1,5 [0,4;5], $p = 0.003$ and 102 [39;145] vs 88 [61;163], respectively.

Conclusion: NAFLD is associated with cardiometabolic factors and risk markers of cardiovascular disease and DM2. The frequency and severity of cardiometabolic disorders increases with the progression NAFLD that may have adverse effects on morbidity and quality of patients' life.

T4:PO.033

Anthropometrical assesment of body nutritional status of children and adolescents from Southern and Western Bulgaria

Silviya Mladenova¹, Zorka Mitova², Mima Nikolova³, Emiliya Andreenko³

¹Plovdiv University "Paisii Hilendarski"- Branch Smolyan, Bulgaria

²Institute of Experimental Morphology, Pathology and Anthropology with Museum, Bulgarian Academiian of Sciences, Bulgaria

³Plovdiv University "Paisii Hilendarski", Faculty of Biology, Department of Human Anatomy and Physiology

Introduction: This study present the general results from anthropometrical studies of body nutritional status, provided between 2000–2007, in three territorial groups in Southern and Western Bulgaria-town of Smolyan, Plovdiv and Sofia cities. The general sampe included a total 3393 children (1763 boys and 1630 girls), aged 9 to 16 years.

Methods: The anthropometrical methods by Martin-Saller (1957) were used. Of each child data on height and weight were taken and body mass index (BMI, kg/m²) was calculated. Different categories of body nutritional status were assessed using gender- and age- specific cut-off points of BMI for children and adolescents of IOTF, developed by Cole et al. (2000, 2007) and Cole and Lobstein (2012).

Results: The general results for prevalence of different categories of body nutritional status among children and adolescents from all three territorial groups on Southern and Western Bulgaria showed highest average relative part of boys and girls with normal nutritioanal status (65–67%), followed of underweight, which is within about 15%. The average relative part of overweight in boys is 13.3% and in girls-14.5% respectively. The relative part of obese children is smallest (4.3%–4.6%).There are territorial, intersexual and interage differences in the distribution of deviations from normal body nutritional status in the three groups Bulgarian children and adolescents.

Conclusion: In conclusion the serios problem in Bulgaria is prevalence of underweight, not only of overweight and obesity. Also the differences in distribution of deviations from normal body nutritional status between three groups of studied children probably are connected with different biological and pubertal stages of their development and with their different living conditions, lifestyle and nutrition.

T4:PO.034

Evaluation of the effect of low calorie diet on level of sexual ability and desire of people who are overweight, fat and obese

Javad Arian Nezhad, et al.

Arian Pooya Obesity research Institute

Introduction: Obesity (almost) duplicates the incidence of sexual disorder. Sexual concern and sexual dysfunction in society is epidemic. The aim of this study is (the) evaluation (investigation) of the effect of low calorie diet on level of sexual ability and desire of people who are overweight, fat and obese.

Methods: In this study volunteer (61 women and 10 men) aged between 20 and 25 years old with BMI of 25–47 km² who had active partner were

selected by purposeful sampling. Height, weight, body fat percentage and body mass index of patients; the nutrition status, diet habits and sexual ability and desire were evaluated by Arizona questionnaire. This questionnaire includes 6 questions. The maximum score is 29 for women and men in the optimum condition and the least one is 5. For each person, based on his or her weight, low calorie diet was defined and given to them. Patients were visited (checked) every week for two months, in each visit, weight of patients was measured and according to that, a new program was given. At the end of the low calorie diet program intervention, the Arizona was completed again by patients.

Results: Weight and body mass index in both sex significantly decreased $p < 0.05$. Fat percentage for women also significantly decreased ($p < 0.05$) whereas fat percentage of men body decreased but not significantly. The score of sexual ability in both sexes has not changed.

Conclusion: According to the results, the intervention of the low calorie diet program caused a decrease in weight and BMI but there has been no effect on the score of Arizona questionnaire.

T4:PO.035

The effect of nutrition counselling and self-help resources on body weight and quality of life in overweight men treated for prostate cancer: The PROstate cancer weight MANagement (PRO-MAN) trial

Mohamad¹, Leone Craig¹, Clark¹, Steven Heys², N'Dow³, McNeill¹

¹Public Health Nutrition Research Group School of Medicine and Dentistry University of Aberdeen

²Division of Applied Health Sciences School of Medicine and Dentistry University of Aberdeen

³Division of Applied Medicine School of Medicine and Dentistry University of Aberdeen

Introduction: Recent studies suggest that obesity is associated with prostate cancer aggressiveness and higher recurrence rates after treatment. Prognosis may be improved by maintaining healthy weight. Following three preliminary studies; systematic review, questionnaire survey and qualitative research among patients and their partners, a weight management programme was designed for prostate cancer patients and a pilot trial conducted to evaluate compliance and effectiveness.

Methods: A two arm randomised controlled trial compares a wait-list control to a 12 week package of individual telephone-based diet consultations at 1, 4 and 8 weeks, web-based self-help resources, pedometer and a group session. 286 men with localized and locally advanced prostate cancer were invited to participate from UCAN (Urology CANcer Charity) Care Centre database of which 94 responded. 62 men were randomly assigned to intervention ($n = 31$) or wait-list control group ($n = 31$) using minimisation on age, BMI and time since diagnosis. Weight and quality of life are measured at baseline, 12 week endpoint and 24 week follow-up.

Results: Eight (5 intervention; 3 control) of the 62 men randomised withdrew before baseline data collection. Mean age of all participants at enrolment was 65.5 years (SD 5.6), mean weight 88.9 kg (SD 11.7) and mean BMI 29.6 kgm⁻² (SD 2.9), with no significant difference between groups. Data on change in weight and quality of life in the two groups at 12 weeks will be presented.

Conclusion: This trial involves a low-cost intervention designed to meet the preferences of men treated for prostate cancer, which could help inform clinical practice.

T4:PO.036

Adjustment for height to characterize fat mass in children and adolescents

Sandra Plachta-Danielzik, Rhea Dankers, Britta Kehden, Lisa Schweitzer, Manfred James Müller

Institute of Human Nutrition and Food Science, Christian-Albrechts-University Kiel

Introduction: To compare fat mass in children and adolescents at different ages it has to be adjusted for height to take into account growth. Here, we analyzed the optimal exponent for adjustment of height (fat mass/heightⁿ) and compared adjusted and unadjusted indices.

Methods: Study population: 17,409 children and adolescents from the Kiel Obesity Prevention Study (KOPS) and the German reference center for body composition measured 1996–2012; age range: 5–18 years. Parameters of fat mass: fat mass (FM): calculated from BIA measurements; waist circumference (WC): measured according to WHO criteria; sum of skinfolds (ΣSF): TSF, BSF, SSF and SIF were measured. Statistics: Log-log-regression analyses to analyze the exponent (independent variable: logheight; dependent variable: logfat mass) according to *Wells&Cole 2002*. To address the influence of growth adjusted and unadjusted indices were used in longitudinal data of 749 children of KOPS at age 6 and 10 years. Children were stratified to growth (=4-year changes in height percentiles): >-10 percentiles=low; >+10 percentiles=rapid and in between = normal.

Results: The optimal exponent varied with age, sex and parameter of fat mass, i.e. between 2.0 and 3.1, 2.6 and 6.0, 0.5 and 1.3, 1.0 and 3.8 for weight, FM, WC and ΣSF, respectively. 4-year changes in weight, FM and TU increased in children with low to rapid growth while changes in adjusted weight, FM and TU decreased. By contrast, changes in ΣSF and adjusted ΣSF increased from low to rapid growth.

Conclusion: Adjustments for height are necessary for weight, FM and TU while it is questionable in ΣSF.

T4:PO.037

Associations between weight-related anthropometric traits and lifestyle factors in 3839 Norwegian children aged 4–16 years

*Hege Kristiansen*¹, *Pétur B. Júlíusson*², *Geir Egil Eide*³, *Robert Bjerknes*⁴

¹Dept. of Paediatrics, Distric General Hospital of Førde, Førde, Norway.

²Dept. of Clinical Medicine, Section for Paediatrics, University of Bergen, Bergen, Norway Dept. of Paediatrics, Haukeland University Hospital, Bergen, Norway.

³Centre for Clinical Research, Haukeland University Hospital, Bergen, Norway Department of Public Health and Primary Health Care, Research Group for Lifestyle Epidemiology, University of Bergen, Bergen, Norway

⁴Department of Clinical Medicine, Section for Paediatrics, University of Bergen, Bergen, Norway Department of Paediatrics, Haukeland University Hospital, Bergen, Norway

Introduction: There is limited information about how different weight-related anthropometric measures are associated to eating habits, physical activity and sedentary lifestyle on a population level. As BMI is not a direct measure of fat, we postulate that waist circumference and skinfolds are associated differently with lifestyle factors.

Methods: With data from the Bergen Growth Study the relation body mass index (BMI), waist circumference (WC), waist-to-height ratio (WHTR), subscapular- (SSF), and triceps (TSF)-skinfolds and self-reported lifestyle was studied in 3839 Norwegian children (1543 boys) aged 4–16 years.

Results: There are negative associations between regular meal frequency, higher intake of fruit and vegetables and SSF, WHTR; between physical activity (times and hours per week) and SSF, TSF, WHTR; between less sedentary activity and SSF, WHTR. There are positive associations between regular meals and WC; between higher fruit and vegetable intake and WC, BMI; between higher physical activity and BMI; less sedentary activity and WC. In overweight and obese children there are negative correlations between higher fruit and vegetable intake and WHTR; between higher physical activity and SSF/TSF; between less sedentary activity and SSF/WHTR and positive correlations between higher intake of fruit and vegetables and WC.

Conclusion: SSF, TSF and WHTR are negatively associated with healthier eating habits, higher physical activity and a less sedentary lifestyle whereas BMI and WC are positively associated with a healthy lifestyle in

3839 Norwegian children aged 4–16 years, a pattern also observed in the overweight and obese children.

T4:PO.038

Characteristics of complains variety of children with overweight and obesity at the specialists

*Kozhevnikova*¹, *Namazova-Baranova*², *Logacheva*³, *Abashidze*³, *Meshcheryakova*³, *Gevorkyan*⁴, *Shirokova*³

¹chief of department of functional diagnostics

²Director of the Scientific centre of children health

³physician

⁴head of physician

Introduction: The hypoxia at night can lead to life-threatening situation. About half of children with obesity have obstructive sleep apnea, which becomes stronger in children with ENT pathology.

Methods: The out-patient medical records, epicrisis of medical examination by the pediatrician, the endocrinologist, the cardiologist and the ENT specialist of 77 children aged from 6 to 17 y. o. with overweight and obesity were analyzed.

Results: At the pediatrician there dominated complains of headache (23%), increased arterial pressure (17%), stomachache (12%), syncope, fatigue.

At the endocrinologist the patients showed the complains of overweight (55%), proceeding increase of weight (29%), selectivity of appetite (19%), increase of arterial pressure (17%), sleepiness (14%), headache of (14%). At the cardiologist complains of increase of arterial pressure (30%), stabbing pains in heart area (17%), headache (13%). At the otolaryngologist 31% of the studied children showed strong complains of difficult nasal breathing, stuffiness in nose, sometimes with seasonal dependence, frequent sore throat (10%), the difficult breathing (5%), and also nasal bleedings.

Snoring and apnea were diagnosed at the pediatrician in 3 cases (4%), at the endocrinologist and cardiologist in 1 case each, at the otolaryngologist in 3 cases. These were 3 patients whose main complain was sleep-disordered breathing.

Conclusion: Parents do not associate sleep-disordered breathing with the main disease of children. Practically experts do not focus their attention to sleep disturbance in children with obesity to take preventive measures of life-threatening situation. Unfortunately, experts do not pay enough attention to sleep disturbance of children with obesity, thus, there appear life-threatening situations.

T4:PO.039

A pilot study on the characteristics of outpatients in a Centre for Obesity Management (COM) in Greece

*Hara Dimitroula*¹, *Maria Grammatikopoulou*², *Iro Gounitsioti*¹, *Argyropoulos*¹, *Maria Belivani*¹, *Elena Fotiadou*¹, *Daskalopoulou*¹, *Axiotidou*¹, *Ountzoudi*¹, *Christos Savopoulos*¹, *Maria Hassapidou*², *Apostolos Hatzitolios*¹

¹Obesity & Metabolism Outpatient Clinic, EASO accredited Collaborating COM, 1st Propedeutic Department of Internal Medicine, AHEPA University Hospital of Thessaloniki, Greece

²Department of Human Nutrition & Dietetics, Alexander Technological Educational Institute of Thessaloniki, Greece

Introduction: Obese patients are failing to lose weight successfully, and even if they do, the majority of them relapse after some months. The reason is that obese people, usually, are not treated by professionally educated and specialized in obesity experts. The aim of the present study was to define the characteristics of outpatients of a COM in Greece.

Methods: A total of 68 (mean age 46.9 ± 14.9 years old, Mean BMI 39.8 ± 7.2kg/m²) outpatients were recruited from the only COM in Greece during the year 2013. Basic anthropometric characteristics of the participants, comorbidities and family medical history were recorded.

Results: The majority of the outpatients were women (86.8%), who were either obese (52.9%) or morbidly obese (41.2%), all of whom had numerous previous dieting attempts. 36.8% of the sample had MS according to the IDF criteria. 79.4% of the participants had a family history of diabetes, dyslipidemia, hypertension, CVD or cancer. Morbidly obese patients had triple chances of being diagnosed with depression (OR:3.0, CI:1.0–8.8) and six fold chances of having sleep apnea (OR:6.3, CI:2.2–18.4) and those with sleep apnea were more likely to be smokers (OR:21.0, CI:1.0–423.5). BMI significantly increased with each additional cluster of the metabolic syndrome.

Conclusion: This pilot study shows that outpatients in specialized Obesity Clinics demonstrate high prevalence of comorbidities and an aggravated family history of metabolic disease making them “high risk” obesity patients. This delineates the need for more specialized obesity clinics in the country, with one of the highest rates of obesity in Europe, Greece.

T4:PO.040

An Uncomfortable Subject: Are healthcare professionals missing opportunities to promote weight management?

Elizabeth Dinsdale¹, Catherine Homer², Angela Tod², Simon Palfreyman³

¹Sheffield Teaching Hospital Foundation Trust

²Sheffield Hallam University

³University of Sheffield

Introduction: Obesity and weight management are not always included in care guidelines for other health conditions and procedures e.g. leg ulcer, stroke and routine surgery. After acute hospital admission the focus is often on patients being under rather than overweight.

Aims:

This study explored obesity assessment practice across the care pathway for obese patients with a leg ulcer, from the HCP perspective.

Methods: A qualitative study using semi-structured interviews (n = 18) and one focus group (n = 14) with HCPs. Transcribed data was analysed using framework analysis to identify key themes and issues.

Results: Findings indicate that care planning for obese patients was linked to moving and handling, and safety concerns, not to weight loss advice. Assessment of BMI was inconsistent. Rather than using formal methods of calculating BMI HCP’s visually assessed patient’s size, independence and suitability for equipment. Lack of weighing equipment meant patients who were acutely unwell, had restricted mobility or appeared to exceed size for equipment were unlikely to be weighed. HCP’s were unaware of resources and services available to support patients to lose weight. Participants lacked confidence and skills to raise weight loss with patients, fearing they would cause offence. They require additional training and resources to help them broach what may be a difficult subject.

Conclusion: HCP’s are ideally placed to promote weight management amongst patients with co-morbidities. Investment in training and resources are required to overcome fear of raising the issue.

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T4:PO.041

Weight, Height and BMI self-reported and assessed: What Portuguese said

silvia pinhao¹, Rui Poinhos², Bela Franchini³, Cláudia Afonso³, Pedro Moreira³, Vitor Hugo Teixeira³, Olivia Pinho³, Diana Silva⁴, Joˆse Pedro Lima Reis⁵, Manuel Teixeira Verissimo⁵, Bruno Oliveira⁶, Maria Daniel Almeida³, Flora Correia⁷

¹FCNAUP, Centro Hospitalar São João, EPE, Porto

²FCNAUP

³FCNAUP, SPCNA

⁴FCNAUP, SPCNA, Centro Hospitalar São João, EPE, Porto

⁵SPCNA

⁶FCNAUP, LIAAD – INESC Tec, Porto, Portugal

⁷FCNAUP, SPCNA, Centro Hospitalar São João, EPE, Porto, Unidade de Investigação em Nefrologia da FMUP

Introduction: BMI is a valid indicator of nutritional status of population groups. Although weight and height could be easily evaluated, not always is possible to assess them, and self-reported data are used.

Methods: To compare weight(w), height(h) and BMI self-reported and assessed, we studied a representative sample of the Portuguese population (n = 3529 adults (52.2% women)), +18 years, of the study “Portuguese Population’s Food Habits and Lifestyles” (led by SPCNA). Portuguese reported their current weight, height, and both were measured according to standardized methodology. BMI reported, measured and discrepancy between the two, was calculated.

Results: Reported weight was 71.4kg, height 1,688m and BMI 25,0kg/m². Measured weight was 72.1kg, height 1,685m and BMI 25.4kg/m². Strong and statistically significant correlations between reported and measured data (R(w) = 0.984; R(h) = 0.985; R(BMI) = 0.972, p < 0.001) were found. Men reported less weight, women more height compared to measured values. The discrepancy between measured and reported BMI is higher among men. By sex, data reported and measured had strong and significant correlations (men-R(w) = 0.973, R(h) = 0.975, R(BMI) = 0.959; women-R(weight) = 0.981, R(H) = 0.979, R(BMI) = 0.977; p < 0.001). All differences between data evaluated and reported are significant for all. BMI reported has a very strong correlation with assessed BMI (R = 0.972; p < 0.001); reported BMI underestimates assessed BMI on 0.37kg/m² (p < 0.001)

Conclusion: Although strong correlations between reported and real values, we found statistical significant differences between them. When isn’t possible to assess anthropometric data, our equation could be used to know real BMI, using reported-BMI, age and sex of the participant.

T4:PO.042

GPs’ attitude and approach to obesity in children

Radost Asenova¹, Gergana Foreva¹, Daniela Mileva¹, Zornitsa Ambareva², Levena Kireva²

¹Medical University-Plovdiv

²Medical University – Plovdiv

Introduction: The prevalence of child obesity is rapidly increasing worldwide, but healthcare capacity to address this substantial problem seems limited. General practice is a suitable setting for educating children and their parents on the issues of healthy lifestyle.

The **aim** of the study was to present the GPs’ attitude and approach to child obesity.

Methods: A cross-sectional study among 832 GPs (19.22%), randomly selected from all contractors with national health insurance funds in Bulgaria, was conducted, using a direct telephone interview. Distribution according to gender – 37.9% male, respectively 62.1% female. The average age was 48.38 ± 6.96 years and the average work experience – 23.05 ± 6.93 years. Data were processed by SPSS 17.0 version, using descriptive statistics, correlation analysis. A significance criterion equal to or smaller than 0.05 was used.

Results: Almost all of the GPs – 95.4% reported the presence of child obesity in their practice and 79.4% recognised their crucial role in prevention. Moreover, GPs met a variety of barriers in solving the problem. Prevalent GPs – 87.4% who have used specific assessment tools, mostly BMI. Most of the GPs followed up obese children, and 88% referred them to different specialists. On the other hand, only 25.7% of responders discussed the health problem profoundly with parents.

Conclusion: The current findings show GPs' responsible attitude to value the health problem of obesity in children and it reveals a potential for further investment to develop their approach.

T4:PO.043

Muscular Strength Is Inversely Related to Body Adiposity Index (BAI) in individuals young

Robinson Ramirez-Velez¹, Katherine González-Ruiz²

¹Facultad de Cultura Física, Deporte y Recreación, Universidad Santo Tomás

²Universidad Manuela Beltrán

Introduction: Inverse associations with muscular fitness and prevalence of obesity have previously been reported in cross sectional studies. However, this association has not been reported in Latin-American population. The aim was to study the correlation between muscular strength with Body Adiposity Index (BAI) in individuals young.

Methods: 2.374 young men (age 23.3 ± 2.3 years; weight 61.2 ± 11.3 kg; BMI 22.5 ± 3.6 kg·m⁻¹; BAI 20.1 ± 3.3) were invited to participate in the study. All subjects were from Bogota (Colombia) and belong to different universities (public and private). They had no indication of cardiometabolic problems, as evaluated by interview. Muscular strength was measured by isometric handgrip (dynamometer). Weight and height were determined according to the recommendations (ISAK). BMI was calculated as weight (kg) divided by height (m) squared (kg·m⁻¹). The BAI was calculated using the equation suggested by Bergman and colleagues, $BAI = (\text{hip circumference}) / ((\text{height})^{1.5} - 18)$. The existence of significant bivariate correlations among parameters such as BMI, BAI and weight was ascertained by means of determining Pearson correlation coefficients.

Results: Muscular strength and weight showed a moderated correlation ($r = 0.472$, $p = 0.001$). A lower correlation was found between muscular strength and BMI ($r = 0.130$, $p = 0.001$). Furthermore, there was an inverse correlation between BAI and muscular strength ($r = -0.316$, $p = 0.001$).

Conclusion: The key finding of our study is that muscular strength is inversely associated with body adiposity index. Among youth, low muscular fitness levels should be avoided for primary cardiovascular disease prevention.

T4:PO.044

Characteristics of complains variety of children with overweight and obesity at the specialists

Kozhevnikova¹, Namazova-Baranova², Logacheva³, Abashidze³, Meshcheryakova³, Gevorkyan⁴, Shirokova³

¹Chief of department of instrumental and laboratory diagnostics

²Director of Scientific centre of children health

³physician

⁴head physician

Introduction: The hypoxia at night can lead to life-threatening situation. About half of children with obesity have obstructive sleep apnea, which becomes stronger in children with ENT pathology.

Methods: The out-patient medical records, the epicrisis of medical examination (inspection) by the pediatrician, the endocrinologist, the cardiologist and the ENT specialist of 77 children aged from 6 to 17 y. o. with overweight and obesity were analyzed.

Results: At the pediatrician there dominated complains of headache (23%), increased arterial pressure (17%), stomachache (12%), syncope states, fatigue, hyperhidrosis.

At the endocrinologist the patients showed the complains of overweight (55%), proceeding increase of weight (29%), selectivity of appetite (19%), increase of arterial pressure (17%), sleepiness, fatigue (14%), headache of (14%), the hyperhidrosis, polydipsia. At the cardiologist – complains of increase of arterial pressure (30%), stabbing pains in heart area (17%), headache (13%) dominated. At the otolaryngologist – 31% of the studied children showed strong complains of difficult nasal breathing, stuffiness in nose, sometimes with seasonal dependence, frequent sore throat (10%), the difficult breathing (5%), and also nasal bleedings.

Snoring and apnea were diagnosed at the pediatrician in 3 cases (4%), at the endocrinologist and cardiologist – in 1 case each, at the otolaryngologist – in 3 cases. These were 3 patients whose main complain was sleep-disordered breathing.

Conclusion: Parents do not associate sleep-disordered breathing with the main disease of children. Practically experts do not focus their attention to sleep disturbance in children with obesity to take preventive measures of life-threatening situation. Unfortunately, experts do not pay enough attention to sleep disturbance of children with obesity, thus, there appear life-threatening situations.

T4:PO.045

Leg fat and inflammatory profile in obese children

Samouda¹, De Beaufort², Hirsh³, Van Nieuwenhuysse⁴, Gilson⁵, Jacobs¹, Vaillant⁶, Lair¹, Dadoun⁷

¹Centre de Recherche Public-Santé. Public Health Department. Luxembourg

²Diabetes & Endocrinology Care Clinique Pédiatrique (DECCP), Centre Hospitalier de Luxembourg

³Rheumatology Department, ZithaKlinik, Luxembourg

⁴Paediatric Radiology Department, Centre Hospitalier de Luxembourg

⁵Department of Clinical Biology, Centre Hospitalier de Luxembourg

⁶Centre of Competence for Methodology and Statistics (CCMS), Centre de Recherche Public-Santé

⁷Endocrinology and Diabetology Department, Centre Hospitalier de Luxembourg

Introduction: Childhood obesity is currently epidemic. This is of major concern since excess adiposity associate with an early low-grade systemic inflammation, which is closely correlated with cardiometabolic risk and related complications^{1,2}. Leg fat seems to be protective against inflammation in adults³ but the question remains open in children. We aim to analyse the relationship between leg fat and the C-reactive protein (CRP) in 7–17 years overweight/obese young in Luxembourg (N = 203).

Methods: Total and leg fat masses were measured by DXA, using a Hologic® QDR4500W densitometer. CRP was measured with an Olympus latex reagent on a P module of Roche Modular. To determine if leg fat protects from a low-grade systemic inflammation, we performed a multiple regression between CRP as a dependant variable, leg and total fat mass as independent variables.

Results: Multiple regression showed a leg fat negative partial significant correlation.

Conclusion: Our results suggest a leg fat protective role.

T4:PO.046

Reference curves of waist circumference for Russian children and adolescents in comparison to international values

Alyoshina¹, Novikova¹, Komissarova², Vorontsova², K.A. KLIKUNOVA²

¹The Federal Center of Heart, Blood and Endocrinology named after V.A. Almazov

²St.Petersburg State Pediatric Medical University,

Introduction: Waist circumference (WC) is a sensitive marker of abdominal obesity in the pediatric age group. WC is influenced by age, sex, ethnicity, causing difficulties in the selection of the most appropriate cut-off

value. Considering the lack of reference values in Russia, we developed age- and gender-specific WC smoothed reference curves in children from Nord-West region of Russia and compared them with reference curves obtained from different countries.

Methods: A representative sample of 4328 children and adolescents from Nord-West region of Russia (2308 boys, 2020 girls) aged 2–17 years was studied. WC was measured according to the recommendations of the World Health Organization, then age- and sex-specific WC reference curves were constructed and smoothed using the LMS method and SPSS 14.0 for statistical analysis.

Results: Gender-specific WC percentiles were constructed. WC increased with age in both boys and girls in a monotonic fashion across ages but at nonconstant rates. Significant differences between the WC percentiles and cut-offs in children from Nord-West region of Russia and international values (NCEP/ATP III, IDF, 2007) were founded. Waist circumference cut-off values for diagnostics of metabolic syndrome in children from Nord-West region of Russia were below, than international ($r < 0.05$) in two age groups (5–7 years and 5–17 years) at girls and in 15–17 years at boys.

Conclusion: Percentile curves for waist circumference of Russian children are presented. These first ever WC reference curves of Russian children can be added to the existing international curves for children and adolescents.

T4:PO.047

Hormonal etiologies in morbid obese patients

Dilek Yazici, Dilek Gogas Yavuz, Mehmet Yasar, Melin Uygur, Oguzhan Deyneli

Marmara University Medical School, Section of Endocrinology and Metabolism

Introduction: Obesity is a condition with multifactorial etiologies. Type 2 diabetes mellitus (DM), hypothyroidism and Cushing syndrome are among the hormonal etiologies. The aim of the study was to determine the ratio of hormonal etiologies in morbid obese patients.

Methods: Morbid obese patients evaluated preoperatively for bariatric surgery were included. After detailed history and examination, TSH, freeT4 and HbA1c levels were determined and 1mg dexamethasone suppression test was performed.

Results: Two hundred and twenty six morbid obese patients (mean age: 37.8 ± 11.1 years; F/M: 187/39) were evaluated. Of these, 10 (4.4% of total patients) had cortisol levels not suppressed under $1.8 \mu\text{g/dL}$ by dexamethasone. Six had cortisol levels between $1.8 \mu\text{g/dL}$ - $5 \mu\text{g/dL}$, 4 had above $5 \mu\text{g/dL}$. These patients were further evaluated by confirmation tests and in 9 hypercortisolism was not confirmed by further tests, but in one Cushing syndrome due to an adrenal adenoma was detected. Twenty eight patients (12.8% of total patients) had TSH above 4IU/L. Of these, 15 had TSH between 4IU/L – 10IU/L and 13 had TSH >10IU/L. Only 12 patients had free T4 levels below the lower range of normal. Sixty patients (26% of total patients) had HbA1c levels between 5.7%-6.5% and 40 patients (17.7% of total patients) had HbA1c $\geq 6.5\%$. Of these, 15 patients had HbA1c $\geq 8\%$.

Conclusion: While disturbance in glucose metabolism was evident in a quarter of morbid patients, subclinical and overt hypothyroidism and cortisol hypersecretion were seen to a less extent.

T4:PO.048

Diagnostics and monitoring of central fatness with the help of non-contact 3D scanning – a preliminary report

Tadeusz Nawarycz¹, Adam Michalski², Maciej Gazicki-Lipman¹, Lidia Ostrowska-Nawarycz¹

¹Chair of Experimental and Clinical Physiology, Department of Biophysics, Medical University of Łódź

²3D Anthropometry Lab., Medical University of Łódź,

Introduction: Non-contact 3D anthropometry is a technique increasingly used in medical diagnostics, including an assessment and monitoring of central fatness (CF).

Objectives: 1/ An assessment of a compliance of manual and 3D methods of waist circumference (WC) measurement; 2/ An analysis of the usefulness of new indicators in the CF diagnosis.

Methods: The body weight, height and the WC values (3 sites) in a group of 21 healthy men (19–23 years) were analyzed using the classic manual (M) and 3D methods. Two new CF indicators: an ASI- abdomen surface index, and an AVI abdomen volume index – were proposed. In addition, measurements of basic BIA body components (BF%, CFI – central fatness index, VI – visceral index) and blood pressure (BP) were performed. The compatibility (3D vs M) and correlations between ASI/AVI and BIA/BP indicators were analyzed.

Results: The 3D measurements of WC and other indicators of CF were characterized by high compliance with the MM method for all the locations analyzed. WHtR correlated significantly ($p < 0.05$) with all the fatness indicators evaluated using BIA method (% BF: $r = 0.68$, CFI: $r = 0.86$, VI: $r = 0.73$). Also, ASI showed a significant correlation with VI ($r = 0.41$, $p < 0.05$) and SBP ($r = 0.80$, $p < 0.01$).

Conclusions: The study showed a good agreement between the results of WC measurements using both methods. The new CF indicators (ASI, AVI), acquired with the help of a 3D scanning technique, can be used for monitoring of CF and a primary prevention of cardiometabolic diseases.

T4:PO.049

Sagittal abdominal diameter in determining cardiometabolic risk profile by using artificial neural networks

Edita Stokic¹, Aleksandar Kupusinac², Biljana Srdic³, Dragana Tomic-Naglic¹, Esma Isenovic⁴

¹Department of Endocrinology, Clinical Center of Vojvodina, Medical Faculty, Novi Sad, Serbia

²Faculty of Technical Sciences, University of Novi Sad, Serbia

³Department of Anatomy, Medical Faculty, Novi Sad, Serbia

⁴Institute Vinca, Laboratory for Molecular Genetics and Radiobiology, University of Belgrade, Belgrade, Serbia

Introduction: Obesity, especially visceral obesity, is associated with increased risk of cardiometabolic disturbances. Imaging techniques usually used for quantification of intraabdominal fat depots include computed tomography and magnetic resonance. Anthropometric measurements as indirect measurements of intraabdominal fat in clinical evaluation of patients are often used. Among a variety of anthropometric parameters, sagittal abdominal diameter (SAD) has been proposed as the valid measurement of the visceral fat mass and cardiometabolic risk level

Methods: We aimed to evaluate a solution based on artificial neural networks (ANN) for estimating age- and gender-dependent SAD low-limits for the adverse metabolic profile. Artificial neural networks inputs were: gender, age, body mass index (BMI), systolic and diastolic blood pressures, HDL-, LDL- and total cholesterol, triglycerides, glycemia, fibrinogen and uric acid. ANN output was SAD.

Results: ANN training and testing are performed by dataset, which includes 1341 persons (637 women and 704 men) aged 18 to 67 years, with BMI values between 16.60 and 63.00 kg/m². The accuracy of solution was 89.48%.

Conclusion: Using SAD we were able to determine persons with increased cardiometabolic risk profile. Thus, this approach could be a useful method in both, individual and public health prevention.

T4:PO.050

Prevalence of childhood overweight and obesity in Durres

Manjola Carcani¹, Spartak Carcani², Mimoza Keci², Florian Toti³

¹Regional Hospital Durres Department of Endocrinology

²Regional Hospital Durres

³QSUT "Mother Teresa"

Introduction: Recently we have found an increasing number of obese children and adolescents. Resulting, we have diagnosed more obese children with type 1 diabetes, double new cases of childhood type2 diabetes. Obese children are more likely to become obese adults with direct result in increasing risk of type2 diabetes, hypertension, cardiovascular diseases.

Methods: We studied 1200 children and adolescents 6–18years of age, measured weight, height and calculated BMIp. They answered questions on food habits, physical activity, hours of screen time, family history on diabetes.

Results: Of 1200 children, 640 were females, 560 males. Were divided in 2 agegroups: 6–11years, 12–18years; of 6–11years, 250 were females, of which 30 (12%) overweight (BMIp 85–95), 15 (6%) obese (BMIp > 95). In group 12–18years,390 females,of which 70(17.95%) overweight, 25 (6.4%) obese.

560 were males, in group 6–11years 220 children, of which 40 (18.2%) overweight, 35 (15.9%) obese; in group 12–18years, 340 adolescents, of which 110 (32.36%) overweight, 25 (7.35%) obese.

from the questionnaire we saw that obese children consumed more carbohydrate rich food, more sweetened beverages and fast food products. Most of these kids spent more than 4 hours screentime.

Conclusion: Growing prevalence of overweight and obese children and adolescents and health risks bound to this, ask for completion of some recommendations for treatment and prevention regarding limited consumption of sweetened beverages and fast food, engage in physical activity, limit screentime.

T4:PO.051

The Wilma (weight loss maintenance in adults) trial: A qualitative evaluation

Elizabeth Randell¹, Yvonne Moriarty², Sharon Simpson¹, Chris Shaw³, Rachel McNamara¹, et al.

¹Cardiff University

²Research Associate Trial Manager, South East Wales Trials Unit (SEW-TU) Institute for Translation, Innovation, Methodology and Engagement (TIME) School of Medicine Cardiff University

³University of Glamorgan

Introduction: Weight loss maintenance interventions have had limited effectiveness with weight regain common. We are conducting a trial to assess a 12 month individually tailored intervention based on two key features; Motivational Interviewing (MI) and self-monitoring. As part of the process evaluation of this trial we interviewed study participants at 6 and 12 months. We aimed to interview participants about their participation in the trial, their views of the intervention and longer term weight loss maintenance challenges.

Methods: We interviewed 14 participants at 6 months and 30 at 12 months. The data were analysed using a framework approach, supported by NVIVO.

Results: Key themes included weight loss history, weight loss strategies, the intervention and research processes. Individuals described long struggles with their weight, their attitudes to and relationship with food, factors motivating them to lose or keep weight off including realising the health risks associated with obesity. They described barriers to weight maintenance

including environmental influences, life events and coping with relapse. Generally the face to face sessions of MI were seen as helpful whilst the phone sessions less so. Some participants described how the MI sessions helped them understand the reasons for their eating patterns and helped them make plans. Planning and self-monitoring were seen as key to weight loss maintenance.

Conclusion: Participants in the study described long histories of struggles with weight and strategies that have used to manage their weight. They were generally positive about taking part in the study and they found the intervention helpful.

T4:PO.052

Metabolically Healthy Obesity: Friend or Foe

Khin Swe Myint¹, Vidya Srinivas²

¹Dr Khin Swe Myint MBBS, FRCP, MD Consultant Physician Department of Diabetes and Endocrinology Elsie Bertram Diabetes Centre Norfolk and Norwich University Hospitals NHS trust Colney Lane Norwich NR47UY Honorary Senior Lecturer University

²Norfolk and Norwich University Hospitals NHS Foundation Trust

Introduction: Metabolically healthy obese individuals (MHO) are at lower cardiovascular and other obesity related comorbidities compared with metabolically unhealthy obese subjects.

Methods: We present a case with MHO who imposed a huge management challenge and burden to the health system.

Results: A 66 year old obese bed bound lady, was admitted to emergency with bilateral legs cellulitis on a background of lymphedema. She required 12 fire crews and 8 paramedics to transfer her out of her home from front widows due to her body size. She weighed 249kg (BMI of 86 kg/m²). The screening for obesity related complications including diabetes, obstructive sleep apnoea, fatty liver disease, and ventricular function were all normal. She responded well to antibiotics and compression bandage. She required two-bed space and special hire equipment for proper nursing care. 3–6 staff was required for manual handling for any activity. She was started on a liquid diet (1100 Kcal/day) achieving significant weight loss (50kg in 10 weeks) and subsequently underwent a successful sleeve gastrectomy at the referred bariatric centre. She had a period of rehabilitation back at acute hospital as no suitable rehabilitation centre to accommodate her. She was discharge home on day 154 and lost 86kg of weight. Her admission cost the health system over £100 000 in excess of a case with straight forwards bariatric surgery.

Conclusion: The delay in progression of metabolic disease allowed our patient to reach an extreme obesity before medical attention. It imposed a huge burden on health resources and hazard in case of emergency.

T4 – Prevalence and trends

T4:PO.053

The association of common variants in PCSK1 with obesity: A Meta-Analysis

Stijnen¹, Tuand¹, Aertgeerts², Creemers¹

¹Centre for Human Genetics, KULEUVEN

²Academic Center for General Practice, Department of Public Health and Primary Care, KULEUVEN

Congenital deficiency of *PCSK1*, encoding proprotein convertase 1/3, causes a severe multihormonal disorder marked by severe early onset obesity. Single nucleotide polymorphisms (SNPs) rs6232 and rs6234-rs6235 in *PCSK1* have been associated with obesity. However, case-control studies in different ethnicities have only partly replicated this association. Moreover, these SNPs have only weakly been associated with body mass index at a genome wide level of significance. To investigate this discrepancy, a systematic search for studies was conducted and rele-

vant data extracted. Pooled estimates were calculated for overall and subgroup analyses. This meta-analysis confirmed the association of *PCSK1* SNPs with obesity and provides the first evidence that the association of *PCSK1* rs6232 with obesity is stronger for childhood obesity than for adult obesity. No difference was found in the association with different obesity grades and no association of *PCSK1* rs6234-rs6235 with obesity was identified in the Asian populations. This systematic review shows convincingly that the SNPs rs6232, rs6234 and rs6235 in *PCSK1* are associated with obesity in Caucasians. More studies are needed to investigate the importance of *PCSK1* SNPs in obesity etiology in Asian, African and Hispanic populations.

T4:PO.054

Obesity and diabetes in primary care – do we realize the future?

Karin Schindler¹, Elisabeth Pilz¹, Dörtepe Binnaz¹, Florian Pichler², Kadriye Aydinkoc-Tuzcu³, Turgay Taskiran⁴, Hubert Lutnik⁵, Bernhard Ludvik¹

¹Medical University Vienna, Div. Endocrinology and Metabolism

²Lammgasse 5, 1080 Wien

³Wilherminenspital, Div. Endocrinology and Rheumatology

⁴Albin Hirsch Platz 2/5, Vienna

⁵Rueppgasse 29A, Vienna

Introduction: Obesity and Type2 Diabetes mellitus are major challenges for national healthcare systems. Migrants seem being more vulnerable to obesity and Type 2 Diabetes than country-born subjects. The primary care setting might be a good access point to deliver preventive measures and disease specific health promotion for both patient groups.

Aim: To assess the rates of obesity, new and already diagnosed T2DM as well as diabetes risk in Austrian and Turkey-born patients attending a GPs practice and to describe the probable additional burden to general practices in the future.

Methods: 904 patients (Austrians (A) n = 451 and Turkey-born (T) n = 459) were evaluated in primary-care practices. Weight, height, HbA1c, level of education, existing diabetes, and the probability of developing diabetes within 5 years (German Diabetes Risk Score) were assessed.

Results: Patients characteristics (mean ± SD): Age T:44.9 ± 11.8 vs. A:51.5 ± 19.9y; p = 0.000, BMI T:29.8 ± 5.5 vs. A:25.6 ± 5.0kg/m²; p = 0.000, HbA1c T:5.9% ± 1.1 vs. A:5.7% ± 0.6% (p = 0.005); T2DM prevalence T:10% vs. A:11% (n.s.); newly diagnosed T2DM T:5% vs. A:3% (n.s.). 5y-diabetes risk was significantly higher in T vs. A (32.8% vs. 17.3%, p = 0.000), as well as overweight/obesity (T: 74% vs. A:52.4%, p = 0.000). Lower education level (T:62% vs. A:34%; p = 0.0009) was more prevalent in migrants, but impacts significantly on diabetes risk of the overall population OR 0.26 95% CI (0.20; 0.35).

Conclusion: In migrants, compared to country-born patients, although younger, T2DM prevalence was similar 5y-diabetes risk was higher. Overweight/obesity was more prevalent. Primary care is already facing high numbers of patients needing culturally and educationally sensitive lifestyle counselling and the future will be even more demanding. Act now for a better future!

T4:PO.055

Overweight and Obesity among Preschool- Aged Children in Lebanon: Prevalence and Associated Factors

Angie Saliba¹, Farah Naja¹, Nahla Hwalla¹, Nadine Yazbeck², Nada Adra¹, Lara Nasreddine¹

¹Department of Nutrition and Food Science, Faculty of Agricultural and Food Sciences, American University of Beirut

²Department of Pediatrics & Adolescent Medicine, Faculty of Medicine, American University of Beirut

Introduction: The Eastern Mediterranean region is characterized by one of the highest burdens of paediatric obesity worldwide. The present study

aims at examining the prevalence and correlates of overweight and obesity in Lebanese preschool children aged 2–5 years.

Methods: A cross-sectional study was conducted on a nationally representative sample (n = 531) of 2–5 year old children and their mothers. Subjects were recruited from randomly selected households based on stratified cluster sampling from the six governorates of Lebanon. Socio-demographic, lifestyle, dietary and anthropometric data were collected. Overweight and obesity were defined according to WHO 2007 growth standards.

Results: Prevalence rates of overweight (BMI Z score >+2) and obesity (BMI Z score >+3) were estimated at 6.5% and 2.7%, respectively. Regression analysis showed that the odds of overweight increased significantly with increasing educational attainment of mothers (OR = 5.257) and fathers (OR = 9.646), and amongst those reporting the presence of a household helper (OR=2.714). The odds of obesity were significantly lower amongst those reporting a higher crowding index (OR = 0.446). A positive and significant association was documented between overweight and dietary fat intake (OR = 2.876). There was no association between history of breastfeeding and overweight in the study sample.

Conclusion: This study provides current estimates of obesity amongst Lebanese pre-schoolers and highlights positive associations between overweight and socio-economic status, measured by parental education, presence of household helper and crowding index. These findings highlight the importance of the home environment in modulating the child's lifestyle and dietary habits and call for intervention strategies targeting the family as a unit.

T4:PO.056

Occurrence of overweight and obesity in Albanian adolescents

Enkelejda Shkurti¹, Diamant Shtiza², Irena Kola¹

¹Faculty of Technical Medical Sciences, University of Medicine, Tirana, Albania

²University Hospital Centre: "Mother Theresa", Tirana,Albania

Introduction: There is limited information on overweight and obesity in Albanian adolescents. The aim of the study was to investigate the body weight models among adolescents and to establish the national prevalence of overweight and obesity in Albania

Methods: A cross-sectional study on a stratified sample of 1786 adolescents, 705(39%) males and 1081(61%) females was conducted all over Albania in January-December 2013. They were interviewed and examined for weight and height using standardized techniques.

Results: Referring to the 2007 WHO classification for the BMI scale it resulted that 4.4% 95% CI 3.5 –5.4 adolescents resulted overweight where 32.9% were females and 67.1% were males with a statistically significant difference among them, p < 0.01. The overall prevalence of overweight in females was 2.4% ; in males 7.5% . The prevalence of obesity class I resulted 0.4%, the obesity class II 0.3% ; obesity class III 0.1% 95% CI 0.02 – 0.3 of the participants. A remarkable finding of our study was that 70.8% of adolescent school students were in normal weight, 20% underweight, where 71.7% were females, p < 0.01.

Conclusion: Overweight and obesity is not a big public health problem among the youngsters in Albania. The problem is more prevalent among boys. Considering that a big part of adolescents participants were underweight, mainly girls that may develop unhealthy lifestyles with disordered eating and possible suicide rates health promotion strategies should be implemented to deal with this problem.

T4:PO.057

Obesity: A public health threat in Hungary – Previous trends and recent prevalence of obesity in 2013

Imre Rurik¹, Péter Torzsa², Judit Szidor³, Csaba Móczár⁴, Gabriella Iski⁵, Éva Albók⁵, Tímea Ungvári⁵, Zoltán Jancsó⁵, János Sándor⁶

¹University of Debrecen, Department of Family and Occupational Medicine
Hungary Hungarian Society for the Study of Obesity

²Semmelweis University, Budapest, Hungary

³University of Debrecen

⁴Irinyi Primary health Centre, Kecskemét, Hungary

⁵University of Debrecen, Department of Family and Occupational Medicine

⁶University of Debrecen, Department Biostatistics and Epidemiology

Introduction: The increasing ratio of overweight and obese people means a growing challenge for the Hungarian population, economy and health care provision alike. The previous wide-range evaluation about the nutritional status of Hungarian inhabitants was completed in 1988.

The *aim* of this study was to collect and present updated prevalence data.

Methods: Anthropometric, educational and morbidity data of persons above 18 years were registered at primary care encounters for any reasons in all geographical regions of Hungary.

Results: The data (BMI, waist circumference, educational level) of 40,331 individuals (16,544 men and 23,787 women) were analyzed. The overall prevalence for overweight was 40.4% among men and 31.3% among women, while the relevant figures for obesity were recorded at 32.0% and 31.5%, respectively. Abdominal obesity was found in 37.1% of males and 60.9% of females.

. The data were presented according to age by decades as well.

The highest odds ratio of overweight was registered in the group with middle educational level and the lowest odds ratio of obesity in the group with the highest educational level.

The highest proportion (35.4%) of obese people lived in villages and 28.9% in Budapest.

Registered metabolic morbidities were strongly correlated with BMIs and both were inversely related to the level of urbanization.

Conclusion: Over the previous decades, there has been a shift in the distribution of population toward being overweight and moreover obese. This shift was most prominent among males, mainly belonging to the younger generation.

T4:PO.058

Authenticity of BMI on self-reported weight and height in Albanian adolescents

Enkelejda Shkurti¹, Diamant Shtiza²

¹Faculty of Technical Medical Sciences

²University Hospital centre: "Mother Theresa", Tirana, Albania

Introduction: To evaluate in a subset of a stately representative sample of Albanian adolescents, the authenticity of Body Mass Index (BMI) according to self-reported weight and height.

Methods: This survey consisted of 462 students in grades 6, 8 and 10 (mean age 14.0 ± 1.9 years) from 12 high schools randomly chosen from 2012 Health Behavior in School Aged Children Albanian survey, similar to approximately 10% of the sample. Self-reported weight and height were verified and then assessed.

Results: Prevalence of normal weight, overweight and obesity prior to self-report in relation to that of computed values was not significantly diverse for boys and girls, and between age groups. BMI based on measured weight and height was undervalued corresponding to BMI based on self-reported records, both between girls and boys. Bigger limits of concurrence were established for boys, showing a higher changeability of self-reported BMI in assessing measured BMI, particularly under the age of 14 years.

Conclusion: These facts propose that BMI regarding self-reported weight and height is not precise for BMI calculation at an individual rank.

Nevertheless, self-reported BMI may be applied as a simple and suitable device for BMI approximation of overweight and obesity in epidemiological surveys.

T4:PO.059

Cardiovascular risk factors in patients with nonalcoholic fatty liver disease

Oleg Babak, Olena Kolesnikova, Tatyana Solomentseva, Olena Kurinna, Kseniia Sytnyk

GI "National L.T.Malaya Therapy Institute of the National Academy of Medical Sciences of Ukraine"

Introduction: Nonalcoholic fatty liver disease (NAFLD) is widespread pathology. It is known that the formation of NAFLD is associated with increased risk of cardiovascular diseases (CVD) and CVD is one of the leading causes of death among patients with NAFLD. The aim was to study cardiovascular risk factors in NAFLD patients.

Methods: The study included 98 NAFLD patients. By questionnaire we identified gender, age, height, weight, the presence of social habits, physical activity level. We determined blood pressure in all patients. To assess lipid and carbohydrate metabolisms concentrations of total cholesterol and its fractions, fasting glucose and glycosylated hemoglobin were measured. The control group involved 30 healthy volunteers.

Results: 61 NAFLD patients were male and 48 of them (78.68%) were older than 45 years. 37 NAFLD patients were female, and 19 of them were 55 years and older (51.35%). 54 of the 98 NAFLD patients (56.12%) had close relatives with ischemic heart disease and / or diabetes. Analysis of social habits revealed that 58 patients NAFLD (60.20%) smoked. 50 NAFLD patients (51.02%) had all the signs of the metabolic syndrome. Analysis of carbohydrate metabolism found that HbA1c concentration depends on the severity of hepatic steatosis. Hypertension was found in 68 patients (69.38%). Analysis of dyslipidemia showed that the proatherogenic changes were observed in 57.14% of NAFLD patients.

Conclusion: NAFLD patients have cardiovascular risk factors, the amount of which depends on the degree of hepatic steatosis and reflects pathogenetic relationship between the NAFLD and CVD development.

T4:PO.060

Association between Socioeconomic Status and Insulin Resistance: Data from the Korea National Health and Nutrition Examination Survey

Lee¹, Kang², Kim³, Lee⁴

¹Endocrinology and Metabolism, Gacheon University College of Medicine

²Endocrinology and Metabolism, Hallym University Sacred Heart Hospital

³Family Medicine, Korea University College of Medicine

⁴Endocrinology and Metabolism, Hanyang University College of Medicine

Introduction: To investigate the relationship between socioeconomic status (SES) and Insulin Resistance(IR) in non-diabetic adult. Korea National Health and Nutrition Examination Survey 2008–2010.

Methods: We analyzed the Korean National Health and Nutrition Examination Survey (2008–2010). Adult participants aged ≥30 years without diabetes in adult. SES, as measured by house income or education level. IR was assessed by homeostasis model assessment-insulin resistance (HOMA-IR). The adjusted OR for IR was calculated using multivariate logistic regression analysis across house income and education level quartiles.

Results: In Korean non diabetic adult women, the adjusted OR (95% CI) for IR for the lowest vs. highest quartile of house income and education level were 0.66(0.55, 0.81) and 0.71(0.56, 0.90) in MODEL1, determined by multiple logistic regression analysis after adjusting for age, year. The adjusted OR (95% CI) for IR for the lowest vs. highest quartile of house income were 0.71(0.56, 0.90) in MODEL2, adjusted for model 1 plus BMI, place, occupation, smoking, alcohol, drinking, exercise, spouse, to-

tal energy, fat intake, house income level and education level. However, such relationship was not found among education level in model2.

Conclusion: SES significantly influences the risk of IR in Korean adult woman and there are interactions with sex. Korean women with a low house income represent increased IR. These findings show that sex-specific public health interventions that consider SES, especially a low economic status are needed for the prevention and treatment of metabolic diseases, related to IR, such as diabetes, dyslipidemia and metabolic syndrome.

T4:PO.061

Food intake pattern and nutritional status of preschool children of Chalma ethnic community

Monoarul Haque, et al.

Bangladesh University of Health Sciences (BUHS)

Introduction: Nutritional status is a sensitive indicator of community health and nutrition among preschool children, especially the prevalence of undernutrition that affects all dimensions of human development and leads to growth faltering in early life

Methods: The subjects were selected purposively. Anthropometric data height and weight of the study subjects were collected by standard techniques. Nutritional status was measured using Z score according WHO classification. χ^2 test, independent t test, Pearson's correlation, Multiple regression and logistic regression was performed as $P < 0.05$ level of significance. Statistical analyses were performed by appropriate univariate and multivariate techniques using SPSS windows 11.5.

Results: Moderate ($-3SD$ to $<-2SD$) to severe underweight ($<-3SD$) were 23.8% and 76.2% study subjects had normal weight for their age. Moderate ($-3SD$ to $<-2SD$) to severe ($<-3SD$) stunted children were only 25.6% and 74.4% children were normal and moderate to severe wasting were 14.7% whereas normal child was 85.3%. Significant association had been found between child nutritional status and monthly family income, mother education and occupation of father & mother. Age, sex and incomes of the family, education of mother and occupation of father were significantly associated with WAZ and HAZ of the study subjects ($P=0.0001$, $P=0.025$, $P=0.001$ and $P=0.0001$, $P=0.003$, $P=0.031$, $P=0.092$, $P=0.008$). Maximum study subjects took local small fish and some traditional tribal food like bashrool, jhijhipoka and pork very much popular food among tribal children. Energy, carbohydrate & fat intake was significantly associated with HAZ, WAZ, BAZ and MUACZ.

Conclusion: This study demonstrates that malnutrition among tribal children in Bangladesh is much better than national scenario in Bangladesh.

T4:PO.062

Trends of overweight and obesity among medical and psychology students

Lucero Soto-Lucero¹, Arturo Jimenez-Cruz¹, Montserrat Bacardi-Gascon¹, Ana Lilia Armendariz-Anguiano¹, Raul Gonzalez-Ramirez²

¹Universidad Autonoma de Baja California

²Colegio de la Frontera Norte

Introduction: Obesity (O) is a global public health problem and is especially severe in Mexico in all social and economic strata. The purpose of this study was to determine overweight (OW), O and abdominal obesity (AO) trends among first and fifth year students in psychology (PS) and medicine (MS) at the Universidad Autonoma of Baja California, Mexico. **Methods:** Five hundred and twenty eight students enrolled in both schools participated in the study. Weight, height and waist circumference (WC) were assessed and their body mass index (kg/m^2) was calculated. They were classified according to WHO criteria (2010).

Results: Participants were 297 women and 231 men. Mean age of participants was 20.7 ± 3.0 . In the first year, 9% PS and 7% MS were underweight, 23% PS and 19% MS were overweight, 15% PS and 16% MS

were obese, and 37% and 30% had AO. During the last year 6% of PS and 6% of MS were underweight, 36% ($p = 0.03$) and 25% were overweight, and 20% and 11% were O. Fifty four percent of PS women and 33% of men had AO. Thirty eight percent of MS women and 17% of men, in the fifth year had AO. The WC was 4.1 cm ($p = 0.025$) greater in the fourth year PS and was 2.79 cm ($p = 0.05$) greater in the fifth year of MS.

Conclusion: The prevalence of OW, O and AO in psychology students was higher in the fourth year of PS and AO was higher in the fifth year of MS.

T4 – Risk factors

T4:PO.063

Gender does not significantly affect the association between inflammation and the metabolic syndrome among patients with stable coronary artery disease

Christoph Saely¹, Alexander Vonbank¹, Philipp Rein¹, Daniela Zanolin², Andreas Leiberer², Heinz Drexel²

¹Department of Internal Medicine & Cardiology, Academic Teaching Hospital Feldkirch

²Vivit-Institute, Academic Teaching Hospital Feldkirch

Introduction: The metabolic syndrome (MetS) confers a stronger increase in cardiovascular event risk among women than among men. It is associated with elevated markers of inflammation, and inflammatory markers have been linked to cardiovascular event risk in MetS patients. We therefore tested the hypothesis that CRP and leukocyte count are more strongly associated with the MetS among women than among men.

Methods: We measured CRP and leukocyte counts a large high-risk cohort of 1041 patients with angiographically proven stable coronary artery disease, enrolling 371 women and 670 men. The MetS was diagnosed according to National Cholesterol Education Panel III criteria. Interaction analyses were performed using analysis of covariance models, applying a general linear model approach.

Results: The prevalence of the MetS was significantly higher among women than among men (40.2 vs. 31.2%; $p = 0.004$). Both CRP and leukocyte counts were significantly higher in patients with the MetS than in those without MetS among women (0.50 ± 0.58 vs. 0.41 ± 0.83 mg/dl; $p = 0.001$ and 6.9 ± 1.7 vs. 6.3 ± 1.8 G/l; $p < 0.001$, respectively) and also among men (0.47 ± 0.67 vs. 0.40 ± 0.72 mg/dl; $p < 0.001$ and 7.1 ± 1.8 vs. 6.6 ± 1.8 G/l, $p < 0.001$, respectively). Formal interaction analyses did not show a significant MetS by gender interaction neither with regard to CRP ($p = 0.788$) nor to leukocyte count ($p = 0.333$), indicating that the associations between CRP and leukocyte count did not differ significantly between women and men.

Conclusion: From the data of this large study we conclude that gender does not significantly affect the association between inflammation and the MetS among patients with stable coronary artery disease.

T4:PO.064

Bread consumption and incidence of overweight/obesity: A longitudinal study of the SUN cohort

Carmen De la Fuente-Arrillaga¹, Miguel A. Martinez-Gonzalez¹, Itziar Zazpe², Zenaida Vazquez³, Silvia Benito³, Maira Bes-Rastrollo¹

¹Department of Preventive Medicine and Public Health, University of Navarra (Spain) CIBERObn, Instituto de Salud Carlos III (Spain)

²Department of Nutrition and Food Sciences and Physiology, University of Navarra (Spain)

³Department of Preventive Medicine and Public Health, University of Navarra (Spain)

Introduction: Little is known about the relationship between bread intake and obesity. Our objective was to evaluate prospectively the rela-

tionship between white and whole grain bread, and weight change in a Mediterranean cohort.

Methods: We followed-up 9 267 Spanish university graduates for a mean period of 5 years from the SUN cohort. Dietary habits at baseline were assessed using a validated semi-quantitative 136-item food-frequency questionnaire. Average yearly weight change was evaluated according to categories of bread consumption. We also assessed the association between bread consumption and the incidence of overweight/obesity using multivariate models to adjust for potential confounders.

Results: White bread and whole-grain bread were not associated with higher weight gain. By contrast, white bread consumption was directly associated with a higher risk of becoming overweight/obese (adjusted OR (≥ 2 portions /day) versus (≤ 1 portion /week): 1.40; 95% CI: 1.08–1.81; p for trend: 0.008). However, no statistically significant association was observed between whole-grain bread, and overweight/obesity.

Conclusion: Consumption of white bread (≥ 2 portions /day) showed a significant direct association with the risk of becoming overweight/obese.

T4:PO.065

A study of overweight and obesity among secondary school students in Dubai: Prevalence and associated factors

Hamid Hussain, et al.

DUbai Health Authority

Methods Multistage stratified random sample was carried out in secondary schools in Dubai. The students were subjected to a self administrated questionnaire that included personal data, family history, and dietary habits. Weight and height were measured. The sample amounted to 1186 students

Results prevalence of overweight and obesity was 26.7%, 12.2% respectively. Male were higher than female (30.1% & 15.4% respectively) than females (23.1% & 8.9% respectively, $p < 0.05$). Non-national students experienced a higher percentage of overweight & obesity (29.2% & 12.8% respectively) compared to nationals (20.2% & 10.6% respectively) and this was statistically significant. It was found that students in grade ten were more likely to become overweight or obese compared to those in grades eleven or twelve (30.8%, 25.2% & 22.1% for overweight respectively) and for obesity (15.3%, 10.4% & 9.7% respectively). Stepwise logistic regression analysis delineated five predictors for overweight and obesity. These predictors were in order: eating fast food regularly, positive family history of obesity, male gender, those in tenth grade and non-national students; the associated risks were (OR = 1.44, 1.51, 1.79, 1.72, and 1.41 respectively).

Conclusion The present study revealed that overweight and obesity are highly prevalent among secondary school students in Dubai. Urgent and effective community intervention programs are highly required in order to combat this problem.

T4:PO.066

Coping strategies as moderators in the relationship between socio-cultural pressure to be thin and psychosocial functioning of overweight/obese adolescents

Miljana Kukic¹, Anita Vulic-Prtoric²

¹Department of Psychology, Faculty of Humanities and Social Sciences, University of Rijeka

²Department of Psychology, University of Zadar

Introduction: Socio-cultural pressures to be thin may have a wide range of negative effects on the well-being of adolescents, especially the obese ones. The aim of this study was to examine the role of coping strategies in the relationship between socio-cultural pressure to be thin and psychosocial functioning of overweight/obese adolescents.

Methods: The research was conducted on a sample of 113 overweight and obese high school students (76 girls and 37 boys, mean age 16.1 ± 1.3 years). Participants completed Body Image and Body Change Inventory, Depression Scale for Children and Adolescents, UCLA Loneliness Scale, Tripartite Influence Scale, and Coping Scale for Children and Adolescents.

Results: Socio-cultural pressure to be thin is a significant predictor of body dissatisfaction, usage of strategies to lose weight and depression. Avoidance as a coping strategy moderates association between socio-cultural pressure to be thin and body image dissatisfaction. Cognitive restructuring moderates association between socio-cultural pressure and depression, while cognitive restructuring and emotional reactivity moderate association between socio-cultural pressure and loneliness. None of the coping strategies moderates association between socio-cultural pressure and weight loss strategies.

Conclusion: This research showed that certain coping strategies moderate the relationship between socio-cultural pressure to be thin and functioning of overweight/obese adolescents. The results could be used as guidelines for designing the prevention and treatment programs focused on the quality of life of obese adolescents.

T4:PO.067

Pref-1 expression and adiponectin level after fluoxetine administration in rats

Melinda Kolcsar¹, Gáll², Mezei³

¹Department of Pharmacology and Clinical Pharmacy, University of Medicine and Pharmacy, Tîrgu. Mureş, România

²Doctoral School, Department of Physiology, University of Medicine and Pharmacy, Tîrgu. Mureş, România

³Department of Anatomopathology, University of Medicine and Pharmacy, Tîrgu. Mureş, România

Introduction: The body weight fluctuation during antidepressant drugs represents an interesting area of psycho-endocrino-pharmacology. The majority of the mentioned drugs increased intrasynaptic noradrenaline and/or serotonin level, influencing food intake via central mechanisms, but direct adipogenesis influencing effect is also discussed.

Methods: The aim of this experimental research consists in studying the fluoxetine influence on adipocyte maturation. Comparing adipocyte morphology after this selective serotonin reuptake inhibitor administration, searching the adipocyte differentiating factor (Pref-1) using immunohistochemistry and measuring plasma adiponectin levels

The study was performed on female and male white Wistar rats, fluoxetine being administered in different doses peroral during 40 days. After animals' slaughter perirenal adipose tissue and plasma samples were obtained. Perirenal adipocyte morphology was evaluated. Uni- and multi-vacuolar fat cells being identified, and expression of Pref-1 was studied using the proceeds tissue samples. Adiponectin levels were measured using ELISA method.

Results: The number of multivacuolar immature adipocytes increased after fluoxetine administration and a decreased presence of Pref-1 and low level of adiponectin was obtained.

Conclusion: The results suggest that fluoxetine influence adipogenesis and induced insulin-resistance, these mechanisms concurring on weight gain during antidepressant therapy.

T4:PO.068

BMI and weight changes in patients with treated macroprolactinomas

Guelho, Gomes, Paiva, Rodrigues, Ruas, Oliveira, Saraiva, Moreno, Cardoso, Vicente, Carrilho

Department of Endocrinology, Diabetes and Metabolism of Centro Hospitalar e Universitário de Coimbra, HUC-CHUC, E.P.E. Portugal

Introduction: Some studies have shown an association between prolactin levels and body weight, with increased prevalence of obesity in patients

with prolactinomas as well as weight loss associated with dopaminergic treatment. This work aims to assess the prevalence of obesity in patients with macroprolactinomas, before and after treatment with bromocriptin, and identify some determinants of weight variation during follow-up.

Methods: Medical records of patients with macroprolactinomas, treated with bromocriptin for ≥ 2 years, were retrospectively reviewed. Analyzed: tumor size; prolactin; anthropometric data; persistent hypogonadism and bromocriptin doses. Statistical analyses: SPSS(21).

Results: There were 87 eligible patients, 53 women, with 40.67 ± 15.44 years. Initial obesity prevalence was 41.3% [class I:24,1%; class II:11,5%; class III:5,7%]. One third of the patients ($n = 29$) had persistent hypogonadism, although these didn't present initial higher prolactin levels or an association with obesity ($p > 0.05$). The median bromocriptin cumulative dose was 15432.78 (1825–81395)mg, over 8.04 ± 5.56 years. Most patients (89.7%) normalized prolactin levels. After treatment more than half of the patients ($n = 47$) had lost weight, and there was a global BMI reduction (29.0 ± 5.0 vs. 28.3 ± 4.9 kg/m²; $p = 0.014$). Final obesity prevalence was 30.1% [class I:20.5%, class II:5.5%; class III:4.1%]. BMI wasn't correlated with prolactin or bromocriptin cumulative dose ($p > 0.05$), although prolactin normalization quadrupled the odds of losing weight (OR:4.65; $p = 0.031$).

Conclusion: There was a high prevalence of obesity in patients with macroprolactinomas and a significant weight reduction after treatment with bromocriptin. Despite the main mechanisms remain undetermined, patients that achieved normal prolactin levels were more likely to lost weight. These findings reinforced the metabolic importance of an appropriate treatment of patients with macroprolactinoma, particularly the obese one.

T4:PO.069

Prevalence of metabolic syndrome and associated behavioural factors in Tunisian adolescents

Hajer Aounallah-Skhiri¹, Jalila El Ati², Pierre Traissac³, Agnès Gartner³, Houda Ben Gharbia², Mohamed Hsairi¹, Chiheb Ben Rayana², Francis Delpeuch³

¹INSP (National Institute of Public Health), Tunis, Tunisia & SURVEN Unit (Nutritional Surveillance and Epidemiology in Tunisia research laboratory)

²INNTA (National Institute of Nutrition and Food Technology), Tunis, Tunisia & SURVEN Unit (Nutritional Surveillance and Epidemiology in Tunisia research laboratory)

³IRD (Institut de Recherche pour le Développement), NUTRIPASS Unit, IRD-UM2-UM1, Montpellier, France

Introduction: Chronic diseases related to the modernisation of dietary patterns and to changing lifestyles are increasing rapidly in North Africa, in youth among others. The aim of this study is to assess the prevalence of Metabolic Syndrome (MetS) among urban adolescents and its relationship with behavioural risk factors.

Methods: Cross-sectional study (2009/2010) in Great Tunis (93% urban) among a random sample of 1258 adolescents 10–19y (585 boys, 673 girls). MetS defined according to IDF criteria (2007). Food intake estimated by retrospective three-day dietary intake records; physical activity measured by a validated frequency questionnaire; sedentary activities are those with metabolic cost ≤ 1.5 MET. Adjusted (for physiologic, socio-demographic and economic factors) associations of MetS and its components with energy intake and sedentary behaviour were assessed using logistic regression models.

Results: prevalence of MetS was low (1.6% [0.9–2.8]), but higher among girls (2.4% [1.3–4.7]) vs. boys (0.6% [0.3–1.6]). Contrarily to the other MetS components for which no difference was found, abdominal obesity was more frequent among girls (22.5% [18.3–27.3]) vs. boys (6.0% [4.0–9.0]). After adjustment on gender, age, puberty, education, economic level, size of household and profession of household head, MetS and its most important component were associated with daily energy intake : MetS: 3rd tertile vs. 1st OR = 5.7 [1.3–24.4] ; abdominal obesity: 2nd tertile vs. 1st : OR = 2.5 [1.2–5.0]; 3rd tertile vs. 1st : OR = 9.3 [4.7–18.3].

No significant association was found between sedentary behaviour and MetS or its components.

Conclusion: These findings justify the necessity of promoting healthy diet behaviour among youth in order to prevent abdominal obesity and related diseases.

T4:PO.070

obesity and overweight among secondary schools in Dubai, prevalence and associated factors

Hamid Hussain, et al.

Dubai health authority

Introduction: Obesity is a major public health problem all over the world. It has become a global epidemic in both industrialized and developing countries. The dramatic increase in the prevalence of obesity among school children is associated with significant health and financial burdens

Methods: Multistage stratified random sample was carried out in secondary schools in Dubai. a self-administrated questionnaire used, included personal data, family history, and dietary habits. Weight and height were measured. The sample amounted to 1186 students

Results: prevalence of overweight and obesity was 26.7%, 12.2% respectively. Male showed higher percentage of overweight & obesity (30.1% & 15.4% respectively) than females (23.1% & 8.9% respectively, $p < 0.05$). Non- national experienced a higher percentage (29.2% & 12.8% respectively) compared to nationals (20.2% & 10.6% respectively) $P < 0.05$. grade ten were more overweight or obese compared to those in grades eleven or twelve (30.8%, 25.2% & 22.1%) and for obesity (15.3%, 10.4% & 9.7% respectively). Stepwise logistic regression analysis delineated five predictors for overweight and obesity in order: eating fast food regularly, positive family history of obesity, male gender, those in tenth grade and non- national students; (OR = 1.44, 1.51, 1.79, 1.72, and 1.41 respectively)

Conclusion: overweight and obesity are highly prevalent among secondary school students in Dubai. Urgent and effective community intervention programs are highly required in order to combat this problem

T4:PO.071

Influence of S-adenosylmethionine in fructose-induced hepatic injuries

Kameliya Bratoeva¹, Ganka Bekyarova¹, Mariya Tsaneva²

¹Division of Pathophysiology, Department of Physiology and Pathophysiology, Medical University-Varna, Bulgaria

²Department of General and Clinical Pathology, Medical University – Varna, Bulgaria

Introduction: Fructose is an important risk factor in the development of fatty liver. This is related to the de novo hepatic lipogenesis, excess production of free radicals and changes in redox balance. It is known that the overcoming of antioxidant protection in the cells leads to a change in the redox enzyme activity, mitochondrial dysfunction and cell death by apoptosis. The aim of this study was to investigate the influence of S-adenosylmethionine (SAM-e) administration in fructose-induced hepatic injuries.

Methods: The study was performed on male Wistar rats divided into 3 groups ($n = 7$): control, fructose fed (35%,16 weeks), fructose fed and treated with SAM-e (20 mg/kg b.w.,16 weeks). Liver injury was assessed biochemically and histologically together with hepatic Bcl-2 family proteins expression.

Results: The results showed microvesicular steatosis, increase liver MDA levels ($p < 0.05$), significantly elevated ratio Bax/BCL-2 by 92% ($p < 0.01$), reduced total thiol levels ($p < 0,05$) in the fructose-fed rats compared to the control group. In the group treated with SAM-e steatosis, MDA levels ($p < 0.001$) the ratio Bax/BCL-2 were significantly reduced

while total thiol levels ($p < 0,05$) was elevated compared with fructose fed rats.

Conclusion: Our results showed that SAM-e administration inhibits fructose-induced hepatic injuries and apoptosis. As a precursor of glutathione SAM-e improves antioxidant defenses in hepatocytes. This effect likely modulates the expression of hepatic Bcl-2 family proteins by increasing anti-apoptotic Bcl-2 protein, suppressed apoptosis and protects against oxidative damage in the liver.

T4:PO.072

Community and household socio-economic influences on overweight in urban South African adolescents

Rebecca Pradeilles¹, Paula Griffiths¹, Shane Norris², Emily Rousham¹

¹Centre for Global Health and Human Development, Loughborough University, Loughborough, United Kingdom

²MRC/Wits Developmental Pathways for Health Research Unit, University of the Witwatersrand, Johannesburg, South Africa

Introduction: The influence of the community environment on adolescent overweight has not yet been investigated in low- and middle-income countries. This work investigates associations between community & household socio-economic status (SES), gender, ethnicity and overweight.

Methods: A sample of 17–19 year olds ($n = 2000$) enrolled in the 1990 born Johannesburg-Soweto Birth to Twenty cohort was used. Associations between gender, ethnicity, community & household SES indices, and overweight were examined using logistic regression whilst controlling for potential confounders. Ethnicity was self-identified as White, Black or Mixed Ancestry. Community and household SES indices were created using principal components analysis applied to proxy indicators of the community (perceptions of the environment) and household (asset ownership) environment. Overweight according to BMI was defined using international age-specific cut-off points ($BMI \geq 24.7$ for ♂ & ≥ 24.8 for ♀).

Results: Adjusted multivariate regression results showed that the prevalence of overweight was significantly higher in girls than in boys ($OR=3.8$ [2.8–5.3]; $p < 0.0001$). White adolescents were more likely to be overweight than Blacks ($OR = 2.1$ [1.1–4.2]; $p = 0.03$). No significant associations were found between community & household SES and overweight in girls. The odds of being overweight were lower in boys living in poor households in comparison to relatively wealthy ones ($OR = 0.3$ [0.1–0.7]; $p = 0.006$). Boys who reported living in an economically disadvantaged area were more likely to be overweight than adolescents living in a relatively advantaged one ($OR = 3.1$ [1.4–7.0]; $p = 0.006$).

Conclusion: Findings of this analysis show that gender, ethnicity, and area & household socio-economic factors have an influence on overweight in this cohort of adolescents.

T4:PO.073

The relationship between adipocytokines and cardiovascular risk factors in patients with diabetes mellitus and obesity

Ramona Dragut¹, Emilia Rusu², Cristina Parpala¹, Raluca Nan¹, Florin Rusu³, Georgiana Enache⁴, Tocaci Georgiana⁵, Radulian Gabriela²

¹"Prof. N. Paulescu" Diabetes, Nutrition and Metabolic Diseases Institute, Bucharest

²"Carol Davila" University of Medicine, Bucharest

³"Carol Davila" Emergency Military Hospital, Bucharest

⁴County Emergency Hospital Calarasi, Calarasi

⁵Clinical Hospital "Al. Obregia", Bucharest

Introduction: There are several studies that have shown a strong relationship between type 2 diabetes, obesity and cardiovascular disease.

The purpose of this study was to evaluate the relationship between circulating levels of adiponectin, leptin, resistin, TNF-alpha and IL-6, the parameters of the metabolic syndrome (MetS), insulin resistance and the presence of cardiovascular risk factors in obese patients with type 2 diabetes.

Methods: In this cross-sectional and observational study, were included 100, to which were followed anthropometric indexes, biochemical parameters and adipocytokines. Insulin resistance was determined using HOMA-IR. The 10-year coronary heart disease (CHD) was calculated for each patient using the UKPDS risk engine.

Results: The mean age of patients evaluated was 53.3 ± 8.5 years, females representing 49% of total. The prevalence of obesity was higher in patients with greater duration of diabetes of 7.4 years. UKPDS score was positively correlated with age ($r = 0.41$, $p = 0.0001$), HOMA-IR ($r = 0.44$, $p = 0.0001$), TNF- α ($r = 0.30$, $p = 0.001$), IL-6 ($r = 0.23$, $p = 0.005$), leptin ($r = 0.19$, $p = 0.05$), resistin ($r = 0.27$, $p = 0.001$), MetS ($r = 0.34$, $p = 0.001$), systolic blood pressure (SBP) ($r = 0.63$, $p = 0.0001$) and adverse with adiponectin ($r = -0.23$, $p = 0.005$) and HDL-C ($r = -0.37$, $p = 0.001$). Multiple regression models controlled by BMI showed that adiponectin ($R(2)=0.14$, $p = 0.20$), TNF- α ($R(2)=0.23$, $p = 0.54$), resistin ($R(2)=0.35$, $p = 0.12$) and TAS ($R(2)=0.12$, $p = 0.11$) were associated with increased risk of CHD.

Conclusion: In this study we observed that serum levels of adipocytokines were strongly correlated with the presence of cardiovascular risk factors, the parameters of metabolic syndrome and insulin resistance.

T4:PO.074

A study of overweight and obesity among secondary school students in Dubai: Prevalence and associated factors

Hamid Hussain, et al.

Dubai Health authority

Introduction: Obesity is a major public health problem all over the world. It has become a global epidemic in both industrialized and developing countries. The dramatic increase in the prevalence of obesity among school children is associated with significant health and financial burdens;

Multistage stratified random sample was carried out in secondary schools in Dubai. The students were subjected to a self administrated questionnaire that included personal data, family history, and dietary habits. Weight and height were measured. The sample amounted to 1186 students prevalence of overweight and obesity was 26.7%, 12.2% respectively. Male encountered a significant higher percentage (30.1% & 15.4% respectively) than females (23.1% & 8.9% respectively, $p < 0.05$). Non-national students experienced a higher percentage of overweight & obesity (29.2% & 12.8% respectively) compared to nationals (20.2% & 10.6% respectively). $P < 0.05$ students in grade ten were more likely to become overweight or obese compared to those in grades eleven or twelve (30.8%, 25.2% & 22.1% for overweight respectively) and for obesity (15.3%, 10.4% & 9.7% respectively). Stepwise logistic regression analysis delineated five predictors for overweight and obesity. These predictors were in order: eating fast food regularly, positive family history of obesity, male gender, those in tenth grade and non-national students; the associated risks were ($OR = 1.44$, 1.51, 1.79, 1.72, and 1.41 respectively). conclusion overweight and obesity are highly prevalent among secondary school students in Dubai. Urgent and effective community intervention programs are highly required in order to combat this problem.

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T4:PO.075

Working hours and incidence of metabolic syndrome and its components in a Mediterranean cohort: The SUN project

Maira Bes-Rastrullo¹, Adriano M. Pimenta², Carmen Sayon-Orea³, Alfredo Gea³, Miguel Ruiz-Canela¹, Miguel A. Martinez-Gonzalez¹

¹Department of Preventive Medicine and Public Health, University of Navarra (Spain) CIBERobn, Instituto de Salud Carlos III (Spain)

²Department of Maternal and Child Nursing and Public Health, Universidade Federal de Minas Gerais (Brazil)

³Department of Preventive Medicine and Public Health, University of Navarra (Spain)

Introduction: Metabolic syndrome (MetS) is an important public health concern around the world. Long working hours have been proposed as a modifiable risk factor for MetS, despite sparse epidemiological consistency. Thus, the aim of this study was to prospectively evaluate the associations between working hours and incidence of MetS and each of its components.

Methods: We assessed 6,845 participants of a Spanish dynamic prospective cohort of university graduates, initially free of any specific criteria of MetS, and followed-up for a median of 8.3 years. Weekly working hours were collected at baseline and divided into 4 categories: > 0 to 24 hours, 25 to 39 hours, 40 to 49 hours, \geq 50 hours. MetS was defined according to the updated harmonizing criteria. The associations between working hours and incidence of MetS and each of its components were estimated by calculating multivariable adjusted Relative Risk (RR) and its 95% Confidence Intervals (95% CI), using Poisson regression models.

Results: The cumulative incidence of MetS was 6.0%. Working hours were not independently related to MetS (25 to 39 hours/week = RR: 1.42, 95% CI: 0.90–2.25; 40 to 49 hours/week = RR: 1.45, 95% CI: 0.91–2.30; \geq 50 hours/week = RR: 1.49, 95% CI: 0.91–2.42, *P* for trend = 0.235) or any of its individual definition criteria.

Conclusion: The findings of this study suggest that long work hours do not increase the risk of MetS development or each of its components. Further longitudinal studies in general population should be conducted to test these hypotheses.

T4:PO.076

Body Mass Index in Diabetes Type 2 in Elbasan Albania – a case control study

Marsida Krasniqi¹, Dajana Roshi²

¹Dep. Healthcare Elbasan, Albania

²Chemistry

Introduction: Our aim is to see the distribution of body mass index (BMI) among patients with diabetes type 2 and risk group as well as control 1

Methods: Our study consists in three groups. Total population was 200. One group with DM2 wish was consider as cases and other groups as control groups;one in high risk group(blood sugar>100mg/dl and<125mg/dl),last group subjects were neither diabetes nor high risk groups(normal blood sugar).Obesity was considered as BMI over 29.9.All three groups were compared with control group and diabetic subject were compared also with high risk group. All groups named:Group1-with DM;Group2-high risk for DM;Group3-control group. Data included in study were also age,gender,BMI. Chi-square test was performed for categorical variables;ANOVA for continues variables. $P \leq 0.05$ was considered as statistical significance

Results: Average and \pm SD in all 3 groups were: Group1 (27.53 \pm 2.86), group 2 (27.88 \pm 3.43), compared with group 3 (26.02 \pm 2.6) was higher ($P < 0.005$). BMI of female in group1 (27.72 \pm 3.25) was higher than BMI of males (26.08 \pm 2.65).

According to age,in women BMI > 29 was higher in age group 40–49years compare to other age groups.

Among men the mean of BMI (26.6 \pm 1.70) was in age groups 50–59 years,and age > 70 years old BMI was 26.4 \pm 3.03.

The percentage of overweight in DM was 65.43% and in group2 was 64.4%; in control group was 20.1%.

The obesity was considered as BMI>29.9 was in Group1 20.98% Compared with control group13% ($P \leq 0.05$).

Conclusion: The prevalence of obesity and overweight was higher in DM2 and high risk group compared with control group. The data showed high prevalence of BMI over 24.5.From this point of there a need for health promotion and education as well as for the screening tools education and training among family physicians in order to make early prevention and diagnosis

T4:PO.077

Association between muscular fitness and fatness in individuals young

Robinson Ramirez-Velez¹, Katherine González-Ruiz², Jorge Enrique Correa³, Yisel Carolina Estrada¹, Jose Francisco Meneses¹, Maria Victoria Gomez²

¹Facultad de Cultura Física, Deporte y Recreación, Universidad Santo Tomás

²Universidad Manuela Beltrán

³Centro de Estudios en Medición de la Actividad Física, Escuela de Medicina y Ciencias de la Salud, Universidad del Rosario

Introduction: Inverse associations with muscular fitness and prevalence of obesity have previously been reported in cross sectional studies. However, this association has not been reported in Latin-American population. To examine the relationships between of muscular fitness with different fatness index in individuals young

Methods: A total of 2,374 young men (age 23.3 \pm 2.3 years; weight 61.2 \pm 11.3 kg; BMI 22.5 \pm 3.6 kg/m³) were invited to participate in the study. All subjects were from Bogota (Colombia) and belong to different universities (public and private). They had no indication of cardiometabolic problems, as evaluated by interview. Muscular fitness was measured by isometric handgrip (dynamometer) with participants placed into strength quartiles. Fatness index were assessed by measuring, waist circumference (WC), body adiposity index (BAI), body mass index (BMI) and waist size index (WSI). Dichotomous variables were created based on whether or not the subjects were in the lower muscular strength (Q1) for the fatness index assessed. Logistic regression was used to estimate multivariate adjusted odds ratios (ORs) and their 95% confidence intervals (CIs).

Results: An adjusted logistic regression analysis showed that being in Q1 was associated with a WC>90 cm (OR, 3.27; 95% CI, 2.47 to 4.33), BAI>20 (OR, 5.74; 95% CI, 4.45 to 7.40); BMI>26 kg/m³ (OR, 1.83; 95% CI, 1.37 to 2.45).

Conclusion: The key finding of our study is that muscular fitness is inversely associated with fatness index. Among youth, low muscular fitness levels should be avoided for primary cardiovascular disease prevention.

T4:PO.078

Obesity and Thyroid Functions

Cigdem Alkac, Feray Akbas, Burak Alkac, Hanife Usta Atmaca

MD,Istanbul Training and Research Hospital, Internal Medicine Department,Istanbul,TURKEY

Introduction: Increasing incidence of obesity is a cause of significant morbidity and mortality. The relationship between obesity and thyroid functions are previously demonstrated in many studies. In this study, we aimed to evaluate the parameters of thyroid function in obese patients.

Methods: The study included 180 patients admitted to Istanbul Training and Research Hospital obesity outpatient clinic between January 2012–March 2013. Their medical histories, age, sex, body mass index (BMI), free T3, free T4, thyroid stimulating hormone, anti thyroglobulin, anti thyroid peroxidase levels and thyroid ultrasonographies were screened.

Results: We found that 18,9% of the patients were hypothyroid, 76,6% euthyroid, 2,8% subclinic hypothyroidic, 1,1% subclinic hyperthyroid, 0,6% hyperthyroid according to thyroid function tests. The mean BMI of hypothyroid group was 41,005 kg/m. Under medical therapy, thyroid function parameters of 88,3% of hypothyroid patients were normal. The mean BMI of euthyroid group was 40.5 kg/m². Although they were euthyroidic, 11% of patients had thyroiditis, 41,3% had thyroid nodules and 2,17% had both thyroiditis and thyroid nodules and 34% thyroid auto-antibodies. There was only 1 hyperthyroidic patient. The mean BMI of subclinic hypothyroid group was 40,863 kg/m², also they all had thyroid nodules.

Conclusion: The association of obesity with increased thyroid pathology is highly noticeable especially among young women in our society. Therefore; patients must be screened for both obesity and thyroid functions, and necessary treatment and follow-up should be initiated as soon as possible for preservation of public health.

With PCOS carry on cardiovascular risk factors that later in life might result in higher incidence of cardiovascular morbidity and mortality.

Even a very intense advertising promoting fruit consumption is not enough to have children eating more fruit: Results from an experimental study in Italy

Dario Gregori¹, Maria Gabriella Vecchio², Apostolia Nikolakis², Francesca Galasso²

¹Unit of Biostatistics, Epidemiology and Public Health Department of Cardiac, Thoracic and Vascular Sciences, University of Padova, via Loredan 18, 35121 Padova, Italy

²Zeta Research Ltd Via caccia 8 34129 Trieste Italy

Introduction: Consumption of fruit and vegetable is important to keep a healthy life style. Intake of fruit and vegetable is recommended to be at least 5 portions/per day but nowadays less than 15% of children between the ages of 4–8 years reach that consumption level. How to promote and increase fruit consumption in children is still an open issue. The aim of this study was to experimentally assess the efficacy of an intense pro-fruit advertising on its actual consumption in children during a snacking occasion.

Methods: The study was conducted on 12 children exposed to a 9 minutes movie, filled with a total 3.30 minutes advertising. Advertising was classified as healthy if the message was focused on fruit and vegetable consumption, and as unhealthy if focused on hyper-caloric foods. Children were randomized equally to have equicaloric snacks of apples (packaging of 80 grams) or chips (25 grams) available during TV watching.

Results: No significant differences ($P = 0.762$) were found in terms of kcal intake deriving from fruit consumption among the group exposed to chips advertising (20.20 kcal, 95% C.I. 1.01–32.93) and fruit advertising (0 kcal, 95% C.I. 0.00–0.00). Overall children had a higher consumption of chips (11.35 grams, 0–22.86) compared to fruit (0 grams, 0.00–44.91).

Conclusion: Even an intense exposure to TV advertising of fruit and vegetables has not been able to increase the consumption of fruit during a snack time. More innovative approaches may be necessary to stimulate the intake of fruit and vegetable in children.

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