synbiotics, and fecal microbiota transplantation represents a promising novel approach in the treatment of NAFLD.

Adipose Tissue, Appetite, and Obesity
INTEGRATED PHYSIOLOGY OF OBESITY AND METABOLIC DISEASE

Hair Cortisol, Obesity and the Immune System: Results From a 3 Year Longitudinal Study

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Background: Long-term glucocorticoid levels measured in scalp hair (HairGC) are positively correlated to obesity in cross-sectional studies, however it is unclear whether this reflects a state of obesity or an actual maintaining or contributing factor to obesity. **Objectives:** To investigate whether hair cortisol (HairF) and hair cortisone (HairE) predict changes in body mass index (BMI) and waist circumference (WC) over time, and to assess whether HairGC are linked to immune parameters. **Methods:** We measured HairGC in 1604 participants of the Netherlands Study of Depression and Anxiety (NESDA), and correlated these to BMI, WC, and immune parameters (interleukin-6 (IL-6), high-sensitive C-reactive protein (CRP), total leukocyte, monocyte and lymphocyte counts and the neutrophil-to-lymphocyte ratio). Also, we assessed whether baseline HairGC predict changes in BMI and WC at the follow-up visit, three years later, and whether immune parameters influenced this correlation. **Results:** In cross-sectional analyses, HairF and HairE were positively correlated to BMI (β=2.06 and β=2.84kg/m^2 respectively) and WC (β=5.36 and β= 8.54cm respectively, all p<0.001). HairF was related to IL-6 (adjusted β=0.15, p<0.05) and leukocyte count (adjusted β=0.57, p<0.01), and HairE to IL-6 (adjusted β=0.21, p<0.05). In the adjusted longitudinal analyses, baseline HairF was associated with a yearly increase in BMI (β=0.58%, p=0.009) and baseline HairE with a yearly increase in WC (β=0.84%, p=0.049). Adjusting for baseline IL-6 or leukocytes did not affect the found associations between GC and WC or BMI change. **Conclusions:** HairGC levels are related to BMI, WC, IL-6 and leukocytes in cross-sectional analyses. Moreover, chronically higher HairGC may be a relevant risk factor for the development of obesity in the future, although causality is yet to be proven.

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Higher Peptide YY Levels Are Associated With Lower Bone Mineral Density in Low Weight Adolescent Girls With Avoidant/Restrictive Food Intake Disorder

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Background: Avoidant/Restrictive Food Intake Disorder (ARFID) is a condition characterized by lack of interest in eating or food, sensory sensitivity, and/or fear of aversive consequences of eating; as opposed to the body image disturbance and fear of weight gain that characterize anorexia nervosa (AN). While appetite regulating hormones and their associations with bone mineral density (BMD) have been well studied in AN, little is known regarding BMD and its association with appetite regulating hormones in ARFID. Peptide YY (PYY), a gut derived anorexigenic hormone, acts via the Y2 receptor to inhibit osteoblastic activity in mammals. In AN, levels of PYY are higher than in healthy controls (HC) and are negatively associated with BMD. We hypothesized that similar to AN, low-weight female adolescents with ARFID would have lower BMD and higher PYY levels than in HC and that PYY levels would be inversely associated with BMD.
Methods: We studied 24 adolescent females (10 low weight with ARFID and 14 HC). BMD variables were measured by Dual-Energy X-ray Absorptiometry. We performed cross sectional analysis to compare BMD and fasting PYY levels between low weight ARFID and HC and to determine the relationship between BMD and PYY levels.
Results: ARFID and HC were 15.1±2.9 (mean ± SEM) and 17.1±3.8 years old, respectively (p=0.178), with mean BMI Z-scores of -1.74±0.88 kg/m^2 and 0.24±0.51 kg/m^2, respectively (p<0.0001). Total body BMD Z-scores were significantly lower in ARFID (-1.59±1.19, n=10) compared to HC (-0.41±1.11, n=14) (p=0.022), and lumbar BMD Z-scores were numerically lower in ARFID (-1.13±1.40, n=9) vs. HC (-0.44±0.86, n=14) (p=0.212). Mean PYY levels trended higher in ARFID (104.6±39.9 pg/ml, n=8) vs. HC (71.4±24.5 pg/ml, n=9) (p=0.054). In a combined analysis of participants with ARFID and HC, PYY levels were negatively correlated with lumbar BMD and BMD Z-scores (r=-0.52, p=0.038 and r=-0.54 p=0.031, n=16). In multivariable regression analysis, PYY remained a primary determinant of lumbar BMD after adjusting for age and height (p=0.035, β= -0.36) and a borderline significant predictor of lumbar BMD Z-scores after adjusting for height (p=0.064, β=-0.5). Similar associations were noted within the ARFID group alone, with PYY being a significant predictor of lumbar BMD (p=0.031, β=-0.97) after adjusting for age and height.
Conclusion: Female adolescents with low-weight ARFID have lower BMD and a trend toward higher levels of PYY compared with HC. Increased PYY levels may contribute to the lower BMD observed in ARFID. These findings are an initial step in understanding the neuroendocrine dysregulation in low weight adolescents with ARFID, which may predict bone outcomes in this condition.