Steroid Hormones and Receptors

STEROID BIOLOGY AND ACTION

A Proteomic Approach to Identify Circulating Glucocorticoid Responsive Proteins in Humans

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SAT-LB136

Glucocorticoids used in pharmacological doses for the treatment of a variety of medical conditions, and endogenous glucocorticoid excess - Cushing's syndrome, may result in several adverse effects, but currently there is no clinically useful biomarker of glucocorticoid activity. We have applied a proteomic approach to the discovery of glucocorticoid-responsive proteins potentially measurable in human serum samples. To minimise the masking by abundant serum proteins, we conducted discovery proteomics on the secretome of ex vivo-stimulated peripheral blood mononuclear cells (PBMC) isolated from 12 volunteers. The PBMC were divided into 4 treatment groups; +/- dexamethasone 100 ng/mL (dex) for 4h, or +/- dex for 24h. In all treatment groups, media was changed to serum free for 3h before collection. Media samples were processed for proteomics, with 561 and 273 proteins analysed by label-free quantification (LFQ) for the 4h and 24h secretome, respectively. Paired statistical analysis at the 2 time points generated a shortlist of 43 candidate biomarker proteins, which was verified using a multiple reaction monitoring (MRM) assay, confirming the differential secretion of 12 proteins at both 4h and 24 h. Five proteins were selected for validation using enzyme linked immunosorbent assay (ELISA) in an independent cohort: β2 microglobulin (B2M), lysozyme C (LYZ), high-mobility group protein 2 (HMG2), nucleophosmin (NPM1) and nucleolin (NCL). Twenty new volunteers (10M and 10F) had venous blood drawn at baseline and 12h after 4 mg oral dex. Four proteins were detectable by ELISA, three of which showed statistically significant change in concentration. Serum LYZ and NPM1 significantly decreased following dex: LYZ - 101 ± 5.5 vs 67 ± 4.4 ng/mL, (P<0.0001); NPM1 - 17.4 ± 1.0 vs 14.3 ± 0.9 ng/mL, (P<0.01), while HMG2 significantly increased - 819 ± 34 vs 984 ± 60 pg/mL (P<0.01). These results demonstrate that an *ex vivo* proteomic approach using PBMC in conditioned media can identify glucocorticoid-responsive proteins measurable in human serum.

Diabetes Mellitus and Glucose Metabolism

DIABETES DIAGNOSIS, TREATMENT AND COMPLICATIONS

The Nutrition Education Using a Health Care Application With Artificial Intelligence in Patients With Diabetes Mellitus

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SUN-LB110

Background: Diet control is the basis of the treatment of type 2 diabetes. However, the education and practice of diet control for the patients with type 2 diabetes mellitus (T2DM) need a lot of manpower and time. In 2009, we have developed a telemedicine model that nutritionists analyze photos of T2DM patients' meal and supervise them remotely. Our system resulted in the improvement of glycemic control of T2DM patients. Recently, the image analysis technology using the artificial intelligence (AI) progresses rapidly. The smart device application "Asken" has an AI-powered photo analysis system which analyzes the photo of the entire meal and identifies the frame of each item as well as its menu and serving amount. In addition, this application delivers individualized dietary messages and feedbacks. Case reports: We report two T2DM cases who conducted nutrient intervention by this application. One case was a 72-year-old man whose HbA1c decreased from 7.2% to 6.6% and weighed from 58.7kg to 57.5kg in 4 months. However, his total cholesterol increased from 119mg/dl to 200mg/dl, and low-density lipoprotein cholesterol (LDL) also increased from 47mg/dl to 106mg/dl. Another case is a 60-year-old man whose HbA1c improved from 7.0% to 6.6% and his weight decreased from 78.0kg to 76.0kg in 3 months. Total cholesterol was 140mg/dl to 128mg/dl, and LDL-cholesterol was from 65mg/dl to 54mg/dl. Conclusion: Using this application might be useful for diet control of T2DM patients. The effects of AI-supported nutrient intervention using application like this should be further clarified in the large number of patients.

Healthcare Delivery and Education

EXPANDING CLINICAL CONSIDERATIONS FOR PATIENT TESTING AND CARE

The Construction of the Online Health Guidance Service for Life-Style Related Diseases (Kanazawa Slim Study)

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MON-LB304

Background: Metabolic syndrome is a cluster of metabolic disorders including elevated blood pressure, high plasma glucose, excess body fat around the waist, and abnormal cholesterol or triglyceride levels. These conditions cause serious complications such as heart disease, stroke and type 2 diabetes. In Japan, specific health checkups and specific health guidance which focused on metabolic syndrome has

been performed since 2008. Those who fall under certain criteria need to receive a medical treatment guidance from doctor, public health nurse or dietitian. Those who received health guidance receives a reassessment of improvement of their life-style 3-6 months later. However, the efficacy of this approach has not been elucidated. In addition, many persons who have metabolic syndrome do not receive this instruction. Recently, the image analysis technology using the artificial intelligence (AI) progresses rapidly. The smart device application "Asken" has an AI-powered photo analysis system which analyzes the photo of the entire meal, and delivers individualized messages and dietary feedbacks. In this study, we utilized the Internet of Things (IoT) device which includes Asken app, body composition analyzer and sphygmomanometer that can connect wirelessly. Objective: Our aim is to assess the efficacy of specific health guidance adding on IoT device. This is a multicenter, unblinded, non-randomized controlled study. Results: At the end of January 2020, we recruited 219 participants including 105 participants with IoT devices. We used 48 participants (32 with IoT and 16 without IoT) who had finished a reassessment 3 to 6 months after initial guidance. Results: Age, body weight (BW), body mass index (BMI), blood pressure (BP), fasting plasma glucose (FPG), hemoglobin A1c (HbA1c), total cholesterol (T-Chol), high density lipoprotein cholesterol (HDL), low density lipoprotein cholesterol (LDL), non-HDL cholesterol (n-HDL), and triglyceride (TG), did not differ between IoT-use and control group. 6 months after initial guidance, the quantity of decrease of BW in IoT-use group was significantly larger than control (-2.5 ± 4.1 kg vs. 0.6±4.4, p = 0.03). In addition, the quantities of decrease of both T-Chol and n-HDL in IoT-use group were also significantly larger than control (T-Chol, -5.9 ± 32.0 vs. 14.3 ± 31.6, p = 0.02; n-HDL, -7.6 ± 29.0 vs. 9.4 ± 27.5, p = 0.01). Conclusion: Using IoT device might be useful for body weight loss and the improvement of mild hypercholesterolemia in those with metabolic syndrome.

Thyroid

THYROID DISORDERS CASE REPORTS IV

Riedel's Thyroiditis: A Diagnostic and Therapeutic Challenge

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SUN-LB84

Background: Riedel's thyroiditis is a rare thyroid pathology which presents a challenge for clinicians to diagnose and treat. Etiology remains largely unknown, although data suggests an association with Hashimoto thyroiditis, systemic fibrosis, and IgG-4 related systemic disease. Presentation of Riedel's thyroiditis can mimic malignant thyroid neoplasm, lymphoma, or a fibrous variant of Hashimoto thyroiditis. Due to its rarity, there is no consensus on the treatment. **Clinical case:** A 36-year old woman presented with a two-month history of gradually progressing neck swelling. She developed associated neck pain, decreased range of motion, hoarseness, and dysphagia, without difficulty breathing. One year prior to presentation, she had been diagnosed with hypothyroidism. She did not have a family or personal history of thyroid malignancy, however, she lived near Chernobyl during her childhood. On exam, the anterior and lateral neck was hard and enlarged, but nontender. The neck range of motion was diminished. The initial ultrasound of the thyroid demonstrated asymmetrically enlarged heterogenous diffusely nodular right thyroid and isthmus measuring 1.9cm. A CT of the chest with contrast showed diffusely enlarged thyroid extending superiorly beyond the image with mild tracheal displacement. Initial laboratory results included TSH of 17.40 uU/ml (ref: 0.35-4.94 uU/ml), free T4 of 1.06 ng/dl (ref: 0.61-1.82 ng/dl). She had a significantly increased thyroid autoantibodies (Anti-TPO >700 IU/ml with ref: 0.0-9.0 IU/ml, Anti-TG >2000 IU/ml with ref: 0.0-4.0 IU/ml). PTH and calcium were normal, and calcitonin was low. In the interim, the patient was evaluated by ENT without evidence of airway compromise. She underwent a core biopsy of the right thyroid lobe which demonstrated dense fibrous connective tissue mixed with mature lymphocytes. Pathology and immunostaining results were suggestive of Riedel's thyroiditis. The patient was started on prednisone 60mg daily, which she tolerated for 6 weeks. Due to side effects, prednisone dose was titrated down and tamoxifen was added. Over the following 6 months, compressive symptoms resolved, and the ultrasound showed a significant decrease in the thyroid size. TSH normalized with thyroid hormone replacement. To date, she is asymptomatic and continues on tamoxifen and low dose prednisone without evidence of progression. **Conclusion:** Riedel's thyroiditis is a rare condition that can progress into a medical emergency and should be suspected in patients presenting with a thyroid mass. Clinical awareness of Riedel's symptomatology and laboratory findings should enhance our ability to distinguish and make the diagnosis. Instituting effective treatment that results in the improvement of symptoms and reduction in thyroid size can be challenging due to possible poor response or development of side effects.

Adrenal

ADRENAL CASE REPORTS I

Allgrove's: A Syndrome for the "A"ges

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SAT-LB43

Allgrove's syndrome is an inherited condition caused by mutations in the *AAAS* gene (encoding the protein ALADIN) and is inherited in an autosomal recessive pattern (1). It classically is characterized by three specific features: achalasia, Addison's disease, and alacrima (reduced or absent ability to secrete tears). This has led to the name "Triple A syndrome", and some have suggested a 4th 'A' of autonomic disturbance (2). It is important to note that the phenotype of this condition is variable, and some patients may have all three (or four) of the manifestations at initial presentation, and that other patients may develop or have worsening of the 'As' over time. In this