[Case reports]
Case 1. Six-year and eight-month-Japanese boy visited a pediatric hospital because of hyperactivity disorder. Physical examination revealed that he had a slight mental retardation (IQ 63 by Tanaka-Binet test). Thyroid tests showed that fT4 1.21 ng/dL, TSH 120.4 μU/mL, Tg antibody 1.9 IU/mL, TPO antibody <0.1 IU/mL. His serum was sent to our laboratory to examine the causes of inappropriate high serum TSH concentration.
Case 2. Eight-year and three-month-Turkish girl was brought to a pediatric hospital by her parents because of her yellowish palms, which was not identified at the hospital. She did not have any complaints and physical signs attributable to thyroid dysfunction. Laboratory data disclosed that fT4 1.5 ng/dL, TSH 19.6 μU/mL, Tg Ab negative, TPO Ab negative. Levothyroxine treatment started but serum TSH concentration was still high (39.0 μU/mL) after two months. Her serum sample was sent to our laboratory to examine the causes of inappropriate high serum TSH concentrations.
[Lab. Tests for macro-TSH]
When serum was mixed with the same amount of 25% polyethylene glycol (PEG) and γ-globulin fraction was precipitated, TSH concentration in the supernatant decreased significantly from 109.3 μU/mL to 2.3 μU/mL (PEG precipitation ratio 97.9%) in case 1, and from 17.3 μU/mL to 0.15 μU/mL (PEG precipitation ratio 99.1%) in case 2. HAMA blockers did not significantly change TSH concentration in both cases. High proportion of serum TSH bound to a protein G column, which binds IgG, in case 1 (91.3%) and in case 2 (57.7%), indicating that TSH was associated with IgG. Gel filtration chromatography (GFC) revealed that TSH was mostly eluted at the fraction > 150 kDa rather than 28 kDa of authentic TSH in both cases. Serum was incubated with 37.7 μU of TSH for one hour and subjected to GFC. TSH concentration in the fraction of 150 kDa (macro-TSH) increased from 2.8 μU/mL to 5.6 μU/mL in case 1 and from 0.4 μU/mL to 2.0 μU/mL in case 2, suggesting that macro-TSH was produced by the binding of exogenous TSH to anti-TSH autoantibodies.
[Conclusion]
Macro-TSH exists in children and careful evaluation is required in patients with inappropriate high serum TSH concentrations to avoid unnecessary treatment.

Reproductive Endocrinology
FEMALE REPRODUCTION: BASIC MECHANISMS

Uterine Contractility in Pregnancies Complicated by Obesity: The Effects of Adipokines on the in Vitro Functional Contractility of Isolated Uterine Samples

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MON-003
Objectives: The onset of parturition in pregnant women with obesity is frequently delayed. Without induction, these women are nearly twice as likely as normal-weight to have prolonged pregnancy (≥41 weeks gestation) which is concerning because of associated two-fold increased risk of third-trimester stillbirth. Data from vascular studies have shown that different adipokines have different effects on smooth muscle contractility; either as relaxants or constrictors. However, only few studies have investigated their role in uterine contractility, a relationship that we sought to investigate. **Materials and Methods:** Total of 22 pregnant women scheduled for term cesarean delivery (CD) were recruited. Strips from the first two participants were used to identify dose response effects for each adipokine, and 20 participants' data were included in the final analysis. Study groups consisted of normal-weight (N=10) and women with obesity (N=10). Myometrial strips were obtained from the hysterotomy incision at the time of the CD. Muscle strips were mounted within experimental recording baths. Both spontaneous and oxytocin induced contractions were recorded by a custom-build data acquisition software. Adipokines of interest included adiponectin, TNFα, resistin, and omentin. Adipokines were added to the muscle baths after muscle equilibration was achieved. Contractions outcomes of interest included forces, durations, and frequencies. Data comparisons were conducted using Wilcoxon Rank-Sum tests; medians and ranges are presented. **Results:** Forces of contractions in normal-weight participants were double those studied from participants with obesity (13.9 [9.3-34.3] vs. 8.9 [4.8-23.6], p=0.05). There were no statistically significant differences between contractility outcomes of interest after adding adiponectin, TNFα, and resistin to the muscle baths within and between the study groups. In participants with obesity, compared to baseline, omentin significantly reduced the force of spontaneous induced contractions (p=0.002) and prolonged the period between contractions (p=0.01). Importantly, that effect was not seen in normal-weight participants or in oxytocin induced contractions. Omentin also significantly reduced the forces of spontaneous induced contractions (2.9 [2.2-4.6] vs. 14.4 [4.8-33.6]; p=0.01) and prolonged the period (790.6 [753.0-832.0] vs. 611.4 [128.3-702.7]; p=0.04) in participants with obesity compared to normal-weight participants. Differences were no longer observed after adding oxytocin. **Conclusion**: In vitro, uterine contractions were reduced in muscle samples prepared from pregnant women with obesity compared to normal-weight counterparts. Omentin may have a role in reduced uterine contractility in pregnant women with obesity and that effect may be corrected by oxytocin administration.

Reproductive Endocrinology
CLINICAL STUDIES IN FEMALE REPRODUCTION I

Investigating Racial and Ethnic Comorbidity Patterns of Polycystic Ovary Syndrome

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SAT-024
Polycystic ovary syndrome (PCOS) is a highly heterogenous reproductive endocrine disorder that affects up to 15% of women and is one of the leading causes of infertility. However, its genetic etiology remains poorly understood. Additionally,

PCOS patients have a greater risk of having metabolic disorders, such as insulin resistance and cardiovascular diseases, but it is estimated that up to 75% of women remain undiagnosed. Delayed treatment and care can exacerbate comorbid conditions and be detrimental to high risk populations like African American and Hispanic women. We aim to characterize genetic and environmental variables contributing to PCOS and understand its shared etiological features with metabolic disorders. To do this, we developed two algorithms to identify diverse PCOS patients using medical records. The broad algorithm used a combination of PCOS-related billing codes (Code Based) and identified a large dataset (N = 8,340) who exhibited diverse PCOS symptoms, while the strict algorithm required PCOS keywords in addition to billing codes (Regex Based). The strict algorithm identified a smaller cohort of patients (N = 4,593) who exhibited more classically diagnoseable PCOS characteristics according to Rotterdam and NIH criteria. Using both datasets, we tested PCOS case status against 1,853 phenotypes in the medical database using a logistic regression model and identified comorbidity patterns for women of European and African descent. We observed that European descent women consistently had more distinct phenotypes associated with PCOS case status than African American women. Next, we examined the interacting effects of self-reported race on PCOS case status and found four significant phenotypes ($p < 6.25e-4$) in our Regex Based algorithm. African American women with PCOS had greater odds of being diagnosed with "Early onset of delivery" ($p = 1.3e-4$, OR = 1.86), "Hereditary hemolytic anemias" ($p = 1.8e-4$, OR = 0.65), and "Other hereditary hemolytic anemias" ($p = 3.7e-04$, OR = 0.90). Meanwhile, European descent women had greater odds of being diagnosed with "Hypertensive chronic kidney disease" ($p = 1.7e-04$, OR = 0.68). Results show that European and African American women have unique metabolic comorbidity patterns and it may also indicate that clinical PCOS diagnostic standards vary between these groups with possible disparity-causing effects.

Diabetes Mellitus and Glucose Metabolism

DIABETES TECHNOLOGY

Flash Glucose Monitoring Helps Achieve Better Glycemic Control Than Conventional Self-Monitoring of Blood Glucose in Non-Insulin-Treated Type 2 Diabetes: A Randomized Controlled Trial

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SAT-648

Background and aims: Flash glucose monitoring (FGM) is a novel system with which glucose levels are monitored and has been reported to improve glucose variability and glycemic control in type 1 and type 2 diabetes patients treated with insulin. The present study aimed to evaluate the effects of FGM and conventional self-monitoring of blood glucose (SMBG) on glycemic control in patients with non-insulin-treated type 2 diabetes. **Reseach design and Methods:** In this 24-week, multicenter, open-label, randomized (1:1), parallel group study, non-insulin-treated type 2 diabetic patients at 5 hospitals in Japan were randomly assigned to the FGM (n = 49) or SMBG (n = 51) groups and were provided FGM or SMBG devices for 12 weeks. The primary outcome was change in glycated hemoglobin (HbA1c) level. This trial is registered with UMIN-CTR (UMIN000026452). **Results:** Forty-eight participants in the FGM group and 45 in the SMBG group completed the study. The mean HbA1c levels were 7·83% (SD 0·25) in the FGM group and 7·84% (SD 0·27) in the SMBG group at baseline, and the values were reduced in both FGM (−0·43%; 95% confidence interval [CI], −0·57 to −0·28; $p < 0·0001$) and SMBG groups (−0·30%; 95% CI −0·48 to −0·13; $p = 0·001$) at 12 weeks. On the other hand, HbA1c was significantly decreased from baseline values in the FGM group, but not in the SMBG group at 24 weeks (FGM: −0·46%, 95% CI −0·59 to −0·32, $p < 0·0001$; SMBG: −0·17%, 95% CI −0·05 to 0·11, $p = 0·124$); a significant between-group difference was also observed (difference −0·29%, 95% CI −0·54 to −0·05; $p = 0·022$). Diabetes Treatment Satisfaction Questionnaire score was significantly improved, and the mean glucose levels, standard deviation of glucose, mean amplitude of glycemic excursions, and duration of hyperglycemia were significantly decreased in the FGM group compared with the SMBG group. **Conclusions:** Glycemic control was better with FGM than with SMBG after cessation of glucose monitoring in non-insulin-treated type 2 diabetic patients.

Bone and Mineral Metabolism

PARATHYROID HORMONE TRANSLATIONAL AND CLINICAL ASPECTS

Neonatal Hypocalcemic Seizures in Offspring of a Mother with Familial Hypocalciuric Hypercalcemia Type 1 (FHH1)

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SAT-404

Background: Familial hypocalciuric hypercalcemia type 1 (FHH1) is caused by loss-of-function mutations of the calcium-sensing receptor (CaSR), and considered to be a benign condition associated with mild-to-moderate hypercalcemia (1). However, the children of parents with FHH1 can develop a variety of disorders of calcium homeostasis in infancy.