

Friday November 6, 1:30-3:30 PM

T-OR-2076

A Novel Gastrointestinal Microbiome Modulator (GIMM) from Soy Pods Reduces Absorption of Dietary Fat in Mice

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Background: Diet impacts the composition of the gastrointestinal (GI) microbiome, which is studied by monitoring biomarkers in fecal samples such as microbiota taxa and their secretome, nutrients, intestinal secreted proteins and xenobiotic metabolites. Simplification of diets, low in variety but high in energy, contributes to the loss of diversity reported in the obese GI microbiome. Because dietary habits are difficult to change, we developed a GI microbiome modulator (GIMM) to expand diversity of this ecosystem.

Methods: Mice were fed either an obesogenic diet (ObD), or an ObD containing 15% activated soy pod fiber (ObD-ASPF) for 30 days. The diets were isocaloric and balanced for macronutrient content. ASPF is a novel fiber preparation from whole soy pods that is activated to produce glyceollins. Fecal biomarkers measured at baseline and study termination included triglycerides, bile acids, glucose, lactate, pH, short chain fatty acids, caloric content and taxonomy analysis. Body composition and energy intake were measured weekly. Circulating proinflammatory markers were measured by ELISA.

Results: Mice fed ObD-ASPF did not gain body fat. This was associated with decreased absorption of calories ($p < 0.05$) and increased fecal excretion of triglycerides, which may be attributed to decreased bile acid secretion ($p < 0.05$). A shift ($p < 0.05$) in abundances of microbiota in 10 genera was observed. Mice fed ObD-ASPF had elevated plasma concentrations of the anti-inflammatory IL-10 ($p < 0.05$) and decreased ($p < 0.05$) plasma concentrations of the neutrophil chemoattractant CXCL1.

Conclusions: We developed a novel dietary intervention derived from soy pods that acts as a GIMM to hinder absorption of dietary fat and sugar in mice. More studies with this GIMM in animal models of diet-induced GI dysfunction are needed. Possible indications are nonalcoholic fatty liver diseases, obesity, type 2 diabetes (T2D), irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), autism, and chronic constipation.

T-OR-2077

Biliary Diversion to the Distal Ileum Results in Metabolic Improvements Similar to Gastric Bypass in Mice

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Background: Roux-en-Y gastric bypass (RYGB) is associated with resolution of insulin resistance prior to significant weight loss through mechanisms that are not well understood. Recent studies in humans and rodents suggest a beneficial role for bile acids and human studies have documented significant plasma bile acid increases after RYGB. To test the hypothesis that bile acids exert effects independent of weight loss, we created a mouse model in which bile is diverted from the gallbladder to the distal ileum without intestinal rearrangement (GB-IL) and

compared that to a sham procedure with bile diversion to the duodenum (GB-D) and to RYGB.

Methods: Biliary diversion (GB-IL, GB-D) and RYGB were performed in a mouse model of diet-induced obesity. Mouse cohorts were characterized in parallel for body weight/composition, food intake, glucose tolerance as well as assessment of whole body and tissue-specific insulin sensitivity with hyperinsulinemic-euglycemic clamp studies.

Results: GB-IL and RYGB led to similar degrees of weight loss and adiposity, though GB-IL resulted in more robust improvement in insulin sensitivity as measured by the hyperinsulinemic-euglycemic clamp. In order to determine whether the same effects occurred in the absence of weight loss we subsequently performed GB-IL in chow fed, lean mice. In this case GB-IL did not result in changes in body weight, food intake, or body composition, but did result in significant improvement in oral glucose clearance.

Conclusions: Biliary diversion to the ileum in the absence of other gastrointestinal rearrangement or restriction leads to weight loss and improved insulin sensitivity similar to RYGB in mice. In GB-IL there is an effect of bile acids independent of weight loss, and those effects do not appear to be mediated by FXR (F32DK103474, R01DK105847).

T-OR-2078

Gastric Control of Obesity

David Boone *South Bend Indiana*, Danika Bakke *South Bend IN*

Background: GASTROKINE-1 (Gkn1) is a protein made exclusively and abundantly in the stomach. It is secreted into the gut lumen and is not found in the circulation. Gkn1 is resistant to chemical and enzymatic denaturation and we have detected intact Gkn1 in the lumen along the entire length of the GI tract. The function of Gkn1 is not entirely understood, and so we generated Gkn1^{-/-} mice to more fully understand Gkn1 function.

Methods: Gkn1^{-/-} mice were generated on a B6 background. Gkn1 was localized by immunofluorescence. The intestinal microbiome was evaluated using 16S sequencing. The effects of Gkn1 on metabolism and the microbiome were examined following exposure of WT and Gkn1^{-/-} mice to a high fat diet (HFD)

Results: Gkn1^{-/-} mice had considerably lower body fat than WT littermates. Notably, adult Gkn1^{-/-} mice had considerable quantities of brown fat in their abdominal fat mass, which was not observed in WT littermates. When placed on a HFD, WT mice gained weight and displayed the expected alteration of the gut microbiome. Conversely, Gkn1^{-/-} mice did not gain weight on a HFD and their microbiome was unaltered by HFD. Immunofluorescence indicated that Gkn1 decorates a subset of microbes in the colon, suggesting that Gkn1 alters microbiome dynamics by direct association with microbes in the gut lumen. Gkn1 is known to bind to amyloid structures of proteins. Bacteria have amyloids on their cell surface that support adherence and biofilm formation and purified Gkn1 alters microbial biofilm formation in vitro.

Conclusions: Gkn1, which is made exclusively in the stomach, promotes obesity and supports the altered intestinal microbiome changes that occur on a high fat diet. This effect of Gkn1 may be mediated by direct binding of Gkn1 to amyloids on bacterial surfaces in the gut. Deletion of Gkn1 results in the presence of brown fat in the abdominal fat pads of adult mice. Whether this reflects preservation of neonatal fat or de novo generation of this fat in the adult remains to be determined.

T-OR-2079

Possible Aternate Strategy to Correct the Dysfunction of Type 1 Cholecystokinin Receptor in Obesity

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Background: Cholecystokinin (CCK) plays an important role in appetite control by eliciting satiety in response to food intake. Therefore, dysfunction of this hormone-receptor system is a possible cause of obesity and a well-established target for its treatment. The type 1 cholecystokinin receptor (CCK1R) is sensitive to elevated membrane cholesterol, such as exists in cholesterol gallstone disease, by acting through a specific motif on the receptor's external surface to disrupt stimulus-activity coupling. We postulate to reverse the negative impact of cholesterol by targeting this site of CCK1R using structurally-related bile acids as a tool.

Methods: We studied the effects of structurally-related hydrophobic chenodeoxycholic acid and hydrophilic ursodeoxycholic acid in vitro on CCK1R function in normal and elevated membrane cholesterol. In order to understand whether bile acids compete with cholesterol for CCK receptor interaction, we utilized constructs with mutations in cholesterol recognition motifs, including the cholesterol-insensitive CCK1R Y140A construct.

Results: Bile acids selectively affected the function of CCK1R and not CCK2R, similar to the impact of cholesterol. Chenodeoxycholic acid had negative effects on CCK1R ligand binding and/or signalling ($p < 0.05$) in both normal and high cholesterol environments. In contrast, ursodeoxycholic acid had no effect on CCK1R function in normal membranes, whereas it significantly corrected the defective signalling in high cholesterol ($p < 0.05$). The cholesterol-insensitive Y140A mutant was resistant to both bile acids.

Conclusions: Both the bile acids compete with cholesterol, probably at the same site, but affecting the conformation and consequent function of CCK1R differently. We provide proof-of-concept for using such agents to correct the negative impact of high cholesterol on CCK1R function. Exploring molecules with similar characteristics may lead to a novel pharmacotherapy for obesity.

T-OR-2080 - Withdrawn

T-OR-2081

Sustained Improvements in Cardiovascular and Metabolic Risk Factors and Quality of Life at Two Years with Vagal Nerve Block in the ReCharge Trial

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Background: Vagal nerve blocking reduces appetite and creates weight loss. The vagal nerve block device recently received FDA approval for the treatment of obesity based on 18-month data from the ReCharge Trial. This report assesses the metabolic benefits through 24 months.

Methods: The double-blind period of the ReCharge Trial has completed and transitioned to a 5-year, open-label study of the safety and effectiveness of vagal blocking. We report on improvements among patients randomized to the active arm of the trial who attended the two-year visit ($n=102$).

Results: Two year weight loss was 21%EWL or 8%TBL. Metabolic parameter improvement was sustained to 24 months. Systolic blood pressure (BP), diastolic BP, and resting heart rate were reduced from baseline by 5.5mmHg (95%CI 2.7 to 8.2), 3.0mmHg (95%CI 1.2 to 4.9), and 4.4 bpm (95% CI 2.4

to 6.3), respectively. Waist circumference reduced by 8.4cm from baseline (95% CI 6.3 to 10.6). At baseline 34 subjects were pre-diabetic and not on diabetic medications (5.79% HbA1c, 95%CI 5.2 to 6.3); at 2 years, 17 (50%) had improved to normal (5.31%, 95%CI 4.9 to 5.6). Additionally, 16 (47%) of the 34 subjects with metabolic syndrome at baseline (5.56% HbA1c, 95%CI 4.7 to 6.5) improved to normal at 2 years (5.27% HbA1c, 95%CI 4.4 to 6.9). Mean scores on Impact of Weight on Quality of Life-Lite significantly improved by 35% (57 to 77; 0-100 scale). All scales of Three Factor Eating Questionnaire showed significant improvements from baseline with mean scores on Cognitive Restraint of Eating improved by 58% (9.5 to 15; 0-21 scale), Disinhibition decreased by 28% (10.3 to 7.4; 0-16 scale) and Hunger decreased by 51% (8.0 to 3.9 on 1-14 scale).

Conclusions: At two years, data from the ReCharge Trial demonstrate that weight loss with vagal blocking continues to provide significant and clinically meaningful improvements in cardiovascular risk factors, pre-diabetes, metabolic syndrome, weight-related quality of life and eating behaviors.

T-OR-2082

Outcomes of adolescent bariatric surgery: A 2 year report from the Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) study.

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Background: Adolescents with severe obesity are increasingly seeking weight loss surgery (WLS) but few adolescent-specific studies examining efficacy and safety are available to support clinical decision-making.

Methods: Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) is the first multicenter, prospective study of adolescent WLS outcomes. 242 adolescents undergoing WLS were recruited from 5 U.S. centers. This analysis summarizes anthropometric, metabolic, micronutrient, and weight-related quality of life (WRQOL) outcomes two years following surgery.

Results: Participants (Mage = 17 years; 76% female; 72% white race) underwent gastric bypass (RYGB: 67%), vertical sleeve gastrectomy (VSG: 28%), or gastric band (5%). Median baseline BMI was 51kg/m² (range 34 to 88). At 2 years, 206 of 242 (85%) completed in-person follow up with an overall 30% decline in median BMI ($p < 0.01$; 31% for RYGB, 31% for VSG, 6% for band). Body fat % declined from 53% to 42% in females and from 55% to 27% in males. Median fasting glucose (-7%), insulin (-65%), and HDL (+38%) levels improved (each $p < 0.01$). Micronutrient assessment showed the following prevalence rates (baseline, 2 year): low folate (3%, 6%; $p = 0.04$), hypoferritinemia (5%, 47%; $p < 0.01$) hypovitaminosis A (6%, 14%; $p < 0.01$), hypovitaminosis B12 (0.5%, 8%; $p < 0.01$), and hypovitaminosis D (38%, 44%; $p = 0.5$). WRQOL markedly improved ($p < 0.01$).

Conclusions: In the largest prospective longitudinal study of adolescent WLS outcomes, 2 year results indicate significant improvement in weight, fat mass, metabolic health, and WRQOL for severely obese adolescents. Greater attention to nutritional management may be needed in some to prevent nutritional deficiency states in the future.

T-OR-2083

Bariatric Surgery is Associated With an Increased Risk of Fracture in the Swedish Obese Subjects study

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Background: Bariatric surgery is an effective treatment to achieve long-term weight loss but it also prevents diabetes and is associated with lower incidence of cardiovascular events. However, several studies have shown that bariatric surgery leads to decreased bone mineral density at the proximal femur region 9-12 months after surgery. This has led to an increased concern of the effect of bariatric surgery on bone health and the long-term risk of fractures for these patients.

Methods: The Swedish Obese Subjects (SOS) study is a controlled, prospective intervention trial including 2010 patients who have undergone bariatric surgery and 2037 matched controls. Study participants were recruited between 1987 and 2001. Information on fractures was obtained by cross checking social security numbers from the SOS database with ICD9/ICD10 codes for fractures in national health registers. Information on smoking and alcohol intake was received from questionnaires at pre-specified time points.

Results: An increased risk of fracture was observed in the surgery group (187 events, incidence rate [IR] = 55.3/10 000 person-years; 95 % confidence interval [CI]: 47.9-63.8) compared to controls (127 events, IR = 37.5/10 000 person years; 95 % CI: 31.5-44.7; hazard ratio [HR] = 1.47; 95 % CI 1.17-1.84; p = 0.001. The fracture risk remained increased in the surgery group after adjustment for preselected risk factors of fracture (age, sex, smoking, alcohol intake and previous fracture) (Adjusted HR = 1.53; 95 % CI: 1.22-1.93; p < 0.001).

Conclusions: Results from the SOS study indicate that bariatric surgery increases the risk of fracture.

T-OR-2084**Sleeve Gastrectomy Modifies Pharmacokinetics of Ingested Alcohol**

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Background: While it is well established that Roux-en-Y gastric bypass (RYGB) accelerates alcohol absorption and causes a rapid and large increase in peak blood alcohol concentration, results from previous studies on the effects of sleeve gastrectomy (SG) on alcohol pharmacokinetics are conflicting. Data from two studies found SG did not affect peak blood alcohol concentration (BAC), whereas another study found SG caused a marked increase in peak BAC after alcohol ingestion. Moreover, all of these studies estimated BAC from breath analysis, which might not reliably estimate true peak BAC.

Methods: We performed an alcohol challenge test in 5 women (BMI=35±5 kg/m², 49±13 yrs. old) who had SG surgery 1.9±0.6 years earlier, 8 women (BMI=30±5 kg/m²; 43±8 yrs. old) who had RYGB surgery 2.2±1.2 years earlier, 4 women (BMI=34±4 kg/m², 56±9 yrs. old) who had laparoscopic gastric banding (LAGB) surgery 2.8±1.2 years earlier (surgery control) and 9 women (BMI=44±4 kg/m²; 41±9 yrs. old) who were scheduled for bariatric surgery (non-surgery control). Blood samples were taken before and at 5, 15, 25, 35, 50, 65, 80, 95, 110, 125, 140, 150 and 200 min after consuming 0.50 g

of alcohol per kg of fat-free mass. BAC was determined by using the gold standard technique of gas chromatography.

Results: Peak BAC occurred sooner and was higher after both RYGB and SG procedures than in control subjects (Time to peak (min); height of peak BAC (mg/dl) for each group: 5±0 min, 111±17 mg/dl after RYGB, 13±5 min; 86±11 mg/dl after SG, 33±17min; 59±27 mg/dl after LAGB, and 25±12 min; 60±14 mg/dl in non-surgery control; P<0.001)

Conclusions: SG causes marked alterations in the response to alcohol ingestion manifested by a faster and higher peak in BAC. However, the effect of SG on alcohol metabolism is smaller than the effect of RYGB.

T-OR-2085**Changes in Appetite and Food Palatability in Roux-en-Y Gastric Bypass (RYGB), Vertical Sleeve Gastrectomy (SG) and Control (C) Participants: A Prospective 18-month Study**

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Background: Changes in appetite following bariatric surgery likely play a role in weight loss. Formal, controlled studies of this issue have been limited.

Methods: 18mo observational study comparing changes in appetite and responses to food cues in women who underwent RYGB or SG as compared to weight stable, BMI-matched controls. Participants completed the Eating Inventory (Cognitive Restraint, Disinhibition, and Hunger) at baseline, 6mo, and 18mo. They used visual analog scales (VAS) to rate their liking (1=not at all, 11=very much) of high- and low-palatability foods presented visually during an fMRI task. Repeated measures ANOVAs compared groups across time and between groups.

Results: 50 women (RYGB=19, SG=14, C=17) with a mean (+SD) baseline BMI of 46.3±4.4 kg/m² and age of 39.1±9.3 yr (59% black, 36% white) participated. Mean percent weight decreases at 18mo in RYGB, SG, and C were 30.7%, 25.5%, and -0.4%, respectively (both p<0.001 for C vs SG and RYGB). Cognitive restraint increased more in RYGB and SG than C at 6-mo (p<0.03), but there were no significant differences at 18mo overall (p=0.16). Disinhibition decreased more in RYGB and SG than C at 6-mo (p<0.01), but only differed between RYGB and C at 18mo (p<0.02). Hunger decreased more in RYGB and SG than C at 6 and 18mo (p<0.01). Changes in VAS ratings of low-palatability foods did not differ at either postoperative assessment. Changes in liking of high-palatability foods did not reach significance between the surgical groups and C at 6 or 18mo.

Conclusions: RYGB and SG, compared to C, showed decreased Hunger from baseline to 6 and 18mo, while increases were attenuated at 18mo for Cognitive Restraint and Disinhibition for the surgery groups. Decreases in liking of high-palatability foods by the surgery groups did not reach significance as compared to C at either 6 or 12 mo post-operatively. In sum, changes in appetite and reaction to food cues likely weaken over time for RYGB and SG differentially.

T-OR-2086**Objectively Measured Physical Activity Predicts Subsequent Energy Intake Over 7 Days in 300 Women**

Larry Tucker *Provo Utah*

Background: Weight loss resulting from exercise interventions is seldom as significant as expected. This is likely due to energy compensation. In short, as physical activity (PA) increases, adults tend to consume more energy. **Methods:** Participants were 300 women. PA was measured using Actigraph accelerometers worn for 7 consecutive days. During the same 7 days, dietary intake was assessed using weighed food records. Regression was used to examine the PA and energy intake associations. Partial correlation was used to control statistically for differences in age, body mass, and day-of-the-week. The SAS variance inflation factor (VIF) option was used to measure the degree of multicollinearity in pertinent regression models.

Results: After adjusting for the covariates, energy intake was 36 kJ (SE=8) higher for each additional 100,000 activity counts ($F=19.0$, $P<0.0001$), based on the entire week of monitoring. From a categorical perspective, women with Low PA ($n=75$) averaged 8364 ± 1235 kJ (1998 ± 295 kcal) per day, those with Moderate PA ($n=150$) consumed 8523 ± 1264 kJ (2036 ± 302 kcal), and those with High PA ($n=75$) averaged 9079 ± 1473 kJ (2169 ± 352 kcal) per day ($F=6.4$, $P=0.0019$), a 5023 kJ (1200 kcal) weekly difference between the High PA group and the Low. PA counts on a given day were predictive of energy consumption on the same day 4 of the 7 days monitored. PA counts were most predictive of energy intake the next day, with 5 of the 6 associations significant. PA was not a consistent predictor of energy intake on days beyond the next day. Multicollinearity was not a problem with any of the analyses.

Conclusions: As PA increases in free-living women, energy consumption tends to increase, independent of age, body mass, and day-of-the-week. Most of the energy compensation seems to occur the day following increased PA, although higher energy intake also occurs the same day.

T-OR-2087

Sleep duration modifies effects of free ad libitum school meals on adiposity and blood pressure.

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Background: Lack of sufficient sleep can potentially affect both energy intake and energy expenditure resulting in obesity and reduced cardiometabolic health. Recently, provision of ad libitum school meals was found to improve certain cardiometabolic markers despite increases in waist circumference

Methods: To investigate if habitual sleep duration of 8-11-year-olds modifies the effect of free ad libitum school meals on cardiometabolic markers, body composition, dietary intake, and physical activity. For two consecutive three-month periods this randomized, controlled, cross-over trial provided 530 children with school meals or usual packed lunch from home (control). Dietary intake, activity, and sleep were measured simultaneously for seven consecutive days using dietary records and accelerometers. Short and long sleeping children were defined as lower and upper tertile of sleep duration. Body composition, blood pressure, triglycerides, HDL-cholesterol, and HOMAIR were measured/calculated

Results: Overall, school meals compared to control had positive effects on physical activity and blood pressure in long sleeping children and negative effects on body fat in short sleeping children. Short sleeping children increased fat mass compared to long sleeping children by 0.21 (95% CI 0.03;0.38) kg, android fat mass by 0.02 (0.001;0.04) kg, waist circumference by 0.73 (0.23;1.24) cm, blood pressure by 1.5

(0.4;2.6) mmHg, fat intake by 1.1 (0.2;2.0) energy %, and decreased total physical activity by 7.2 (1.6;12.7) % (all $P \leq 0.04$), while HOMAIR and blood lipids were not modified by sleep duration

Conclusions: The susceptibility to increase abdominal adiposity and blood pressure when exposed to dietary changes can potentially be explained by too little sleep that results in increased caloric intake and reduced physical activity. We hypothesize that these findings may be explained by different stress levels of the children, and short sleep duration may influence energy balance through stress-induced neuro-humoral mechanisms

T-OR-2088

Trajectory of physical activity during pregnancy

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Background: The purpose of this observational study was to describe the natural trajectory of physical activity and sedentary behaviors in pregnant women throughout the pregnancy time course. A secondary purpose was to understand whether these trajectories differed among weight status.

Methods: Participants were drawn from a nationwide text-message intervention aimed at improving physical activity in pregnant women. Eligible participants included 80 inactive pregnant women (8-16 weeks). Physical activity was measured using a Fitbit throughout pregnancy. Chi-square analyses and t tests were used to analyze univariate demographic and physical activity variables. Mixed model-repeated measures analysis of variance was used to analyze trajectory changes in daily physical activity variables (i.e., sedentary, light, active, and steps).

Results: There was a significant positive linear trend and significant negative quadratic trend in sedentary behavior, light activity, and active time. There were no linear effects for steps, yet a significant positive quadratic trend. Overweight and obese women took significantly fewer steps over the course of the pregnancy than normal weight women, and obese women had less active time than normal weight women. However, trajectories were the same across weight status. There was a significant trimester by time in pregnancy interactions for all physical activity variables in the expected directions, suggesting accelerated increases in sedentary time and decreases in light activity, active time, and steps in the third trimester relative to the first and second trimesters.

Conclusions: Our findings illustrate that, as pregnancy progresses, women are spending more time in sedentary behaviors and less time being physically active. The time course of change over pregnancy indicates more precipitous decline in physical activity in the latter half of the third trimester. This was the first study to describe the natural trajectory of physical activity and sedentary behaviors during pregnancy.

T-OR-2089

Low objectively assessed energy flux predicts future gains in adiposity in adolescents: a prospective doubly labelled water study

David Hume *Cape Town Western Cape*, Sonja Yokum *Eugene OR*, Eric Stice *Eugene Oregon*

Background: Recent reports implicate low energy flux (or the total number of calories an individual consumes and expends),

rather than energy surfeit in the aetiology of weight excess. The present study tested the hypothesis that low objectively measured habitual energy flux (EnFlux) would associate with greater future gains in overall body adiposity.

Methods: 154 adolescents completed a doubly labelled water assessment of total daily energy intake (TDEI) and total daily energy expenditure (TDEE) at baseline. Participants were characterized for absolute level of energy balance, i.e. as low flux (lowest tertile placement for TDEI and TDEE: n=31), mid flux (middle tertile placement for TDEI and TDEE: n=27), or high flux (uppermost tertile placement for TDEI and TDEE: n=36). The remainder of the sample (those with asynchronous TDEI-TDEE tertile placement) were characterised as being out-of-flux (n=60). Body mass index and % body fat (air displacement plethysmography) were measured at baseline and at 1-, 2- and 3-year follow-ups.

Results: A negative dose-response relationship was evident between EnFlux and elevations in body fat from baseline to year 3 of follow-up. More specifically, out-of-flux, low flux and mid flux participants exhibited gains in total fat mass (2.9%, 2.1% and 2.1% respectively), whereas the high flux group showed a 1.1% reduction in body fat. Moreover, % body fat at year 3 follow-up was greater in out-of-flux than high flux participants ($p = 0.005$). Controlling for body composition, stage of pubertal development and energy balance at baseline, multiple linear regression analyses established that EnFlux predicted elevated body fat % measured at final follow-up ($r = -0.25$, $p = 0.03$).

Conclusions: Elevated energy flux (or high TDEI with high TDEE), as opposed to maintenance of energy balance alone, is protective against future gains in body fat. As such, maintaining lower levels of physical activity (even when consuming fewer calories) may predispose individuals to overweight and obesity.

T-OR-2090

Where are Hispanic Preschool Children More Sedentary and Where are They More Physically Active?

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Background: Hispanic children are at increased risk of becoming obese. Physical activity (PA) is important for children to maintain a healthy weight status. It is not known where Hispanic preschoolers are more active or sedentary. Our aim was to objectively assess where Hispanic preschool children are more sedentary and attain more moderate to vigorous PA (MVPA).

Methods: Hispanic preschool children wore time synchronized accelerometers and GPS data loggers for a week during the day. Valid data were simultaneously processed using the Physical Activity and Location Measurement System (PALMS, UC San Diego) to identify children's sedentary time and MVPA tagged with geographic locations. Geographic locations were viewed in Google Earth and coded into 8 location types. Percent of valid accelerometry/GPS time in each location was calculated. Child-specific regression models of PA outcomes, adjusted for temporal and spatial autocorrelation, were computed and included in a meta-regression analysis.

Results: Of the 84 children (mean age 4.5 years (SD 0.8), 58% boys), 73 had valid data (644 (SD 85) min/day for 6.4 (SD 1.2) days). 57% (SD 22%) of their monitor-wear time was at home, 22% (SD 15%) at childcare/school, and 12% (SD 7%) with no fixed location. Only 13 children spent time in parks which

contributed to 4% of time (SD 5%). Children were sedentary 371 (SD 70) min/day and had 84 (SD 40) min/day of MVPA. Compared to home, children had 1.26 higher odds (95% CI 1.07, 1.49) of being sedentary and 0.67 lower odds (95% CI 0.57, 0.78) of MVPA at childcare/school; and 0.37 lower odds (95% CI 0.30, 0.47) of being sedentary, and 4.41 higher odds (95% CI 3.28, 5.85) of MVPA when at parks.

Conclusions: Hispanic preschool children spent the majority of daytime at home, and were less sedentary and attained more MVPA at home and in parks than when in childcare. Interventions and policies should identify ways to engage preschool children in more MVPA while in childcare, and encourage more time spent in parks or playgrounds.

T-OR-2091

Objectively Measured Physical Activity and Sedentary Behavior in Normal Weight, Overweight, and Successful Weight Loss Maintainers

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Background: High levels of moderate-to-vigorous physical activity (MVPA) may be required to maintain weight loss, but few studies have examined sedentary behavior in weight loss maintainers. Our aim was to compare free-living MVPA and sedentary behavior (SB) in subjects successful at weight loss maintenance as compared to normal weight and overweight/obese controls.

Methods: Healthy adults age 18-65 in three groups wore the ActivPAL for 7 days: 1) weight-loss maintainers (WLM, maintaining ≥ 13.6 kg weight loss for ≥ 1 y); 2) normal weight controls (NC, matched to current BMI of WLM) and 3) overweight/obese controls (OC, matched to pre-weight loss BMI of WLM). Subjects were excluded if criteria for a valid monitoring period were not met (≥ 3 weekdays and ≥ 1 weekend day with ≥ 10 hrs awake).

Results: A total of 90 subjects were analyzed (30 WLM, 33 NC and 27 OC); age, gender and ActivPAL wear time were similar across groups. WLM and NC current BMI (23.7 ± 2.5 and 22.7 ± 2.0) and WLM maximum BMI and OC current BMI (32.8 ± 4.9 and 33.4 ± 5.1) were well matched. Compared to OC, both WLM and NC spend a lower proportion of awake time in SB (WLM = $60.8\% \pm 9.3$, NC = $63.8\% \pm 9.5$, OC = $69.3\% \pm 7.5$), take more breaks per sedentary hour (WLM = 6.3 ± 2.5 , NC = 5.9 ± 1.2 , OC = 5.0 ± 1.2) and spend a higher proportion of awake time in light intensity activity (WLM = $29.6\% \pm 7.9$, NC = $29.1\% \pm 8.3$, OC = $24.8\% \pm 6.7$). Compared to both NC and OC, WLM spend more minutes/day in both total MVPA (WLM = 94.9 ± 40.2 , NC = 69.2 ± 20.0 , OC = 55.5 ± 19.9) and bouts of MVPA ≥ 10 minutes, and achieve more steps and MET/hrs per day.

Conclusions: Findings indicate that not only do WLM spend more time in MVPA than both OC and NC, but compared to OC, they also spend 8.5% (58 min/day) less time sedentary and 4.7% (55 min/day) more time in light intensity activity. These data suggest that those successful in long-term maintenance use both increasing physical activity and decreasing sedentary time as strategies to help maintain weight loss.