

# The 35<sup>th</sup> Annual Scientific Meeting of The Obesity Society 2017 Abstracts

Thursday, November 2, 2017

Oral Abstracts

## Thursday, November 2, 2017

### 1:30–4:00pm

### T-ES-0001 to T-ES-0006

---

#### T-ES-0001

##### **Interrupting Sedentary Behavior in Overweight Children: A Randomized, Crossover Trial**

Miranda Broadney, MD, MPH *Bethesda MD*, britni belcher, PhD, MPH *Los Angeles CA*, David Berrigan, PhD, MPH *Bethesda MD*, ROBERT BRYCHTA, PhD *Bethesda MD*, Ira Tigner, BS, Faizah Shareef, BS *MD*, Alexia Papachristopoulou, MPH *Krioneri*, Jacob Hattenbach, BS *Pomona CA*, Sheila Brady, MSN, CRNP *Bethesda MD*, Shanna Bernstein, MPH, RD *bethesda MD*, Amber Courville, PhD, RDN *Bethesda MD*, Bart Drinkard, MS PT *Bethesda MD*, Kevin Smith, RN, Douglas Rosing, MD *Bethesda MD*, Pamela Wolters, PhD *Bethesda MD*, Kong Chen, PhD *Bethesda MD*, Jack Yanovski, MD, PhD *Bethesda MD*

##### **Background:**

Sedentary children have greater risk of developing obesity and its associated comorbidities. We investigated if interrupting sitting improves glucose metabolism or affects cognitive function or dietary intake in overweight (BMI  $\geq$  85th%) children. We hypothesized that interrupting sitting with short walking bouts would decrease insulin demand during an OGTT compared to continuous sitting and not affect energy intake or cognitive function.

##### **Methods:**

Overweight (N=37; 57% male) 7-11yo children underwent two 3hr experimental OGTT trials in random order: continuous sitting and sitting interrupted by 3min of moderate-intensity walking at 80% of ventilatory threshold every 30min. Insulin, C-peptide, and glucose were measured at baseline and every 30min. Attention and working memory were measured at pre- and post- test, after which children ate from a 9800kcal buffet. Mixed models assessed patterns in insulin, glucose, and C-peptide. Paired t-tests assessed differences between conditions for post-test working memory and attention scores, energy intake, and biomarker AUC.

##### **Results:**

Mixed model results indicated glucose was not significantly changed but insulin (p=0.007) and C-peptide (p=0.03) were lower in the interrupted condition. Interrupting sitting resulted in a 21% lower insulin AUC (p<0.001) and 18% lower C-peptide AUC (p=0.002). Energy intake did not differ between conditions (1250 $\pm$ 490 vs. 1240 $\pm$ 500kcal, p=0.89). There were no significant differences in post-test cognitive scores.

##### **Conclusions:**

In overweight children, interrupting sitting with brief moderate-intensity walking improved acute carbohydrate metabolism, likely by increasing glucose effectiveness, without affecting subsequent energy intake or cognitive function. These findings suggest interrupting sedentary behavior is a promising intervention for reducing cardiometabolic risk in children. Future studies are needed to evaluate sustained effects of interrupting sedentary behavior in children.

#### T-ES-0002

##### **Obesity Risk Moderates Healthy Weight Adolescents' Bold Response to Sugar and Fat**

Grace Shearrer, PhD *Chapel Hill NC*, Jennifer Sadler, BA *Chapel Hill NC*, Eric Stice, PhD *Eugene OR*, kyle Burger, MPH, PhD, RD *Chapel Hill NC*

##### **Background:**

Children of overweight/obese parents are at a high-risk of developing obesity, yet little is understood regarding the neural correlates associated with this risk status. The purpose of this study was to examine obesity risk dependent differences in blood oxygenation level dependent (BOLD) response to intake of milkshakes varied by macronutrient composition. We hypothesized that those at risk for obesity would exhibit decreased BOLD response to milkshake intake in reward related regions.

##### **Methods:**

Using functional MRI, 108 healthy-weight adolescents' responses to tastes were examined (BMI 20.9 $\pm$ 1.9; n=53 high-risk by virtue of parental weight status, n=55 low-risk). Milkshakes tested varied in sugar and fat content (high-sugar/high-fat (HF/HS), high-sugar (HS), high-fat (HF), & low-sugar/low-fat (LS/LF)), and a calorie-free tasteless solution control was used. Between-subject T-tests compared differences between obesity risk groups in response to the various tastants. Significance was corrected for multiple comparisons via

# The 35<sup>th</sup> Annual Scientific Meeting of The Obesity Society 2017 Abstracts

Thursday, November 2, 2017

Oral Abstracts

threshold free cluster enhancement and non-parametric permutation with significance set at  $p < 0.05$ .

## Results:

High-risk vs. low-risk adolescents showed increased BOLD response to all milkshakes > tasteless in the primary gustatory cortex, replicating previous work. This effect appeared to be driven by sugar, as response to (HS/HF and HS) versus tasteless solution was also observed in the somatosensory cortex. High-risk adolescents also showed increased caudate response to the high-sugar versus tasteless contrast. No differences in adolescent BMI was observed.

## Conclusions:

Independent of current BMI, obesity risk is associated with elevated response to intake of a palatable food in brain regions that encode aspects of taste and reward, which appears to be more robust in high sugar conditions. This dissimilarity between high and low risk groups may potentiate future weight gain and obesity.

## T-ES-0003

### Weight Loss Habits, Provider Discussions, and Desired Information: Survey of 2,811 Adults With Obesity

Sean Iwamoto, MD *Aurora CO*, David Saxon, MD, MSc *Denver CO*, Ayae Yamamoto, SM *Pasadena CA*, Deborah Young, PhD *Pasadena CA*, Daniel Bessesen, MD *Denver CO*

## Background:

Obese patients want to lose weight but it is unclear what they have tried, what their providers discuss, and what information is desired. Providers often fail to address weight and discussions may not meet obese patients' needs or expectations.

## Methods:

A random sample of 5,400 racially/ethnically/geographically diverse adults with BMI  $> 23$  kg/m<sup>2</sup> (oversampling patients with BMI  $> 40$ ) obtained from the Patient Outcomes Research to Advance Learning (PORTAL) obesity cohort was surveyed to assess patient's weight-related healthcare experiences. PORTAL is one of 13 Patient-Centered Clinical Research Networks (PCORnet) representing 10 U.S. healthcare organizations with ~11 million total members. We examined data from all respondents (excluding missing data) as well as responses categorized by BMI group.

## Results:

In total, 53% (n=2,811) returned surveys; median age 52.7 years, 54.2% white, 61.8% female, and 79.4% obese. Among obese respondents (BMI  $\geq 30$  kg/m<sup>2</sup>), 79.8% tried to lose weight in the last year; more than half exercised and changed eating habits, while  $< 9.0\%$  used weight loss programs or medications and  $< 3.0\%$  had weight loss surgery. Providers only sometimes (49.5%) or never (17.1%) brought up weight at any clinic visit. Obese respondents recalled their providers discussing lifestyle change (83.7%) and weight loss programs (62.0%) much more than meal replacements (19.2%), surgery (15.6%), or medications (10.6%). On the other hand, only half of obese patients desired more information about lifestyle change and weight loss programs while wishing they had more information about or access to medications (41.2%), meal replacements (40.3%), and surgery (23.0%).

## Conclusions:

Providers do not frequently bring up weight with their obese patients. Few patients have tried or received information about weight loss programs, meal replacements, medications, or surgery, yet they desire more information from their providers about these evidence-based tools.

## T-ES-0004

### Exercise Resistance to Enhance Insulin Sensitivity Is Related to in Vivo Mitochondrial Function

Bram Brouwers, PhD *Orlando FL*, Natalie Stephens, Heather Cornell, Richard Pratley, MD *Orlando FL*, Steven Smith, MD *Orlando FL*, Lauren Sparks, PhD *Orlando FL*

## Background:

Exercise training benefits most, but not all patients with type 2 diabetes (T2D). These benefits include enhanced mitochondrial function and insulin sensitivity. It is critical to understand, however, why some patients with T2D have a blunted metabolic response to exercise training. Here, we characterized patients with T2D who did and did not improve in vivo mitochondrial function with exercise training.

## Methods:

17 patients with T2D performed a 10-week supervised, progressive, exercise training protocol. Glucose lowering medication was discontinued during the study. In vivo mitochondrial function (PCr recovery), aerobic capacity (VO<sub>2</sub>peak), HbA<sub>1c</sub>, body composition (DXA), and insulin sensitivity (M-value; hyperinsulinemic-euglycemic clamp) were measured pre- and post- exercise training. Patients were classified as non-responders (non-R, n=6) and responders (R, n=11) based on changes in PCr recovery.

## Results:

Adherence (p=0.96) and compliance (p=0.53) were similar in non-R and R. By design, PCr recovery declined by 20% in non-R (p=0.03) and improved by 35% in R (p=0.004) over time. VO<sub>2</sub>peak (p=0.99), HbA<sub>1c</sub> levels (p=0.95), fat mass (p=0.92), lean mass (p=0.86) and total mass (p=0.78) were not different between non-R and R at baseline, while insulin sensitivity was higher in non-R than in R (p=0.03). In non-R, VO<sub>2</sub>peak (p=0.63) and insulin sensitivity (p=0.69) were unaffected by exercise training, and HbA<sub>1c</sub> levels increased by 11% (p=0.01) over time. In R, exercise training improved VO<sub>2</sub>peak by 10% (p<0.01) and insulin sensitivity by 2-fold (p=0.05), with no

# The 35<sup>th</sup> Annual Scientific Meeting of The Obesity Society 2017 Abstracts

Thursday, November 2, 2017

Oral Abstracts

changes in HbA1c levels ( $p=0.95$ ) over time. In the whole study population, changes in HbA1c ( $r=0.76$ ,  $p=0.01$ ) and changes in insulin sensitivity ( $r=0.55$ ,  $p=0.04$ ) associated with changes in PCr recovery.

## Conclusions:

The inability to improve in vivo mitochondrial function with exercise training in patients with T2D is associated with blunted effects on aerobic capacity and insulin sensitivity, and with deteriorated blood glucose control.

## T-ES-0005

### Sugar-Sweetened Beverage Marketing During SNAP Benefit Issuance: Insight From Three New York Cities

Alyssa Moran, MPH RD *Boston Massachusetts*, Aviva Musicus, BA *Cambridge MA*, Mary Gorski, MS *Cambridge MA*, Ian Brissette, Ann Lowenfels, MPH *Albany NY*, SV Subramanian, PhD *Boston MA*, Christina Roberto, PhD *Philadelphia PA*

## Background:

New York State distributes Supplemental Nutrition Assistance Program (SNAP) benefits in the first nine days of the month, and most benefits are spent within the first week of receipt. Retailers may increase promotions during benefit issuance to attract SNAP shoppers. We assess the degree to which retailers promote sugar-sweetened beverages (SSBs) during benefit issuance, compared to non-issuance days.

## Methods:

In 2011, data on the presence of beverage marketing were collected from 630 SNAP-eligible retailers in three cities in upstate New York. Store locations were geocoded in ArcMap and matched to census characteristics from the American in Communities Survey, 2011. A multilevel regression model with random intercepts for census tracts was used to estimate the odds of beverage marketing during SNAP issuance compared to non-issuance, and in high SNAP use compared to low SNAP use neighborhoods, controlling for city, retailer type, neighborhood percent poverty and racial/ethnic composition.

## Results:

The odds of in-store SSB advertisements were 1.66 times (95% CI=1.01, 2.72) higher on SNAP issuance compared to non-issuance days, and the odds of SSB displays were 1.88 times higher (1.16, 3.03) during SNAP issuance compared to non-issuance. There were no differences in beverage marketing by neighborhood SNAP use, but there was a significant interaction between neighborhood SNAP use and issuance. The odds of SSB displays were 3.35 times higher (1.42, 7.92) in high SNAP use neighborhoods during issuance compared to low SNAP use neighborhoods on non-issuance days. There were no differences in marketing of low-calorie beverages or water by issuance or neighborhood SNAP use.

## Conclusions:

We found a positive association between SSB marketing and SNAP issuance, particularly in areas of high SNAP use. This indicates retailers may be disproportionately marketing SSBs to SNAP recipients. This could be prevented through policy changes to state issuance schedules or restrictions on purchasing SSBs with SNAP.

## T-ES-0006

### Central Melanin-concentrating Hormone Neural Signaling Increases Impulsive Responding for Food

Emily Noble, PhD *Los Angeles CA*, Ted Hsu, PhD *Los Angeles CA*, Scott Kanoski, PhD *Los Angeles CA*

## Background:

Melanin-concentrating hormone (MCH), a neuropeptide produced primarily in the lateral hypothalamus, potently increases feeding through unknown behavioral and neural mechanisms. Here we examined the role of central MCH signaling in impulsive responding for palatable food.

## Methods:

Food impulsivity was examined in male rats using the Differential Reinforcement of Low Rates of Responding (DRL) task, in which rats learn to withhold lever pressing for 20sec in order to obtain each successive palatable food pellet. Selective activation of MCH-producing neurons was achieved prior to DRL testing by injecting the Designer Receptors Exclusively Activated by Designer Drugs (DREADDs) ligand, Clozapine-N-Oxide, in rats with viral-mediated MCH neuron-specific DREADDs expression. To examine a potential neural site of action, DRL was tested after MCH or vehicle injections to the ventral hippocampus (vHP; 1  $\mu$ g), a brain region with dense MCH1 receptor expression. We used a dual virus approach to drive cre recombinase (CRE) expression in vHP-projecting neurons (via canine-adenovirus 2-CRE in vHP) combined with CRE-dependent DREADDs expression in MCH neurons to selectively activate MCH neurons that project to the vHP prior to DRL.

## Results:

Chemogenetic MCH neuron activation reduced DRL efficiency in rats, indicating increased food impulsivity ( $P=.01$ ;  $n=19$ ). A mediating site of action was identified, as MCH injections in the vHP increased palatable food impulsivity but had no effect on standard chow intake ( $P<.05$ ;  $n=12$ ). Corroborating these results, selective activation of vHP-projecting MCH neurons also increased impulsivity without affecting chow intake ( $P<.05$ ,  $n=8$ ).

## Conclusions:

Central MCH signaling promotes impulsive responding for palatable food. Furthermore, we identified a novel neural pathway through

# **The 35<sup>th</sup> Annual Scientific Meeting of The Obesity Society 2017 Abstracts**

*Thursday, November 2, 2017*

*Oral Abstracts*

which MCH-producing neurons target the vHP to increase palatable food impulsivity without affecting bland chow intake. These results provide novel insight into neural pathways that drive excessive feeding.