Exercise can ameliorate Type 2 Diabetes (T2D), and studies also show that estrogens may prevent the onset of T2D. Thus, postmenopausal women may be at a greater risk for T2D. While the effects exercise, estrogens, and diet on whole body risk factors for T2D are established, little is known about the cellular mechanisms in the liver that account for these whole body beneficial effects.

**PURPOSE:** To examine the effects of exercise, estrogens and diet on hepatic protein expression.

**METHODS:** Female Wistar rats were fed a standard diet (SD) or a high-fat diet (HFD) for 10 weeks. A subset of the rats had their ovaries removed via ovariectomy (OVX). The rats were given treatment of treadmill exercise (25 minutes/day at 40 cm/s for 5 days/week (Ex)) or estradiol replacement (E2; 1.4 μg/day). At the end of the study, the liver was removed and homogenized in cell extraction buffer, and the protein was isolated. Western blot analyses were performed to measure the expression of the following proteins involved in lipid metabolism and mitochondrial function: acetyl-coA carboxylase (ACC), fatty acid synthase (FAS), hormone sensitive lipase (HSL), lipoprotein lipase (LPL), citrate synthase, and cytochrome c oxidase (COX) IV.

**RESULTS:** The HFD decreased the ACC expression compared to the SD (0.59 vs. 0.93 AU, p<0.05), and E2 treatment restored these values (0.81 AU, p<0.05). Similarly, the HFD decreased the FAS expression compared to the SD (0.44 vs. 1.58 AU, p<0.05), and E2 treatment restored these values (0.75 AU, p<0.05). The HFD increased the LPL expression compared to the SD (1.58 vs. 1.15, p<0.05), and E2 treatment decreased the LPL expression (1.32 AU, p<0.05). There was no effect of Ex on the ACC, FAS, or LPL expression. The expression of HSL, citrate synthase, and COX IV did not change with diet, E2 replacement, or Ex.

**CONCLUSION:** Two proteins that stimulate de novo fatty acid synthesis (ACC and FAS) decreased with the HFD, likely due to the exogenous intake of fats. Notably, E2 replacement increased the ACC and FAS expression, even though the HFD was still being consumed. LPL is a protein that stimulates fat storage. Consumption of the HFD increased the LPL expression to increase fat storage, and E2 replacement decreased the LPL expression. Thus, E2 may provide benefits by decreasing fat storage.

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**Board #257**

*Ethnicity Mediates Change In Fat Oxidation In Response To High Intensity Interval Training (hiit) Ethnicity Mediates The Magnitude Of Change In Fat Oxidation In Response To High Intensity Interval Training (hiit)*

Todd A. Astorino, FACSM1, Jamie L. De Revere1, Rasmus Clausen2, Sean Walsh, FACSM2. 1California State University--San Marcos, San Marcos, CA. 2Central Connecticut State University, New Britain, CT.

**Email:** astorino@ccsu.edu

(No relationships reported)

One response to high intensity interval training (HIIT) is increased fat oxidation (FOx) (Astorino et al. 2017) which is due to enhanced oxidative capacity and activity of β-HAD (Talanian et al. 2007). In the U.S., Hispanic adults have a higher rate of obesity than Caucasians (Hales et al. 2017), and have twofold higher rate of diabetes (CDC 2018). It is unknown if ethnicity alters FOx responses to HIIT.

**PURPOSE:** To assess the role of ethnicity in mediating FOx changes with HIIT.

**METHODS:** Eleven inactive Caucasian (C) and 7 Hispanic women (H) (age = 25 ± 6 yr) participated in the study. Initially, VO2,max and peak power output (PPO) were determined. On two separate days after a minimum 6 h fast, they completed five stages of progressive exercise at 10 – 50 %PPO during which gas exchange data were acquired to calculate RER, FOx, and carbohydrate oxidation (CHOx). Fingertip blood samples were used to measure blood lactate concentration (BLa). HIIT consisted of 9 sessions of cycling at 85 %PPO separated by 75 s recovery.

**RESULTS:** HIIT increased VO2,max by 10 and 8 % in C and H with no effect of ethnicity (p = 0.69). RER increased during exercise (p < 0.001) and timeXtraining (p = 0.001) and timeXtrainingXgroup interactions (p = 0.012) were shown. Fat oxidation differed during exercise (p = 0.001) and there was a timeXtrainingXgroup interaction (p = 0.03). Post hoc analyses showed significantly higher FOx post HIIT at 10 (0.19 ± 0.04 g/min vs. 0.16 ± 0.04 g/min) and 20 %PPO (0.17 ± 0.03 g/min vs. 0.14 ± 0.04 g/min) versus baseline in H. Data showed a 10 - 35 % reduction in CHO oxidation (p = 0.01) after HIIT and a timeXtraining interaction (p = 0.01), but no timeXtrainingXgroup interaction (p = 0.32) was shown. BLa increased during progressive exercise (p < 0.001) and there was a reduction in BLA during exercise in response to training (p = 0.002) that was similar in C and H (p = 0.28).

**CONCLUSION:** These preliminary data obtained in inactive women suggest that ethnicity may alter changes in energy metabolism observed in response to short-term interval training. Further work is needed to examine the mechanisms underpinning this potential effect of ethnicity on adaptation to training.

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