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Exercise Attenuates Weight Gain and Modulates Satiety Hormones in Female Mice

Candace R. Longoria, Paul J. Wisniewski, Robert A. Dowden, Natasha Malonza, Sara C. Campbell, FACSM. Rutgers University, New Brunswick, NJ

Exercise contributes to both caloric expenditure and nutrient partitioning. We have shown that lean sedentary (LS) male mice had lower levels of insulin and Interlukin-6 (IL-6) when compared to their high-fat fed sedentary (HFS) counterparts. Further, both exercise groups, lean (LX) and high-fat fed (HFX) demonstrated lower ghrelin, a hormone that regulates appetite and energy homeostasis levels compared to their sedentary counterparts. However, there is little work done in understanding the female response to blood biomarkers and exercise. **PURPOSE:** Therefore, the purpose of this study was to replicate our previous study in female mice to ascertain which biomarkers are similar across gender, and further evaluate any potential differences. We hypothesized that female mice would have a similar inflammatory biomarkers response as males, but a different hormonal profile. **METHODS:** Thirty-six, 6-week old C57BL/6NTac female mice were fed a normal or high-fat diet for 12-weeks and randomly assigned to exercise or sedentary groups. After 12 weeks animals were sacrificed, and blood was collected for metabolic hormone analysis using a magnetic bead-based multi-analyte panel. A total of seven biomarkers were analyzed including: insulin, peptide-YY (PYY), ghrelin, amylin, IL-6, tumor necrosis factor alpha (TNF-a), and pancreatic polypeptide (PP). **RESULTS:** HFS female mice had the highest body weight, kcal intake per day and percent weight increase compared to all other groups ($p<0.05$). Exercise attenuated the body weight gain in HF-fed mice (24.7g vs. 30.3g). Exercised groups had significant decreases in levels of insulin (1286.925 pg/ml, 2819.299 pg/ml; $p=0.021$) and amylin (67.233 pg/ml, 95.048 pg/ml; $p=0.009$), and increased levels of PYY (18.840 pg/ml, 61.688 pg/ml; $p=0.031$) compared to sedentary groups. Groups fed HF diets also had increased levels of PYY (64.673 pg/ml, 15.978 pg/ml; $p=0.018$) compared to normal diet groups. **CONCLUSION:** Exercise attenuates body weight gain and the rise in insulin in mice fed high fat diet and this is consistent between genders. Further, appetite/glucose regulating hormones like amylin and PYY are significantly altered in females but display different responses in males. This continues to add to the exciting story of metabolic differences between males and females.