

## **Exercise as a Prevention and Countermeasure to Diet-Induced Weight Gain**

Breslin WL, Strohacker K, Agha NH, Carpenter KC, Lowder TW, & McFarlin BK

Laboratory of Integrated Physiology; University of Houston; Houston, TX

The purpose of this study was to evaluate the effectiveness of treadmill running at attenuating weight gain and immune dysfunction prior to or during a period of high-fat feeding in outbred CD-1 male mice. Mice were divided into four groups (N=10 mice/group): 4-weeks of treadmill running followed by 4-weeks sedentary (EX-SED), 4-weeks sedentary followed by 4 weeks of treadmill running (SED-EX), 8 weeks of treadmill running (EX), and 8 weeks sedentary (SED). After the first four weeks of the study, all groups began consumption of a high-fat diet to elicit a weight gain response. In order to track immune dysfunction, we measured peripheral blood monocytes and monocyte TLR4 expression at the conclusion of the study. We also completed a detailed analysis of body weight change over time. SED-EX was the only group that did not gain a significant amount of weight during the high-fat feeding. SED-EX had the lowest percentage of monocytes, as well as the highest total monocyte and classic subset cell surface TLR4 expression. EX and SED were not significantly different in any measurement. The present study demonstrates the importance of exercise training in counteracting the pro-inflammatory effects of diet-induced weight gain, as seen in SED-EX. Contrary to our hypothesis, exercise training prior to and throughout high-fat feeding did not prevent weight gain or attenuate the pro-inflammatory effects of weight gain. This could be due to an acclimation to the exercise intervention that blunted the anti-inflammatory effects of the exercise training during the high-fat feeding phase of the study. Similarly, exercise prior to high-fat feeding did not provide a lasting protective effect against the pro-inflammatory effects of diet-induced weight gain. Future research will endeavor to expand the current knowledge about monocyte subpopulations and to further elucidate the relationship between exercise and TLR4.