

Aerobic Exercise Training May Not Offset the Pro-inflammatory Effects of a High Fat Feeding

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Int J Exerc Sci 2(1): S15, 2009. Increased adiposity is associated with an increase in systemic inflammation, which is involved in the pathophysiology of various disease states. A current hypothesis in our laboratory suggests that the toll-like receptor 4 (TLR4) pathway may link physical activity and systemic inflammation. **PURPOSE:** The primary purpose was to determine if 6-weeks of aerobic exercise training (5 days per week, 1 hour per day, 21-22m/min) would limit the increase in systemic inflammation resulting from high-fat (60% of calories from fat) feeding. A secondary purpose was to determine if changes in cell-surface TLR4 expression would account for observed differences in inflammatory status between mice which exercise and those that remain sedentary. **METHODS:** 36 CD-1 male mice were randomly assigned to one of three groups (N=12/group): HF (remained sedentary and consumed a high-fat chow (60% fat)), HF-EX (consumed the high-fat chow and underwent an aerobic exercise intervention (running 4.56±0.08 h/week for 6 weeks, or LF (sedentary and consumed a low-fat chow (10% fat)). Key outcome measurements were made on weekly saphenous vein blood samples (~40 uL) using 3-color flow cytometry. Blood glucose and cholesterol concentration were analyzed by an enzymatic assay. **RESULTS:** Absolute and percent body weight gain over 6-weeks was similar between HF and HF-EX, but significantly greater than LF (P<0.001). HF and HF-EX had 66% more leukocytes than LF at weeks 3-5 (P<0.0001). HF and HF-EX had 145% greater CD11b+/14+/TLR4+ cells than LF (P=0.001). There was no difference in the concentration of CD11b+ cells expressing IL-6 or TNF-alpha following LPS-stimulation between HF and HF-EX. No significant difference was found for blood glucose and cholesterol concentrations between groups. **CONCLUSIONS:** Exercise training did not prevent weight gain during 6-weeks of high fat feeding. Since HF and HF+EX gained a similar amount of weight, they did not differ with regarding to blood monocytes expressing TLR4. Both HF and HF+EX were elevated above LF. More research is needed to determine how changes in the blood relate to changes in peripheral tissue compartments.

