TACSM Abstract

Voluntary Wheel Running during Weight Loss Leads to Differential Changes in Monocytes, Compared to Forced Treadmill Running

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ABSTRACT

High-fat feeding and subsequent weight gain may contribute to innate immune dysfunction. Weight loss via calorie restriction and exercise represent one means to restore normal immune function. **PURPOSE**: to examine how 8- weeks of aerobic exercise and low-fat diet affects weight gain, monocyte concentration, and monocyte cell-surface expression of TLR2, TLR4, CD80, and CD86. **METHODS**: For 12- months, 24 male CD-1 mice underwent a pre-treatment phase, consuming either a low fat (10% fat) or high-fat (60% fat) diet *ad libitum.* Mice were randomly assigned to one of four groups (N=6/group): CN (low-fat sedentary), V-EX (voluntary wheel running), F10 EX (forced treadmill running), or SD (sedentary). V-EX, F-EX, and SD groups were switched from the high-fat to low-fat diet for an 8-week treatment period, while the CN group continued consuming the low-fat diet. Saphenous vein blood samples were analyzed using flow cytometry at baseline, week 4, and week 8. **RESULTS**: V-EX (36.4%) and F14 EX (27.1%) lost significant body weight over 8-weeks (P<0.001). V-EX ran 4.4x more than F-EX (P<0.001). As a group, V-EX had higher monocyte concentration than CN (48.9%) and F-EX (58.9%, P=0.004). Cell-surface expression of TLR2 (22.9%, P=0.002), TLR4 (33.3%, P<0.001), and CD86 (18.6%, P<0.001) increased from baseline to week 8. A time effect was seen in week 4 when CD80 expression was 42% greater for V-EX than SD (P=0.013). **CONCLUSION**: The present study confirms short-term exercise and low-fat diet consumption cause significant weight loss and altered immune profile as measured by increased TLR2, TLR4, CD80, and CD86 expression.