ANNALS OF RESEARCH IN SPORT AND PHYSICAL ACTIVITY

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MODERATE ACTIVITY, NOT LIGHT OR VIGOROUS ACTIVITY, IS ASSOCIATED WITH A HIGHER PERCENT OF CIRCULATING CLASSICAL MONOCYTES POSITIVE FOR CX3CR1 AND CCR2

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The American College of Sports Medicine (ACSM) currently recommends adults perform at least 150 minutes per week of moderate physical activity. The PURPOSE of this preliminary analysis of an on-going study was to evaluate the relationship between the amount of moderate exercise and inflammatory receptors on monocytes. METHODS: To date, eight young adults (age mean $\pm$ SE = 22.1 $\pm$ 0.3 years) have completed all measurements. The subjects self-identified as being physically active (PA; n=4) or physically inactive (PI; n=4). PA subjects used planned physical activity to meet or exceed the ACSM recommendations, and PI subjects participated in no more than one day per week of regular physical activity. Subjects performed a two-stage estimated VO₂max test, wore an accelerometer (ActiGraph) for one week, and a post-absorptive resting blood sample was collected on the morning after the accelerometer data collection. Sodium heparinized whole blood was used for lysed whole blood flow cytometry analysis, and serum was separated and stored at -80 degrees Celsius for later ELISA analysis of BDNF. Accelerometry data was analyzed with 1 second epochs and Freedson Adult VM3 (2011) cut points used to classify physical activity intensity. Pearson r values were calculated and included if $r > 0.60$ and $p < 0.05$. RESULTS: PA subjects a higher ($p = 0.0345$) estimated VO₂max than PI subjects (PA 51.1 $\pm$ 2.5 mL/kg/min; PI 34.8 $\pm$ 3.4). There was no difference in average minutes per day of moderate activity between the two groups (PA 56.5 $\pm$ 5.7 mins; PI 53.3 $\pm$ 7.1) and all subjects exceed the ACSM recommendation of at least 150 minutes per week of moderate activity. Moderate activity was associated with BDNF ($r = -0.6841$ $p = 0.0421$), percent of circulating classical monocytes positive for CX3CR1 ($r = 0.7312$ $p = 0.0393$), and percent of circulating classical monocytes positive for CCR2 ($r = 0.8243$ $p = 0.0118$). There were no associations between the variables of interest and light or vigorous activity. DISCUSSION: Despite the

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difference in reported days of planned physical activity, all PI and PA subjects exceeded the ACSM recommendation for moderate activity. However, PI subjects had higher estimated VO_2max , supporting their physically trained status. Moderate activity was positively associated with percent of circulating classical monocytes positive for CCR2, which may be related to the exercise-induced muscle damage signaling role of CCR2. Moderate activity was also associated with percent of circulating classical monocytes positive for CX3CR1, which may be related to exercise promoting a healthy immune system. CONCLUSION: The preliminary results from this on-going study support an relationship between moderate activity and the immune system. The completed study will include monocyte function (LPS stims) and monocyte subset analyses to provide a more complete assessment of the relationship between physical activity and the immune system.