

The Effects of 15 Minutes vs. 30 Minutes of Moderate Intensity Exercise on Lymphocytes, Monocytes and Granulocytes

KAIS ALI, REBEKAH HUNT, RACHEL BANH, LYNNSIE MCBRIDE, MCARTHUR BOLDEN III, KARL LAUREA, & EMILY LAVOY

Laboratory of Integrated Physiology; Department of Health and Human Performance; University of Houston; Houston, TX

Category: Undergraduate

Advisor / Mentor: LaVoy, Emily (eclavoy@central.uh.edu)

ABSTRACT

Vigorous intensity exercise lasting 30 minutes or longer is well known to increase white blood cells, including lymphocytes, monocytes, and granulocytes, in blood. White blood cells are cells of the immune system that provide protection against infection and disease. However, the relative effects of 15 minutes vs 30-minutes of moderate intensity exercise on these variables are not known.

PURPOSE: Compare 15 minutes vs 30 minutes of moderate-intensity exercise on the mobilization of white blood cells including lymphocytes (LYM), monocytes (MONO), and granulocytes (GRAN).

METHODS: 9 healthy men and women across physical fitness levels were recruited (4 female, (mean \pm standard deviation): 28.1 \pm 9.7 years old). Following a 5-minute warm-up, participants were prescribed a 30-minute (min) exercise on a stationary bike at a moderate intensity (55% of heart rate reserve, calculated by (maximum heart rate - resting heart rate) \times 55% of resting heart rate). A blood sample taken before, after 15 min, and after 30 min of exercise. Blood samples were analyzed with a hematology analyzer. Paired T tests were used to compare LYM, MONO, and GRAN between pre-exercise and 15 min exercise, and between 15 min and 30 min exercise. **RESULTS:** The number of LYM was greater at 15 min compared to pre-exercise (pre mean \pm standard deviation: $2.12 \times 10^3 \pm 0.68 \times 10^3$ cells/ μ l, 15 min: $2.88 \times 10^3 \pm 1.22 \times 10^3$ cells/ μ l, $p=.007$). The number of MONO was greater at 15 min compared to pre (pre: $0.43 \times 10^3 \pm 0.12 \times 10^3$ cells/ μ l, 15 min: $0.61 \times 10^3 \pm 0.19 \times 10^3$ cells/ μ l, $p=.006$). The number of GRAN was greater at 15 min compared to pre (pre: $2.86 \times 10^3 \pm 0.60 \times 10^3$ cells/ μ l, 15 min: $4.00 \times 10^3 \pm 0.82 \times 10^3$ cells/ μ l, $p=.002$). On the other hand, the number of LYM, MONO, and GRAN in blood did not differ between 15 min and 30 min (all $p>.05$). **CONCLUSION:** Cycling for just 15 minutes at a moderate intensity showed mobilization of the white blood cells (lymphocytes, monocytes, and granulocytes) into blood circulation. If used in the clinical setting, this has the potential to complement current medical therapies, giving patients with diseases and infections a stronger chance for recovery. However, this requires further investigation.