

Acute Heat Stress on Blood Composition & Body Fluid in Young and Middle-Aged Individuals

KAITLYN STRONG, OLIVIA K. LEACH, & JAYSON R. GIFFORD

Human Performance Research Center; Exercise Science; Brigham Young University; Provo, UT

Category: Undergraduate

Advisor / Mentor: Gifford (Jayson jaysongifford@byu.edu)

ABSTRACT

Sauna therapy has been shown to have benefits to cardiovascular health. Changes in hematocrit, hemoglobin, and plasma volume in response to sauna heating are not well defined in the middle-aged population. This population is of significant interest because of an increased rate of decline in cardiovascular health starting at middle age. **PURPOSE:** The purpose of this study was to examine the effect of acute sauna exposure on blood composition, specifically the change in plasma volume in young and middle-aged adults. **METHODS:** 10 young (24.9 ± 4.2 years, 6 male and 4 female) and 8 middle-aged adults (55.6 ± 3.9 years 4 males and 4 females) underwent 40 mins of sauna exposure (20 mins x2, 10 min recovery at 23 °C in between) at 80°C followed by a 90 min rest period. Blood samples were taken before sauna exposure (PRE) and after the 90-minute recovery period (POST). Hemoglobin and hematocrit levels were measured, and total plasma volume was calculated using the Dill and Costill equation. Semi-nude body mass was recorded at baseline and after the 90 min recovery period. **RESULTS:** Hemoglobin concentration increased and body mass decreased following sauna exposure ($P= 0.046$, $P<0.001$, respectively) with no significant effect of age ($P=0.157$, $P=0.449$, respectively). There was no significant change in plasma volume PRE vs POST sauna ($P=0.459$) or hematocrit ($P=0.097$). Additionally, there was no effect of age on plasma volume in both the young and old populations (young recovery plasma volume = $99.11 \pm 1.5\%$ of baseline, old recovery plasma volume = $100 \pm 2.8\%$ of baseline) ($P=0.368$). **CONCLUSION:** An acute sauna exposure (40 min, 80°C) results in increased hemoglobin concentration and an acute reduction in body mass in individuals ages 18-60. The reduction in body mass during acute sauna exposure, however, does not result in a change in plasma volume in both young and middle-aged individuals.