

The Effects of 3-Weeks of Aerobic Exercise in Heat on Fitness and PGC1 α in Females

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The effects of exercise training in the heat are well documented in men. However, the effects of exercise training in the heat in women have not received as much attention. We have previously reported a blunted rise in PGC1 α in men after acute aerobic exercise in the heat. **Purpose:** To determine the impact of three weeks of aerobic exercise training in the heat compared to training in room temperature on thermoregulation, PGC1 α mRNA response, and aerobic capacity in women. **Methods:** Twenty-three untrained college aged females (24 \pm 4 yoa, 168 \pm 5 cm, and 67.3 \pm 11.2 kg) were randomly assigned to 3 weeks of aerobic exercise training in either 20 $^{\circ}$ C (n=12) or 33 $^{\circ}$ C (n=11). **Results:** VO₂max in room temperature conditions increased with training (2.57 \pm 0.35 to 2.71 \pm 0.32 L \cdot min⁻¹, $p=0.01$), but independent of temperature condition ($p=0.821$). HR decreased with training (152 \pm 16 to 140 \pm 0.13 bpm, $p<0.001$), but was independent of temperature condition ($p=0.341$). Sweat rate increased with training (0.655 \pm 0.192 to 0.775 \pm 0.212 L \cdot hr⁻¹, $p=0.006$) and was higher in 33 $^{\circ}$ C (0.835 \pm 0.144 L \cdot hr⁻¹) than 20 $^{\circ}$ C (0.605 \pm 0.132 L \cdot hr⁻¹, $p<0.001$). PGC1 α mRNA increased with an acute exercise bout before (1.01 \pm 0.10 to 4.96 \pm 2.08 fold, $p<0.001$) and after training (1.07 \pm 0.10 to 3.21 \pm 1.39 fold, $p<0.001$) and had a smaller response after training than before training ($p=0.005$), but there were no differences between temperature groups ($p=0.661$). **Conclusions:** Women can increase aerobic fitness and maintain their exercise induced PGC1 α mRNA response in the heat equally to that of room temperature conditions. This response contrasts with the blunted PGC1 α mRNA response and VO₂ max alterations previously observed in men.