

### 3. SWACSM Abstract

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## The Effect of Heat Therapy on Skeletal Muscle Satellite Cell Content

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#### ABSTRACT

Satellite cells are essential for proper muscle repair and adaptation. Studies have shown that exercise can lead to an increase in satellite cell content within muscle tissue. However, it is unknown whether other environmental stressors, such as heat, are also capable of augmenting the satellite cell pool. **PURPOSE:** The purpose of this study was to quantify changes in satellite cell content before and after 6-weeks (3x/wk) of skeletal muscle heat therapy (HT) or single leg knee extension exercise training (EX). Additionally, a sham heat treatment was used as a control. We hypothesized that HT would result in an increase in satellite cell content, though to a lesser extent than the EX group. **METHODS:** We randomized 28 sedentary but otherwise healthy, young adults (ages 18-36; n = 13 female, n = 15 male) to receive either HT (2 hr, 3 days/wk, 6-week period), EX (40 min, 3 days/wk, 6-week period), or sham heating sessions (CON; 2hr, 3 days/wk, 6-week period). The HT was administered through pulsed, shortwave diathermy. Muscle biopsies were taken from the vastus lateralis at baseline, after 3 weeks of intervention, and again after 6 weeks of intervention. **RESULTS:** For the Control Group, satellite cell count per  $\mu\text{m}^2$  at baseline = 8.107 ( $\pm$  0.4799), at 3 weeks = 10.27 ( $\pm$  0.911), at 6 weeks = 9.84 ( $\pm$  0.675). For the EX Group, satellite cell count per  $\mu\text{m}^2$  at baseline = 9.705 ( $\pm$  1.27), at 3 weeks = 10.87 ( $\pm$  1.12), and at 6 weeks = 10.47 ( $\pm$  0.7997). For the HT Group, satellite cell count per  $\mu\text{m}^2$  at baseline = 8.535 ( $\pm$  0.582), at 3 weeks = 11.54 ( $\pm$  1.43), and at 6 weeks = 10.202 ( $\pm$  0.940). Statistical analysis indicated a significant main effect of time ( $p=0.0125$ ), but no significant effect of group ( $p=0.5504$ ) or the group x time interaction ( $p=0.8412$ ). **CONCLUSION:** Our findings suggest that 6 weeks of HT is insufficient to affect the satellite cell content within muscle fibers. This study provides additional insight in the literature about the effects of HT on human subjects.