*TACSM Abstract*

# Exercise Does not Stimulate Citrate Synthase Activity in Cachectic Muscle

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ABSTRACT

Cachexia causes metabolic alterations in skeletal muscle mitochondria stimulated by inflammatory imbalance towards pro-inflammatory signaling. Previous work by our group has demonstrated that exercise significantly increases muscle mass in cases of advanced tumors in transgenic mice. Furthermore, we have discovered that the natural product Nexrutine® has anti-inflammatory properties which can be beneficial in protecting mitochondria. **PURPOSE:** To compare the effects of exercise and Nexrutine® on mitochondrial density in skeletal muscle taken from transgenic adenocarcinoma of the mouse prostate (TRAMP) models. **METHODS:** This project is a continuation of a larger study investigating the effects of exercise and Nexrutine® on the attenuation of muscle wasting in TRAMP mice. For this analysis, gastrocnemius from 14 TRAMP mice from control (n=5), Nexrutine® (600 mg/kg; n=5), and voluntary wheel running (VWR) groups (n=4) that completed 20 weeks of intervention were used. Mitochondrial activity was quantified using a commercially available citrate synthase assay (Cayman Chemical, USA). An analysis of variance (ANOVA) with Tukey's post-hoc was performed. Correlations between muscle mass and citrate synthase activity was performed for each group. Alpha was set at $p \leq 0.05$. **RESULTS**: All mice presented with tumors upon necropsy. VWR mice ran on average 6.67 kilometers per day. Nexrutine® group consumed 1.49 mg Nexrutine® per day on average. No significant differences in muscle mass or citrate synthase were observed between groups. Briefly, the control group had 7.31% and 20.75% greater citrate synthase compared to Nexrutine® and exercise groups, respectively. Exercise group was observed to have 35.25% higher than Nexrutine® group. When all samples were combined, a significant positive correlation was observed between muscle mass and citrate synthase ($p= 0.04$). **CONCLUSION**: Contrary to our hypothesis, the results suggest neither exercise nor Nexrutine® positively affect citrate synthase activity in cachectic muscle. Future work by our group will focus on reactive oxygen species and mitochondrial complex activity to further understand how cachexia affects skeletal muscle mitochondrial efficiency.

TEXAS CHAPTER
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