

**The Effect of Reactive Oxygen Species on Aged Skeletal Muscle**

by

Talayia Nayette Perkins

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APPROVED

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J. H. Williams, Chairman

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D. M. Moore

E. A. Thomas

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J. H. Williams, Chairman

Department of Human Nutrition, Foods, and Exercise Science

(ABSTRACT)

The production of reactive oxygen species (ROS) may be a contributor to the progression of sarcopenia. Sarcopenia is a generic term for the loss of skeletal muscle mass, quality and strength. ROS are usually produced by radiation, but are also the byproducts of aerobic metabolism. ROS have been found to mediate various pathological conditions in a variety of tissues, to cause oxidative damage to DNA, proteins, and lipids with advancing age, and is presumably a major factor contributing to changes associated with aging. The purpose of this investigation was to determine whether the sarcoplasmic reticulum (SR) of muscle from aged animals are more susceptible to the deleterious effects of ROS. Using isolated gastrocnemius SR vesicles extracted from adult (12m) and aged (27m) male Brown Norway-Fischer 344 hybrid rats,  $\text{Ca}^{2+}$  uptake and release measurements were obtained. The data showed that there was a 33% difference between aged and adult gastrocnemius mass. When gastrocnemius mass was corrected for body mass, the differences was ~20% between the two groups. A 20% decrease in SR  $\text{Ca}^{2+}$  uptake rate was noted in aged animals. HOCl also, decreased uptake by similar extents in both groups. This result suggest that the  $\text{Ca}^{2+}$  pump's response to ROS are similar in

both groups. AgNO<sub>3</sub>-induced and H<sub>2</sub>O<sub>2</sub>-induced release in aged animals was 17.94 and 7.39 nmol/mg/min and in adult animals was 30.46 and 7.18 nmol/mg/min, respectively. H<sub>2</sub>O<sub>2</sub>-induced release, when expressed as a percent of AgNO<sub>3</sub>-induced release was increased in aged animals by 54%. The results suggest that the release channel of aged muscle appears to be more sensitive to ROS. In conclusion, the data support the theory that aged animal skeletal muscle is more susceptible to the adverse effects of ROS.