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Myosin Immunohistochemistry And Fiber Adaptation Following Stretch-shortening Contraction Loading: Influence Of Glutathione And Age: 957: May 29 2:45 PM - 3:00 PM

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The extent and contribution of myosin heavy chain plasticity in the adaptive response following glutathione modulation and repetitive mechanical loading is not known.

PURPOSE: The purpose of this research was to identify the influence dietary supplementation with a glutathione antagonist (L-Buthionine Sulfoximine (BSO)) has on the adaptability of skeletal muscle during chronic high-intensity mechanical loading via stretch-shortening contractions (SSCs) in young and old rats.

METHODS: Left dorsiflexor muscles of young (12 weeks, N= 22) and old (30 months, N = 22), vehicle- (VEH) and BSO-treated rats were exposed 3 times per week for 4.5-weeks to a protocol of 80 maximal SSCs per exposure *in vivo*, while cage, age-matched rats served as controls (CON). Myofiber plasticity was characterized by myosin heavy chain (MHC_{slow}^{+}, MHC_{fast}^{+}, or MHC_{dev}^{+}) response by immunohistochemical analysis, as well as by changes in muscle cross-sectional area distribution following the exposure period.

RESULTS: MHC_{slow}^{+} content was increased in the old rats, irrespective of treatment or exposure. Conversely, MHC_{fast}^{+} content was increased in the young rats, regardless of treatment of exposure. MHC_{dev}^{+} content was not changed following chronic SSC loading. Shifts to larger fiber cross-sectional areas were apparent for all SSC-exposed groups.

CONCLUSIONS: MHC_{dev}^{+} is not expressed following chronic SSC exposure, regardless of age, treatment, or exposure. Aging skeletal muscle does retain some capacity for adaptation; however aging apparently diminishes the adaptive response following chronic SSC exposure. Evidently, a population of small myofibers does exist that do not undergo regeneration in aged skeletal muscle, perhaps accounting for the disparity observed between morphological adaptation and functional performance.