

Medicine & Science in Sports & Exercise

Issue: Volume 36(5) Supplement, May 2004, p S2

Copyright: ©2004The American College of Sports Medicine

Publication Type: [Annual Meeting Abstracts: A-15 - Free Communication/Slide: Cellular/Molecular Aspects of Muscle Injury]

ISSN: 0195-9131

Accession: 00005768-200405001-00009

[Annual Meeting Abstracts: A-15 - Free Communication/Slide: Cellular/Molecular Aspects of Muscle Injury]

## Effects of Repetitive Stretch-Shortening Cycles on Muscle Morphology in Rats

Cutlip, Robert G.; Mercer, Robert; Baker, Brent A.; Geronilla, Kenneth B.; Krajnak, Kristine; Miller, Gerald R.

### Author Information

NIOSH, Morgantown, WV.

Email: [rgc8@cdc.gov](mailto:rgc8@cdc.gov)

(Sponsor: Stephen A. Alway, Ph.d., FACSM)

0056

Quantification of skeletal muscle damage after exposure to injurious stretch-shortening cycles (SSC's) would be beneficial to elucidate the temporal muscle response after contraction-induced injury. Purpose: To investigate the effect of injurious SSC exposure on the temporal myofiber response Methods: Testing was performed on the dorsiflexor muscles of Sprague-Dawley rats *in vivo*. Briefly, rats were anesthetized with isoflurane and exposed to 15 sets of 10 SSC's. Control rats were exposed to 15 isometric contractions of equal intensity. Changes in muscle morphometry were assessed at 0.5, 24, 48, 72, and 240 hours post exposure. The tibialis anterior muscle tissue was excised and weighed, and the midbelly region was cut from the muscle and mounted on cork, immersed in OCT, frozen in isopentane cooled with liquid nitrogen, and stored at -80° C. Next, transverse sections (12 µm) were cut, mounted on precoated microscope slides, air dried, and stained using a routine procedure with Harris Hematoxin & Eosin. Tissue sections were evaluated on a Leica DMLB microscope. Stereology was used to quantify the degree of myofiber damage in muscle from each group; and, also was used to measure the volume fraction, surface densities and average thickness of normal myofibrils, degenerative myofibers and the interstitial space. Results: Analyses of degeneration indicated that almost no degenerative fibers were present in muscle collected from animals in the isometric-control groups. In contrast, there was an increase in the volume and thickness of degenerating myofibers over time in the muscle collected from rats exposed to the SSC's ( $p < 0.0001$ ). Further analyses revealed that the thickness and volume of degenerating fibers from muscle exposed to SSC's was significantly increased above muscle exposed to isometric contractions at 24, 48 and 72 h post exposure ( $p = 0.003$ ). There were no degenerative myofibers seen in muscle at 240 h post exposure. Conclusion: Stereological analysis indicated that muscles exposed to damaging SSC's showed significant myofiber disruption that was not resolved until 240 hours post exposure, while muscles exposed to isometric contractions did not exhibit any degenerative myofibers.

Copyright (c) 2000-2014 Ovid Technologies, Inc.

[Terms of Use](#) | [Support & Training](#) | [About Us](#) | [Contact Us](#)

Version: OvidSP\_UI03.11.00.120, SourceID 59447