

Knockout mouse grows larger, but weaker, muscles

15 August 2013

Although muscle cells did not reduce in size or number in mice lacking a protective antioxidant protein, they were weaker than normal muscle cells, researchers from the Barshop Institute for Longevity and Aging Studies at The University of Texas Health Science Center San Antonio found.

The scientists, who are faculty in the university's School of Medicine, are studying how oxidative stress in cells impacts sarcopenia—a loss of muscle mass and strength that occurs in all humans as they age.

Protein knocked out selectively

The antioxidant protein is called SOD1. The researchers developed mice that did not have SOD1 in their muscles, though it was still present in other types of cells. Then they asked the question: Is lack of SOD1 at the muscle enough to cause atrophy?

Surprisingly, the total muscle mass in this mouse was larger. "We think that lack of SOD1 could be priming the muscle to use all of its survival skills," said Holly Van Remmen, Ph.D., professor of cellular and [structural biology](#) in the School of Medicine and associate director for basic research at the Barshop Institute. "The muscle knows things aren't quite right. Its rescue mechanisms are pulled into play."

But even though the muscles were not atrophied, they were still weak.

Sarcopenia and oxidative stress

Sarcopenia in people has two components: loss of muscle mass and loss of function (weakness). This study supports the idea that oxidative stress has a role in these detrimental effects. If a way can be found to curb the effects, then healthier, more productive aging could result, Dr. Van Remmen said.

The oxidative [stress theory](#) of aging holds that oxidation from molecules called "[free radicals](#)" causes damage to cells over time, resulting in sarcopenia and other decline.

The study is described in *The FASEB Journal*. Future research will assess whether limiting oxidative stress can effect [muscle regeneration](#), Dr. Van Remmen said.

More information: CuZnSOD gene deletion targeted to skeletal muscle leads to loss of contractile force but does not cause muscle atrophy in adult mice, *The FASEB Journal*

Provided by University of Texas Health Science Center at San Antonio

APA citation: Knockout mouse grows larger, but weaker, muscles (2013, August 15) retrieved 3 May 2021 from <https://medicalxpress.com/news/2013-08-knockout-mouse-larger-weaker-muscles.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.