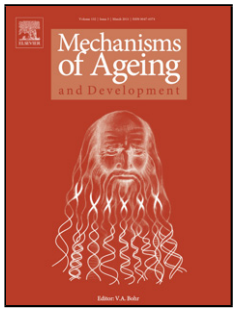

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Integrated study on comparative transcriptome and skeletal muscle function in aged rats

Jing Zhou, Zhiyin Liao, Jinliang Chen, Kexiang Zhao, Qian Xiao*

Department of Geriatrics, The First Affiliated Hospital of Chongqing Medical University, Friendship Road 1, Yuan Jiagang, 400016 Chongqing, China

*Corresponding author. E-mail address: xiaoqian1956@126.com (Qian Xiao).

Highlights

The muscle index and the relative grip strength were reduced in the old rats.
The global transcriptomic information involved in aging related skeletal muscle dysfunction in rats is supplied.
The reduced AMPK, UCP3, IGF-1, and CASK and enhanced MGMT and CHRNa1 can explain the aging-associated losses of muscle mass and function.

Abstract

The present study aimed to reveal aging-related changes in the skeletal muscle of SD rats by comparing transcriptome analysis, integrated with muscle physiological parameters. Ten rats aged 25 months were set as the old group (OG) and ten rats aged 6 months were set as the young group (YG). After 6 weeks of feeding, the body mass, grip strength, and gastrocnemius muscle mass were determined, and the differentially expressed genes were analyzed by transcriptome sequencing, followed by GO enrichment analysis and KEGG analysis. The results showed that the muscle index and the relative grip strength were lower in OG rats than YG rats. The expressions of AMPK, UCP3, IGF-1, several ion channel associated genes and collagen family genes were down-regulated in OG rats. MGMT, one of the strength determining genes and CHRNa1, a subunit of the acetylcholine receptor were up-regulated in OG rats. The present results supply the global transcriptomic information involved in aging related skeletal muscle dysfunction in rats. The reduced expressions of AMPK, IGF-1, and CASK can explain the losses of muscle mass and function in the aged rats. In addition, the