IJAE
Vol. 125, n. 1 (Supplement): 114, 2021
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Skeletal muscle adaptation gender-dependent: focus on distribution of muscle fibers and PGC1α, Hsp60 and IL-6 expression in response to a single bout of endurance exercise

D. D'Amico[1,2], A. M. Gammazza[1], F. Macaluso[3,4], L. Paladino[1], F. Scalia[1,3,4], G. Spinoso[1], I. Dimauro[5], D. Caporossi[5], F. Cappello[1,2,3,4], V. Di Felice[1], R. Barone[1]

[1] Department of Biomedicine, Neuroscience and Advanced Diagnostics, University of Palermo, Italy
[2] Department of Neuroscience, Cell Biology, and Anatomy, University of Texas Medical Branch, USA
[3] SMART Engineering Solutions & Technologies Research Center, eCampus University, Novedrate, Italy
[4] Euro-Mediterranean Institutes of Science and Technology, Palermo, Italy
[5] Department of Movement, Human and Health Sciences, University of Rome Foro Italico, Italy

The gender dimorphism of skeletal muscle can be stated in the of mass, diameter, metabolism, and fatigue differences of the individual fibers, as well as it can be associated with the distinct hormone levels in males and females. The aim of our study was to show the different distribution of skeletal muscle fibers based on the mRNA and protein expression of the myosin heavy chain (MHC) isoforms in the soleus and extensor digitorum longus (EDL) muscles of adult BALB/c mice. Significant differences between males and females were identified in response to a single bout of endurance exercise. In fact, skeletal muscle adaptation was reflected on the mRNA levels of transcription factor Peroxisome proliferation-activated receptor-γ (PPAR-γ) coactivator-1α (PGC1α), as well as the mRNA levels of Heat shock protein 60 (Hsp60), and interleukin 6 (IL-6). Our analysis focused on gender differences showed that the aerobic muscle soleus in females is rich in type I fibers, while the male one in type IIa fibers. Otherwise, the glycolytic muscle EDL in males showed a high mRNA and protein expression of type IIb fibers, that in females displayed only high mRNA levels of MHC type IIa fibers. The muscle response to a single bout of endurance exercise resulted in an increase expression of genes involved in mitochondrial biogenesis such as PGC1 α1, Hsp60 and IL-6 in the soleus muscle of males, while the expression of PGC1 α2 and α3 was increased in the EDL muscle of both animal sexes. Although these genes are important in the physiological response to exercise, our data are useful for the characterization of the fiber-type distribution in other muscles with different anatomical function and location.

http://www.fupress.com/ijae