ACUTE EXERCISE ALTERS THE LOCAL STEROIDOGENESIS IN THE SKELETAL MUSCLE OF FEMALE RATS
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Blood circulating level of sex steroid hormones are different between males and females. In females, blood level of testosterone is lower than in males, against that of estradiol is higher than in males. Recently, we showed that steroidogenesis-related enzymatic genes and proteins detected in the skeletal muscle of male rats and sex steroid hormones (testosterone and estradiol) synthesized from DHEA and/or testosterone in the cultured muscle cell. As steroidogenesis metabolic pathway, 3beta-hydroxysteroid dehydrogenase (HSD) and 17beta-HSD are essential component enzymes to synthesize testosterone, and aromatase cytochrome P450 (P450arom) regulates a metabolism from androgen to estrogen. Therefore, we hypothesized that steroidogenesis-related enzymes exist in skeletal muscle in females, but these responses of steroidogenesis system by exercise may differ between both genders. However, it is unclear that whether the acute exercise is influenced the local steroidogenesis in the skeletal muscle of female rats.

PURPOSE: We investigated alteration of the muscular steroidogenesis by a single bout of acute exercise in female rats.

METHOD: Sixteen female SD rats (10-week old) were randomly divided into two groups. Exercise rats (n=8) performed treadmill-running exercise (30m/min) for 30min. Immediately after this exercise, the gastrocnemius muscle was quickly removed. Control rats (n=8) remained at rest during the same 30-min period. The present study evaluated the presence of mRNA and protein expression of P450arom, 3beta-HSD, and 17beta-HSD in the gastrocnemius muscle by using quantitative RT-PCR, Western blot analyses.

RESULTS: In female rats, mRNA and protein expression of P450arom, 3beta-HSD, and 17beta-HSD detected in the skeletal muscle. Muscular 17beta-HSD mRNA and protein levels were increased by exercise, whereas P450arom were decreased. Muscular testosterone concentration was increased by acute exercise, but estradiol was unchanged.

CONCLUDION: Thus, steroidogenesis-related enzymes in skeletal muscle exist in female rats, and exercise-induced responses in steroidogenesis system may be enhance the locally steroidogenesis in the skeletal muscle of female rats.

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