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Research article



The effects of Creatine Long-Term Supplementation on Muscle Morphology and Swimming Performance in Rats

Ahmet Yildiz, Ercan Ozdemir, Sefa Gulturk, Sena Erdal

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Departments of Physiology Cumhuriyet University School of Medicine, 58140 Sivas, Turkey

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ABSTRACT

Creatine (Cr) has been shown to increase the total muscle mass. The purpose of this study was to investigate the effect of Cr supplementation on muscle morphology and swimming performance, using an animal model. Each rat was subjected to exercise 15-minute period daily for the 12 weeks. The rats were randomly divided into four groups: no Cr supplementation (CON), no Cr supplementation and incomplete food intake (lacking lysine and methionine in diet for rats) (INCO), Cr supplementation 1 g·kg⁻¹·day⁻¹ (CREAT-I) and Cr supplementation 2 g·kg⁻¹·day⁻¹ (CREAT-II). Three months later, all groups adult rats exercised in swimming pool chambers. Swimming time was recorded as minute for each rat. Following swimming performance period, the animals were killed by cervical dislocation and the gastrocnemius and diaphragm muscles were dissected. Serial slices of 5-7 µm were allocated paraffin wax and histochemical staining procedure of cross-sections was carried out with heamatoxylin-eosin technics. All groups gained body weight at the end of 12 weeks but there was no statistical difference among them. Swimming time values were statistical difference between CREAT-II and CON group as well as between CREAT-I and CON group (p < 0.05). In the INCO group was determined increased connective tissue cell of the muscle sample. In contrast, in the CREAT-I and CREAT-II group, the basic histological changes were large-scale muscle fibers and hypertrophic muscle cells. These results suggest that long-term creatine supplementation increased the number of muscle fibers and enhanced endurance swimming performance in rats.

Key words: Creatine, muscle hyprtrophy, muscle morphology, exercise, swimming performance

Key Points

- There is no study about the effects of creatine long-term supplementation on muscle morphology and swimming performance in rats.
- Long-term creatine supplementation increase muscle hvnertrophy (but not body weight)

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