原　著

全身持久的トレーニングに対する骨格筋収縮調節蛋白“トロポニン”の適応

Adaptation of regulatory protein“Troponin”in skeletal muscle fibers to endurance training.

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Abstract

Troponin plays a key role in the regulation of muscle contractions. During strenuous endurance exercise, muscle contractions occur by the sliding of actin into myosin filaments, which depends on Ca^{2+}-activation. Troponin consists of actin filament and plays the role of controlling the bridge between actin and myosin filaments by releasing Ca^{2+} from the sarcoplasmic reticulum. However, the adaptive characteristics of troponin are not clear. This study experimentally examined the characteristics of adaptation of regulatory protein“Troponin”in skeletal muscle fiber (m. soleus and m. plantaris) to endurance using the Wistar male rats. These rats were divided into control (CG), exercise 30 minutes (Ex30G) and exercise 90 minutes (Ex90G). Rats in the exercise groups (Ex30G and Ex90G) performed running on a treadmill at the velocity of 30m/min and a grade of 10 degrees for 8 weeks. The results obtained from this study were as follows: 1) There was a tendency for troponin I (TnI) and Troponin C (TnC) of m. soleus and m. plantaris, and fast Troponin T (TnT) of m. plantaris to increase with the duration of the exercise 2) In the fast Troponin T (TnT) of m. plantaris, fast TnT3 decreased but TnT1 increased with the duration of exercise 3) It was suggested that Troponin C, I, T in muscle fibers were important to more safely achieve smooth and effective muscle fibers contractions during endurance exercise. Especially, the changeover from troponin TnT3 to troponin TnT1 in m. plantaris may be important during strenuous endurance training.

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Calcium ion, western blotting, actin filament, sarcoplasmic reticulum

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