The relationship between myosin heavy chain transition and apoptosis in skeletal muscle after 10 weeks endurance exercise training

Chen Tsung-I¹, Chang Ming-I², Lin Nien-Tsung ³²
(Taiwan Hospitality and Tourism College, Graduate Institute of Medical Sciences, and Graduate Institute of Microbiology Immunology and Molecular Medicine, Tzu-Chi University¹, Graduate Institute of Microbiology Immunology and Molecular Medicine, Tzu-Chi University², Taiwan)

The purpose of this study is to investigate the relationship between myosin heavy chains (MHCs) transition and apoptosis induced by endurance exercise training. Animals, male Sprague-Dawley rats, were randomly assigned to either a control group (CON) or an exercise training group (TR). TR were trained on treadmill for 5 days weekly for 10 weeks. Rats were sacrificed at a rest period of 48 hours after the last day of exercise training. The soleus and gastrocnemius were dissected out and frozen in liquid nitrogen rapidly. The citrate synthesis activity of soleus of TR increased by 24% (p < 0.01) when compared with that of CON. Both of the apoptotic indexes of soleus and gastrocnemius of TR were decreased by 36% (p < 0.01) and 65% (p < 0.01) when compared with that of CON (p < 0.01). Both of the ratio of MHC-IIa and MHC-I of gastrocnemius of TR increased by 129% (p < 0.05) and 91% (p < 0.05) compared with that of CON might resulted from the both of apoptosis and muscle fiber transformation (MFT) of MHC-IIb. Those caused the ratio of MHC-IIb of gastrocnemius of TR decreased by 17 % (p < 0.01) compared with that of CON. The ratio of MHC-I of soleus of TR increased by 7 % (p < 0.01) compared with that of CON might result from the both of apoptosis and MFT of MHC-IIa. Those caused the ratio of MHC-IIa of gastrocnemius TR decreased by 64% (p < 0.01) compared with that of CON. The ratio of MHC-IIx of gastrocnemius of TR increased by 93% (p < 0.01) compared with that of CON might only result from the apoptosis of MHC-IIb, because the MFT was not occurred between the MHC-IIx and MHC-IIb. After 10 weeks endurance exercise training, the ratio of MHCs of skeletal muscle was increased or decreased, and they were might result from both of MFT and apoptosis. Nevertheless, the ratio of MHCs was changed only by apoptosis whiled the MFT was not occurred.

Keywords: Apoptosis, Exercise Training, Muscle fibres

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