



Effects and Mechanism of myokines in exercise mediated improving obesity rats skeletal muscle remodeling

Liang Zhang, Hongtao Yang, Jin Ma, Linjie Li
School of P.E. and Sports Science, Beijing Normal University

Objective Aims From the year 2000, many experimental research data have indicated that skeletal muscle could express, synthesis and secrete multiple cytokines and polypeptides. The cytokines and polypeptides, not only regulate skeletal muscle growth, metabolism and motor function by paracrine/autocrine pathway, but also regulate functions of peripheral tissue and organs by endocrine pathway. Further researches proposed muscle as a secretory organ played a key role in mediating the health-promoting effects of physical activity and proteins expressed and released by skeletal muscle have been termed as myokines. Disorders of skeletal muscle endocrine function have related to the occurrence and development of multiple metabolic diseases, and myokines participate in obesity skeletal muscle remodeling. This study aims to investigate the expression changes of myokines and its effects in exercise mediated improving skeletal muscle remodeling on obesity mice, and explore the underlying mechanism of its functions.

Methods Methods Five-week-old male Sprague-Dawley (SD) rats were randomly divided into a control group of 8 and a high-fat diet (HFD) group of 16. The control group was given normal food, while the HFD group were provided with high-fat diet for eight weeks and further divided into a sedentary HFD group and a treadmill running HFD group, each of 8. The exercise mice underwent 60 min treadmill running at 26 m/min each day, 5 days/week for 8 weeks. Biochemical analyses, immune-histochemical, ELISA, RT-PCR and Western Blot methods were used to investigate multiple myokines expression changes and its mechanism.

Results Results 1) Exercise significantly upregulated the expression of IL-15 in soleus and gastrocnemius muscle of obesity rats, indicating IL-15 could inhibit skeletal muscle endoplasmic reticulum stress and improve insulin sensitivity. 2) Exercise significantly inhibited the expression of myostatin (MSTN) in gastrocnemius muscle and mediated the changes of muscle fiber types. 3) Exercise markedly promoted the expression of apelin/APJ and angiogenesis function in obesity skeletal muscle. 4) Exercise upregulated skeletal muscle vascular endothelial growth factor B receptor expression and improved skeletal muscle ectopic lipid accumulation.

Conclusions Conclusion Exercise regulates skeletal muscle myokines expression and secretion and have the effects on skeletal muscle fiber type changes, myofiber capillary density, glucose and lipid metabolism, thus improves the skeletal muscle remodeling and maintain body homeostasis.