Exercise Biochemistry Review

Proceedings of IBEC 2018, Beijing, China, October 23-25
OR-031

Mechanism of free-wheeling exercise attenuating muscle atrophy in SAMP8 mice

Ying Zhang[1],Xianjuan Kou[1,2]
1.Wuhan Sports University
2.School of Health Science， Wuhan Sports University

Objective Muscle atrophy is a decrease in the volume and number of skeletal muscle cells, decreased muscle strength, and increased connective tissue and fat as the patient ages, and clinical symptoms syndrome characterized by decreased physical function, falls, weakness, and varying degrees of disability. It is estimated that approximately 5-13% of the elderly over the age of 60 are affected by muscle atrophy. Studies have shown that increased myocyte apoptosis and decreased levels of autophagy are involved in the development of muscle atrophy. At present, appropriate exercise has been considered as an economical and convenient way to reduce muscle atrophy, delay aging, and activate autophagy. The molecular mechanism remains to be further studied. The aim of this study was to investigate the effect and mechanism of 8-week free-wheeling exercise on muscle atrophy in rapid aging model SAMP8 mice, in order to provide a theoretical basis for exercise training to improve muscle atrophy and inhibit apoptosis.
Methods Twenty-four SAMP8 male mice of 7-month-old SPF were randomly divided into control group (Con), exercise group (V), and exercise combined with autophagy inhibitor chloroquine group (VQ), with 8 rats in each group. The Con group was fed routinely without any intervention for a total of 8 weeks. After 8 weeks, the mice were sacrificed by cervical dislocation, and the gastrocnemius muscle tissue was taken immediately. The apoptosis of skeletal muscle and the expression of aging-related proteins were detected by Western-blot. Test indicators include BAX, Ac-p53, p21, and p16. All experimental data were analyzed by statistical software and showed significant differences at $P < 0.05$.
Results Western-blot results showed that compared with the Con group, the expression of apoptosis-related protein BAX and aging-related proteins AC-P53, p16, and p21 were significantly decreased in the skeletal muscle of the V group ($P<0.01$). In the VQ group, the protein expression of BAX was significantly increased ($P<0.01$), and the protein expression of AC-P53, p16 and p21 also increased ($P<0.01$).
Conclusions The above Western-blot results indicate that free-wheeling exercise significantly inhibits skeletal muscle cell apoptosis in aged mice and reduces muscle atrophy.At the same time, under the action of free-wheeling exercise combined with autophagy inhibitor chloroquine, the apoptosis-related protein and aging-related protein increased abnormally, suggesting that free-running movement may inhibit apoptosis and delay muscle atrophy by activating autophagy. Further research is needed.