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Effect of HIIT on mitochondrial telomerase of skeletal muscle in aged rats

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Objective The HIIT and moderate-intensity exercise are two different exercise models among the public fitness. In recent years, HIIT become more and more popular, unfortunately, there is a tremendous lack of research being done effects of mitochondrial reverse transcriptase (TERT) on age-related degeneration of skeletal muscle by HIIT. The purpose of this study was to compare the HIIT group and moderate-intensity group, and research difference of telomerase expression and cardiopulmonary endurance between the exercise group and the quiet control group was discussed.

Methods fifty-nine male Wistar rats were divided into three groups at random: control group (Q=19), moderate-intensity intervention group (M=20), and HIIT intervention group (H=20). The rats in Q group did not any exercise, and the rats in M group developed the exercise with 60% VO₂max intensity for 8 weeks. H group did a training program for an 8-week exercise with alternating 40%, 60%, and 80% VO₂max intensities. The rats in the experimental group were exercised for 50 minutes every day and trained for 5 days per week. After the baseline value group was sampled, each group of rats was selected after the training reached the specified number of weeks (4 and 8 weeks), and the maximum oxygen uptake test was performed before the material was taken. Single factor analysis of variance were used to assess differences in VO₂max, and expression of protein between conditions.

Results It was found that H group VO₂max was significantly higher than M group and Q group (P<0.05). At same time, the mTERT expression of the M group at the 4th week was significantly higher than that of the Q group (P<0.05). The mTERT expression in group H was significantly higher than that in group Q at week 8 (P<0.05). There was no significant difference between the H group and the Q group at 8th week (P<0.05).

Conclusions 1. HIIT exercise lasting for 8 weeks can effectively inhibit the decrease of maximal oxygen uptake in aging rats compared with moderate exercise. 2. HIIT training for 8 weeks promotes the expression of mTERT; 3. The maintenance of VO₂max in aging rats may be related to the enhancement of mitochondrial antioxidant function by HIIT-promoted TERT to mitochondrial translocation.