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Oxidative phosphorylation in response to high intensity interval training

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Objective The aim of our study was to investigate the adaptive effect of six sessions of high intensity interval training (HIIT) on changes in the amount and activity of mitochondrial enzymes.

Methods Twenty seven students (age 21.2 ± 0.9) were assigned to HIIT (n=10) and control (CON, n=17) group and performed six training sessions for 14 days: 6 × 90 s intervals at 80% maximal aerobic power (MAP) output separated by 180 s rest. Pre and post interventions anthropometric measurements, maximal activity of citrate synthase (CS) and 3-HydroxyacylCoA (HADH) was determined in muscle samples. The effect of HIIT on proteins involved in oxidative phosphorylation (OXPHOS) in the skeletal muscle was used via proteomic analysis's. We took into consideration 89 identified subunits from the mitochondrial respiratory chain complexes and the ATP synthase complex. For these proteomic tests a muscle biopsy samples from the three representative participants HIIT and three CON before and after training were collected.

Results Training induced the moderate and large effects in maximal enzymes activities CS and HADH. The HIIT caused the increase of level proteins involved in oxidative phosphorylation.

Conclusions HIIT can be an optimal strategy for the prevention of certain civilization diseases or for the rehabilitation of diseases, especially cardiovascular disease.