



## The effects of high intensity interval training and moderate intensity continuous training on mitochondrial biogenesis in subcutaneous adipose tissue of obese male rats

### Oral Presentation

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### Abstract

**Introduction:** Exercise training has been reported as a potential regulator of mitochondrial function and content [1, 2]. The current recommendation for exercise training included 150 or 70 min per week of moderate or vigorous intensity training to maintain or improve cardiometabolic health [3, 4] and manage obesity. It has been proposed that HIIT is the time-efficient and potent approach for cardiovascular and skeletal muscle adaptations that are associated with improved performance and health outcomes. However, the role of exercise training intensity on mitochondrial biogenesis has not been clearly elucidated. The current study investigates the effects of high-intensity interval training (HIIT) and moderate-intensity continuous training (MICT) on mitochondrial biogenesis in subcutaneous adipose tissue of obese male rats.

**Methods:** After inducing obesity by a high-fat diet, obese rats were randomly divided into obesity control (OC), MICT and HIIT. The HIIT protocol, including 10 bouts of 4-minute activity with the equivalent intensity of 85-90% vo<sub>2</sub>max and 2-minute active rest periods, and the MICT protocol with the equivalent intensity of 65-70% VO<sub>2</sub>max, with covered distance matched to that of the HIIT protocol, were performed for 12 weeks and 5 sessions per week. Western Blot method was used to measure protein levels of PGC-1 $\alpha$  and RT-PCR method to measure mtDNA gene expression.

**Results:** Data analysis showed, HIIT and MICT resulted in a significant increase in protein levels of PGC-1 $\alpha$  and expression of mtDNA (P<0.05), while HIIT had more significant effects (P<0.05).

**Conclusion:** It seems likely that HIIT and MICT lead to an increase in mitochondrial biogenesis in subcutaneous adipose tissue; however, the effects of HIIT are significantly higher.

### Keywords

High intensity interval training; Moderate intensity continuous training; Mitochondrial biogenesis; Obesity

### Reference:

1. Menshikova, E.V., et al., Effects of exercise on mitochondrial content and function in aging human skeletal muscle. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 2006. 61(6): p. 534-540.
2. Heo, J.-W., et al., Exercise training attenuates obesity-induced skeletal muscle remodeling and mitochondria-mediated apoptosis in the skeletal muscle. International journal of environmental research and public health, 2018. 15(10): p. 2301.
3. Medicine, A.C.o.S., ACSM's guidelines for exercise testing and prescription. 2013: Lippincott Williams & Wilkins.
4. Organization, W.H., Global recommendations on physical activity for health. 2010: World Health Organization.