

ISEI Abstract – 7

Changes of cytokines in mouse skeletal muscle and plasma by a single bout of endurance exercise.

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ABSTRACT

Introduction: Exercise influences some cytokine levels, which is considered the body's reaction against endogenous stress. Previous human studies demonstrated that high intensity exercise contributes to a dramatic increase of plasma cytokines like Interleukin-6 (IL-6) and Interleukin-1 receptor antagonist (IL-1ra) immediately after exercise. Recently, it has been identified that skeletal muscle produces cytokines and peptides and they exert both paracrine and endocrine effects. However, the sequential changes of cytokine production according to exercise conditions such as intensity, types and working time are still unclear. In this study, we identified the sequential changes of cytokines in both skeletal muscle and plasma after acute endurance exercise.

Methods: Male C57BL/6 mice (n=35) were randomized to a sedentary or a treadmill running group (25m/min, 0% grade). To examine the sequential changes of cytokines, the exercise group was divided into 3 groups and each group was sacrificed at different time points (Post-exercise 0, 2, and 6 hours). Skeletal muscle and plasma were taken and real-time PCR and ELISA were conducted. The mRNA expression of IL-6, IL-7, IL-15, Myostatin, Irisin, Leukaemia inhibitory factor (LIF), IL-1ra and IL-1beta in skeletal muscle was identified by real-time PCR. The protein concentrations of IL-6, IL-1ra, Monocyte chemotactic protein 1 (MCP-1), and Myeloperoxidase (MPO) in plasma were investigated by ELISA. Also, IL-6 protein concentration in skeletal muscle was measured by ELISA.

Results: IL-6 mRNA expression in skeletal muscle increased at 6 hrs post-exercise compared with pre-exercise, immediately post-exercise and 2 hrs post-exercise. In contrast, IL-6 protein concentration in skeletal muscle was decreased significantly 2 and 6 hrs post-exercise compared with pre-exercise and immediately post-exercise. However, there was no significant change in IL-6 protein levels in plasma. Also, there were no significant changes in IL-7, IL-15, Myostatin, Irisin, LIF, IL-1ra and IL-1beta mRNA levels at each time point.

Conclusions: A single bout of endurance exercise in mice altered IL-6 mRNA and protein expression in skeletal muscle in a delayed onset manner. However, there has no effect on IL-7, IL-15, Myostatin, Irisin, LIF, IL-1ra and IL-1beta mRNA expression in skeletal muscle and the plasma concentrations of IL-6, IL-1ra, MCP-1, and MPO.