

PROCEEDINGS OF THE I INTERNATIONAL MEETING IN EXERCISE PHYSIOLOGY

Effect of eleven weeks training program on inflammatory, hematological and biochemical parameters in rat skeletal muscle, liver and serum #11

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Physical exercise is known causer of acute traumas in biological structures. Chronically, physical training or can lead to a coherent sequence of traumas leading to Adaptation (Functional Overreaching – FOR) or to an imbalance between stimulus and recovery leading to Overtraining Syndrome (OTS). In the present study we analyzed muscle and hepatic cytokines concentration: Interleukin-6 (IL6), Tumor Necrose Factor-Alpha (TNF- α), Interleukin-1Beta (IL1- β) and Interleukin-10 (IL-10); muscle and serum concentration of glutamate (GLU) and glutamine (GLN); serum concentration of C-reactive Protein (CRP), Alpha-1 Glicoprotein Acid (AGA), Albumin (ALB), Uric Acid (UA), Ferric Reducing Ability of Plasma (FRAP), Creatine Kinase (CK), Red Blood Cells (RBC) and White Blood Cells (WBC) in rats submitted to a 11 week training protocol divided in 4 parts: training 1x/day (until week 8th), training 2x/day (week 9th), training 3x/day (week 10th), training 4x/day (week 11th). Rats were killed for sample collecting in the following moments: initial (INI), training 2x/day (T2x) and training 4x/day (T4x); performance tests were made at these same moments to allow the calculus of the work done by the rats. The GraphPad InStat[®] software was used to make statistical analysis, using parametric and impaired tests. A *p* significance value of less than 0.05. The results showed that Work increased significantly in T2x and T4x compared to INI (means: 478.79 and 505.88Kg.m compared to 241.81Kg.m). It was observed an anti-inflammatory and antioxidant standard in skeletal muscle (\uparrow [IL6] and \downarrow [TNF α , IL1 β]) and serum (\uparrow [Uric Acid, FRAP]), respectively, in T2x and T4x at the same time of a pro-inflammatory standard in liver at these moments (\uparrow [IL6, TNF α , IL1 β]). We found significant decrease in PCR (means: 3.94mg/L in T4x compared to 5.62mg/L in T2x) and WBC (means: 2461mm³ in T4x

compared to 3457mm^3 in T2x) in T4x and maintenance in serum GLN/GLU ratio along protocol (4.05 in T4x compared to 4.02 in T2x and 4.54 in CO). The eleven weeks training program showed an adaptive trend in rats, considering that T4x showed to be more stressful than T2x.

Key words: physical training; inflammation; cytokines; overtraining syndrome.