

Immunoregulatory Cytokines and Chemokines Synthesis in Endurance Exercises

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Abstract : Endurance exercises and strenuous muscle activity are accompanied by multiple immune dysfunctions due to the activation of cytokines and chemokines synthesis. This study assesses changes in the synthesis of immune regulatory mediators in elite athletes during endurance sports activity. The concentrations of cytokines/chemokines (IL-2, IL-6, IL-8, IL-10, IL-18, MIP-1 beta, GRO-alpha, RANTES, SDF-1a, VEGF) in sera of hockey athletes (n=33) and in supernatants of 24-h cultivated peripheral blood mononuclear cells (PBMC) of boxers (n=6) assayed by ELISA and Luminex xMAP multiplex assays. Estimation of body composition studied by using bioimpedance technology. The dietary energy consumption per person has been estimated using an album of different sizes of portions of the most frequently consumed foods. It has been demonstrated that endurance sports activity enhances the secretions of most pro- and anti-inflammatory cytokines and chemokines in more than 2-6 fold. The study demonstrated that the high increase of more than 3-4 times in the concentration of IL-18 in sera of athletes (327.86 ± 45.67 pg/ml) didn't correlate with BMI ($p=0.040$) but demonstrated a low correlation with MMI ($p=0.234$) and BMR ($p=0.231$). The opposite impact on the concentration of IL-10 has been demonstrated in athletes. It has been shown a negative correlation between its concentration and BMI ($p= - 0.251$), MMI ($p= - 0.327$), and BMR ($p= - 0.301$). In vitro studies in boxers showed greater amounts of chemokines in the PBMC supernatants, including MIP-1 β , GRO- α , RANTES, SDF-1 α , and IL-8 ($P<0.05$). At the same time, healthy controls had greater supernatant levels of MCP-1, Eotaxin, and MIP-1 α . The study demonstrated a high correlation between physical activity, usual athletes' diet, and consumption of specialized sports nutrition products.

Keywords : sport nutrition, cytokines, chemokines, endurance exercises

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