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EXERCISE TRAINING-INDUCED CHANGES IN INFLAMMATORY MEDIATORS AND HEAT SHOCK PROTEINS IN CANOEISTS

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KEY WORDS: inflammation, cytokines, HSP27, HSP70, muscle damage

INTRODUCTION

According to cytokine overtraining theory, skeletal muscle injuries are related to systemic inflammatory reaction. In response to inflammation, cells rapidly produce a series of proteins known as heat shock proteins (HSPs). These are considered to be molecular chaperones which play a universal role in maintaining cellular homeostasis. Among the subset of stress-responsive proteins, HSP27 and HSP70 are considered to be a new approach to monitoring exercise training and adaptive mechanisms^(1,2). The study was designed to demonstrate the effect of sport training on changes in pro-inflammatory cytokines and HSPs, and their relation with muscle damage and body composition.

MATERIALS AND METHODS

Six elite canoeists (19.8 ± 2.9 yr) were observed during preparatory training period (March) at the 1st, the 4th and after 7 days of the conditioning camp, and then after 3 days of recovery.

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RESULTS

The canoeing training did not induce muscle damage, decreased in IL-1 β and HSP27, increased in TNF α and HSP70 concentrations. The highest changes in TNF α and HSP70 were observed 3 days after conditioning camp (during recovery) compared to initial level (the 1st day of conditioning camp). TNF α correlated with HSP27 ($r = -0.563$; $P < 0.01$) and HSP70 ($r = 0.651$; $P < 0.001$). Any significant changes in body composition were not observed.

CONCLUSION

These results show that 7-day canoeing training modulates pro-inflammatory response which is related to HSPs release into the circulation, and reveal that skeletal muscle damage is not necessary to induce training-induced inflammation.

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