Effect of Training in Peripheral Blood Lymphocytes and Cytokine Levels in Elite Kayakers

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ABSTRACT

Prolonged strenuous exercise has been associated with impaired immune function. The objective of this study was to investigate the differences in the peripheral blood cell counts and cytokynes in kayakers at different moments of training. The sample consisted of eight elite male kayakers, 22± 4 years old, 77.2 kg±6.7 body mass and 177.5±5.6 cm stature. The initial VO_2max was 61.2±5.5 mL.kg.min^{-1}. The control group consisted of six healthy males, 18±1 years old, 81.3± 13.8 kg body mass and 171.9±4.5cm stature. Blood samples were collected, at rest, from the kayakers at 4 time points of the training season: t0 early November (beginning of the training season), t1 late February (after an increased volume in training load), t2 early April (after an increase in training intensity) and t4 in June (after a major competition). Blood samples from the controls were taken at 3 equivalent time-points. Lymphocyte subpopulations were determined by flow cytometry. Cytokine concentrations were determined by ELISA. Statistical analysis was done using Friedman's ANOVA- Repeated measures and the Mann-Whitney test for comparing the kaykers and control groups.

The total nº of lymphocytes decreased and the natural killer (NK) CD3+CD56+CD8+ cells increased at t2 when compared to baseline (t0). No changes between time points for the lymphocyte subpopulations were found in the control group. When comparing both groups lower levels of NK cells were found at baseline and througth out the season in the kayakers. When looking at plasma cytokine concentration an increase in intensity training and the competitive period were able to elevate the concentrations of pro and anti-inflammatory cytokines (IL1-Ra, IL-6, Il-1beta and IL-18), even after 24hours of rest. However IFN-Y, TNF-α and IL-10 were not significantly affected in the kayakers. When comparing both groups at t0, kayakers showed lower levels of IL-1β, IL-18, IL-1ra and IFN-γ.

Changes in training load intensity were able to affect the number of lymphocytes and their subpopulations in the circulation periphery. Significant reductions in circulating NK CD3-CD56+ and CD3-CD56+CD8+, appears to be associated with increased risk of URS. In spite of the increase of cytokines after the competition period, the kayakers maintained lower levels of pro and anti-inflammatory cytokines when compared with the control group. Despite extreme levels of exercise being associated with reduced immune function and increased susceptibility to infections, a reduction in inflammation due to training may represent a beneficial effect of the long term exercise practice.

Acknowledgments: this study was supported by the Portuguese Foundation for Science and Technology (FCT), PTDC/DES/68647/2006