

The Functional Activity of Neutrophils in Athletes

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Introduction- Polymorphonuclear neutrophils (PMNs) take direct part in reaction of whole body on exercise. The aim of present study was to investigate the functional activity of PMNs in athletes.

Methods - Quantity of PMNs, their phagocytic and oxidative activity and capacity to produce interleukin-6 (IL-6) and IL-8 *in vitro* in the presence or absence of stimuli (LPS and zymosan A) was studied in 3 groups of athletes parted on the basis of the clinical and anamnestic data: group 1 (n=27) - athletes without the clinical diagnosis (healthy); group 2 (n=11) with persistent infections in the anamnesis (a herpes simplex and influenza virus, a genyantritis, a tonsillitis, etc.); group 3 (n=8) with sings of any allergic responses in the anamnesis. The healthy untrained volunteers served as the controls (n=109).

Results – Athletes with allergy had a lower relative quantity of PMNs than in controls ($p=0.019$) and decreased absolute quantity of PMNs in comparison with healthy athletes ($p=0.045$). PMNs in athletes had decreased phagocytic activity. However phagocytic capacity of PMNs in athletes from groups 2 and 3 was suppressed significantly (1.6- and 2.1-fold, respectively, $p=0.001$, $p=0.0001$) in comparison with controls. Athletes with allergy had also a significantly lower phagocytic activity of PMNs than healthy athletes. PMNs in athletes had raised spontaneous respiratory burst (quantity of formazan-positive cells in NBT-test, FPC) than in controls (4-, 10- and 2.5-fold for groups 1-3, respectively, $p=0.0001$, $p=0.0001$, $p=0.014$). Healthy athletes had elevated quantity of FPC after stimulation of PMNs by zymosan ($p=0.05$). At the same time stimulated oxidative activity of PMNs in athletes from groups 2 and 3 was suppressed. PMNs in healthy athletes possessed the raised ability to produce of IL-6 and IL-8 spontaneously and after stimulation in comparison with controls (all $p<0.05$). Spontaneous secretion of IL-8 by PMNs in athletes from groups 2 and 3 was elevated also ($p=0.003$, $p=0.001$, respectively, compared with controls) and was higher than in healthy athletes. Stimulated secretion IL-8 and IL-6 by PMNs in these athletes was higher than in controls, but did not differ from healthy athletes.

Conclusion - Our data show that regular exercise influence on key effector function of PMNs and its capacity to produce the cytokines. We also observed more significant changes in the functional activity of PMNs in athletes with persistent infections and allergy in the anamnesis. Possibly these changes are linked with a higher incidence of infection and allergic responses in some athletes.

Key words: neutrophils, PMNs, athletes, cytokines, phagocytosis, respiratory burst