

Alterations in the blood cell count under the action of air polluting factors in exercise-trained animals

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Abstract

Background. Environmental stress determined by air-polluting agents, causes multiple adaptive changes in the body under exercise training conditions.

Aims. The aerobic exercise capacity and hematologic changes under the action of some air-polluting agents (cigarette smoke and ozone) in exercise trained animals were explored.

Methods. The investigation was carried out on groups of 10 male albino Wistar rats: 1) group I: animals trained to exercise, group II: animals trained to exercise with chronic exposure to cigarette smoke; group III: sedentary animals with chronic exposure to cigarette smoke. 2) group IV: animals trained to exercise, group V: animals trained to exercise with intermittent ozone exposure, group VI: sedentary animals with intermittent ozone exposure. Venous blood samples were taken from the retroorbital vein in the 1st day, 14th day and 28th day. Leucocyte, red blood cell and platelet count were determined.

Results. 1) The exercise and the chronic exposure to cigarette smoke did not demonstrate significant changes of the leucocyte count but however, caused significant increases of the red blood cell count after 28 days and insignificant changes of the platelet count, as compared with the first day. 2) The exercise with or without intermittent ozone exposure caused decreases of the leucocyte count, which become significant only after 14 days in animals exposed to ozone. The exercise and the intermittent ozone exposure determined significant decreases of the red blood cell count and insignificant decreases of the platelet count on the 14th day.

Conclusions. 1) Training by the treadmill running test determined increases of the aerobic exercise capacity in normal environmental conditions. 2) Air-polluting agents (cigarette smoke and ozone) limited the increase of physical performance in trained animals. 3) Chronic exposure to cigarette smoke and the training caused after 14 days: insignificant decreases of the leukocyte count, followed by insignificant increases and after 28 days: significant increases in the count of the red blood cells and insignificant decreases of the platelet count as compared with the first day. 4) Intermittent exposure to ozone and the training determined after 14 days: significant decreases in the count of the leukocytes and in the count of the red blood cells, insignificant decreases of the platelet count and after 28 days: insignificant decreases in the count of leukocytes and platelets and finally significant decreases in the count of red blood cells, as compared with the first day.

Keywords: exercise, cigarette smoke, ozone, leukocytes, red blood cells, platelets.