

Immune reactivity and exercise

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In exercise, the immune system is influenced by the factors involved in natural immunity (molecules, cells and monocyte-macrophages complex) and in adaptive immunity (molecules and cells).

Immune reactivity in exercise is manifested by beneficial effects in the following situations: in young people as compared with old people, in HIV-infected patients, in patients with certain types of cancer, in chronic fatigue syndrome, in spaceflight, and by adverse effects of immunological dysfunction and immunosuppression in long-term exercise, in strenuous exercise, in exercise without food intake, in overtraining, in lack of sleep, in mental stress, in malnutrition.

Hormesis theory argues that biological systems respond favorably to low stressors and unfavorably to high stressors. The effects of exercise are in accordance with the biological principle of hormesis.

Hormesis plays an important role in the producing of major benefits derived from physical activity. Regular exercise with an intensity and duration from low to moderate has a wide range of favorable biological responses and upregulates the immune system. Physical inactivity or strenuous exercise down-regulate the immune system and increase the risk of infection. The beneficial effects of regular exercise are partly based on the reactive oxygen species involved in induction of antioxidants, while excessive exercise and overtraining lead to oxidative stress production.

Keywords: immunity, acute exercise, training, beneficial effects, unfavorable effects, hormesis, oxidative stress.