

Immunomodulatory Effect of Physical Exercise: From Immunosuppression to Immune Protection

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Editorial

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Recently, there is growing research interest on the immunomodulatory effect of physical exercise. Physical exercise should be approached as a physical stressor and as such, it is anticipated to induce a stress response. The biology of cellular stress response has well been described. A mild stressor induces adaptation and protection while a strong stressor could lead to cellular death. In the whole organism the stress response affects the immune system, the neuroendocrine system, the metabolic regulation. In that aspect, physical exercise induces an immuneresponse that depends on the intensity and the duration of exercise. Thus, acute strenuous exercise is expected to induce immunosuppression, while lifelong physical exercise of medium level could be anticipated to have an immunoprotective effect.

Initial research efforts had focused on the immunosuppressive effect of strenuous exercise in elite athletes. Epidemiological studies have shown that elite athletes are more susceptible to infectious diseases. Potential mechanisms include transient effect of exercise on the number of circulating leucocytes, on plasma cytokine concentrations, natural killer cell activity, neutrophil and macrophage phagocytic activity [1,2]. However, recently, research interest has focused on the effect of lifelong physical exercise, with data suggesting the immunoprotective effect of lifelong exercise.

Epidemiological studies have shown that physical exercise reduces the risk of breast cancer and improves survival in breast cancer patients. Although the underlying mechanisms are not clearly defined, experimental data indicate that physical exercise mediates both innate and acquired immunity.

Physical exercise has been reported to mediate cytokine release inducing beneficial effects in the host tumor microenvironment. The epigenetic regulation induced by physical exercise has well been reported. Recent microarray data have shown that exercise induces transcriptional changes in peripheral leucocytes including upregulation of genes related to protein production and mitochondrial energetics, and downregulation of genes involved in inflammatory response. Although, immunity is quite complex involving the cross talk among immune cells, cytokines, chemokines and the mechanisms underlying the immunomodulatory effect of exercise are difficult to be delineated., existing data indicate that physical exercise targets different cellular pathways. This supports the notion that lifelong physical exercise could have substantial effect in the prevention, treatment and prognosis of numerous diseases including infectious diseases, malignant diseases, autoimmune diseases. The potential additive or even synergistic role of physical exercise with medicines and other treatment modalities could also have clinical implications.

References

1. Buss L, Dachs G (2018) The Role of Exercise and Hyperlipidaemia in Breast Cancer Progression. *Exerc Immunol Rev* 24: 10-25.
2. Liu D, Wang R, Grant AR, Zhang J, Gordon PM, et al. (2017) Immune adaptation to chronic intense exercise training: new microarray evidence. *BMC Genomics* 18(1): 29.