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THE INFLUENCE OF PHYSICAL ACTIVITY ON THE BRAIN

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Today's life is very intense and requires a good physical shape. No one will deny the influence of physical activities on our general health condition. Being physically active is one of the best ways to keep your heart and lungs healthy. The worldwide researches provide information about positive effects physical activity can have on the brain. Moreover, increasing the level of physical activity can contribute to brain health at any age. This fact is very important especially for elderly people because they are more susceptible to neurodegenerative diseases. Thus physical activity can prevent certain disorders and slow down the rate of brain aging by increasing its neuroplasticity.

Physical activity is defined as any bodily movement that cause skeletal muscle contraction and lead to energy expenditure above resting level. It can be physical exercises, gardening, any household work, jogging or just going for a walk.

There exists a difference in intensity and regularity of exercise. Exercise can be acute and chronic. Acute exercise is a sudden short-term burst of activity. It affects the cognition positively but the effect is slight and decreases with time. Chronic exercise is considered to be the best as it causes many long-term adaptive changes both in the body and in the brain. These long-term changes are: improved blood circulation in the brain, reduced amount of certain pro-inflammatory substances, increase in neurotrophic signaling and decrease in stress hormones. These physiological changes underlie changes on behavioral level. The exercise intensity affects the brain too. Too exhausting exercises have negative effect on the brain and cognition. This fact is mainly explained by insufficient supply of glucose to nervous tissue, not maintained blood flow and increase in body temperature.

Nowadays many hypotheses have been elaborated to explain the mechanism by which physical activity improves brain functioning. In this report the four most supported hypotheses are presented. The cardiovascular hypothesis explains this mechanism through improved blood flow to some brain areas. These areas are mostly involved in motor learning. The immunologic hypothesis is mainly focused on the effects physical activity produces on the immune system. Many experiments provide data suggesting the decrease in certain pro-inflammatory substances and reducing the incidence of chronic inflammation. Chronic inflammation is thought to be a risk factor for developing neurodegenerative diseases. The neuroendocrine hypothesis concerns the quantity of hormones in the bloodstream, in particular cortisol, in response to physical activity. Cortisol is a hormone released in stress situations and serves for adaptation to the environment. Chronic stress is harmful as it increases cortisol amount which causes death of nerve cells, therefore oppressing memory, cognitive skills and abilities. The neurotrophic hypothesis explains positive effects through actions of neurotrophic factors. Neurotrophic factors are peptide molecules that regulate division, growth and migration of neurons. This hypothesis is promising because it can give a key to treatment of patients with neurodegenerative diseases.

A famous Latin expression says "Mens sana in corpore sano" (A sound mind in a sound body). Physical activity is an effective method to improve brain plasticity. Exercise is a strong promoter of cognitive health in humans. Having a move always brings benefits both to physical and mental state.