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“Break the Barriers, Design the Future”

Exercise Improves Brain Health

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Abstract

The human brain is the chief component of a complex nervous system. As a central command center, it controls all the body's functions and serves to relay, process, integrate, and coordinate the signals it receives from the body's sensory organs. It outputs information to different parts of the body, organs, and muscles to execute activities or respond to external stimuli. However, as people age, certain parts of the brain shrink, and brain function begins to decay as a result of changes at all levels, from molecules to morphology. Shrinkage in brain size, reductions in communication between neurons (nerve cells), decreases in blood flow, and inflammation due to an injury or disease start to affect our brain function, physical and mental performance, and life independence and quality of life. Exercise can serve as a protective mechanism that not only strengthens muscles and bones and prevents or combats health conditions and diseases but also helps ameliorate and protect the aging brain from declines in cognitive abilities and memory. Within this context, the main objective of this presentation is to provide an overview of the increasing scientific evidence that demonstrates the benefits of exercise in promoting production of neurotrophins (proteins that induce the survival, development, and function of neurons), inducing neurogenesis (formation and growth of new neurons in the brain), increasing neurotransmitters (chemicals that enable neurotransmission of signals across a chemical synapse), enhancing neuroplasticity (the brain's ability to change at any age), and improving cognition and memory. From the perspectives of public health and disease prevention and health promotion, findings from the study of brain health have significant implications and ramifications for promoting exercise and physical activity as an active lifestyle choice for children, adults, and the elderly, as well as helping to develop preventive strategies aimed at preventing and slowing the progression of brain-related diseases such as Alzheimer's.

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