

Spark

The Revolutionary New Science of Exercise and the Brain

According to recent research, in order for your brain to function at its peak, your body needs to move. Aerobic exercise prepares your brain to learn, improves mood and attention, lowers stress and anxiety, and protects against and at times can reverse some of the effects of aging on the brain. John J. Ratey, MD, an associate clinical professor of Psychiatry at Harvard Medical school, has come to find that the brain works just as muscles do, growing with use, withering with inactivity. “Getting your heart and lungs pumping can mean the difference between a calm, focused mind and a hurried, inattentive self.”

Learning Readiness

Exercise improves the learner and their opportunity to absorb material presented to them. Their senses are heightened, focus and mood improve, and they are less distracted and more motivated and energized. In addition to readying the state of mind, exercise influences learning directly, at the cellular level. Improving your brain’s potential to tap into and process new information, exercise creates the environment for our brain cells to connect and retain information. Ratey states “One of the key ingredients that exercise increases is BDNF (Brain Derived Neurotrophic Factor), or what I call Miracle Gro for the brain – as it truly is fertilizer.” Exercise is also perhaps the best way to increase neurogenesis, which is the making of new neurons. This process does occur on a daily basis, however exercise increases this process by releasing factors to encourage the development of our stem cells to divide and provide a healthy environment for them to function as nerve cells on their own. According to a study completed by neurosurgeon Fernando Gomez-Pinilla, “One of the prominent features of exercise, which is sometimes not appreciated in studies, is an improvement in the rate of learning. Because it suggests that if you’re in good shape, you may be able to learn and function more efficiently.”

Attention and Mood

Imagine if they could put exercise in a bottle. The following will provide reasons, besides the already known health benefits of exercise why this could mean a lifetime of medication or a natural remedy. Exercise almost immediately elevates dopamine and norepinephrine and keeps them up for a period of time so that it acts like a little bit of Ritalin or Adderall. According to Dr. Ratey, “Exercise assists to still the impulsivity and still the cravings for immediate gratification as it works to wake up the executive function of the frontal cortex, which in turn allows for delay, better choices, a bit more time to evaluate consequences.” To those who have ADHD, this could mean the difference between consuming medication and exercising to rid the symptoms of an ADHD brain.

The attention circuits are jointly regulated by the neurotransmitters norepinephrine and dopamine. These are the chemicals targeted by ADHD medications. Ratey wrote in another book, *Driven to Distraction*, "Several of my patients had discovered exercise as a way of self-medicating, allowing them to be more productive. With regular exercise, individuals can raise the baseline levels of dopamine and norepinephrine by spurring the growth of new receptors in certain brain areas." "Think of exercise as medication," says John Ratey, MD. "For a small handful of people with attention deficit/hyperactivity disorder (ADHD ADD), it may actually be a replacement for stimulants, but, for most, it's complementary – something they should absolutely do to help increase attention and improve mood."

Exercise can also help increase the response to stressors, allowing one to become less stressed when faced with the same stressors when in a fit condition. Our cells become more resilient in a process called stress inoculation. By stressing our cells through exercise, we build up an internal resistance to future stressors, making armies of our own antioxidant enzymes, repair and rebuild proteins, and improve the toxic waste disposal inside of our nerve cells. Individuals who exercise also increase serotonin levels, an antidepressant that helps reverse the curse of depression. Exercise reenergizes our depressed brains to do their job of adapting to our environment.

Aging

Physical activity has a protective effect on the brain and its mental processes, and may even prevent Alzheimer's disease. According to a recent 5 year study at the Laval University in Sainte-Foy, "Inactive individuals were twice as likely to develop Alzheimer's, compared to those with the highest levels of activity. It is suggested to partake in vigorous exercise at least three times a week. However, even light or moderate exercise cut their risk significantly for Alzheimer's and mental decline." It can then also be understood that muscle activity is vital to keep a synapse stable, if you lose activity you will lose receptors. However, if you regain activity, you can get those receptors back.