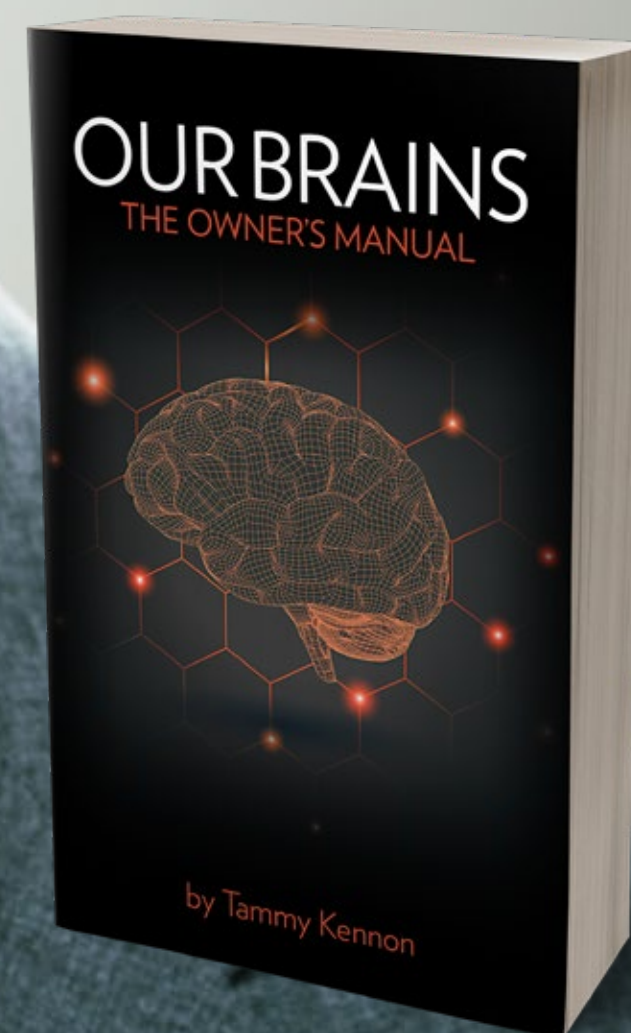


OUR BRAINS

“We can take actionable steps to build and maintain better cognitive function.”



by Tammy Kennon

Writer, journalist, sailor and traveler

We are not the hapless victims of an immutable and deteriorating brain. New research shows us what we can do to help keep our brains fit.



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In what's been called the most "extraordinary discovery of the 20th century" and the "biggest discovery in 400 years," neurologists have found that the adult brain is not only malleable, but it is also capable of forming new neurons and pathways throughout life. This fundamental shift in brain science means we are not the hap-

less victims of an immutable and deteriorating brain. In fact, with the development of new tools to watch the brain in action, scientists have found the opposite: We can take actionable steps to build and maintain better cognitive function.

We'll look at a few science-based ways to protect and improve the mission-critical muscle in our heads.

THE FOUNTAIN OF YOUTH

Explorers have been chasing the Fountain of Youth for centuries, but perhaps they should have just gone to the gym. Brain imaging has revealed that an older adult who exercises regularly has a brain that looks like that of a much younger person.

While any type of exercise promotes brain health and wards off deterioration, a 2013 study led by the Dana-Farber Cancer Institute found that endurance training in particular triggers neurogenesis or new growth in the brain. (Dana-Farber Cancer Institute, 2013) Any type of exercise where you gradually increase aerobic endurance, such as running, walking or swimming, a little farther each time sparks neurogenesis in the hippocampus, the area linked with learning and memory.

Aerobic exercise (the kind that makes you sweat) stimulates production of a protein called FND5 in the bloodstream. Over time, FND5 promotes another protein in the brain called

BDNF, which prods new nerve growth along with the synapses that connect those nerves. This kind of exercise essentially forges new pathways, a hallmark of a healthy, growing brain.

Other studies have shown that aerobic exercise contributes to memory maintenance, protects existing brain cells, and promotes continued cognitive function. One animal study in Kyoto found that in addition to spawning new growth, exercise activates an enzyme that destroys the amyloid plaques implicated in Alzheimer's disease. (Maesako et al., 2012) The bottom line: Long-term aerobic exercise not only benefits the existing tissue, but guards against damaging buildup that can cause memory loss.

The U.S. Centers for Disease Control and Prevention recommend a minimum of two and a half hours of aerobic exercise per week. A 30-minute session five days a week, even broken up into two 15-minute segments, can improve and protect both the body and the brain.



SLEEP ON IT

Sleep has always been a popular topic in brain science; now, new technology that allows scientists to monitor brain activity during sleep has brought new insights into the restorative value of a good night's sleep. Recent revelations show that our brains do a lot of housekeeping while we're snoozing.

Just last year, sleep scientists discovered that the brain uses the "down" time to flush out toxins, particularly those that form in the brains of Alzheimer's patients. (Maric et al., 2017) At the same time, the brain does work directly related to memory retention, placing our newest memories into the brain's filing system.

Unfortunately, aging often comes with sleeping issues. Drifting off to sleep gets more challenging; we wake up more frequently during the night, and then our eyes pop wide open before the sun comes up. This shaves off minutes and hours from deep, restorative sleep, and our brains are left without enough time to perform critical self-maintenance.

Neurologists refer to the chronic lack of sleep as "insufficient sleep syndrome," and it's the most prevalent diagnosis at clinical sleep laboratories. While it's well documented that chronic sleep deficit negatively impacts our health, last year neurologists proved that it also adversely affects decision-making.

Researchers in Zurich peeked into the brain activity of 14 subjects who slept only five hours per night for a week, well short of the recommended 7-9 hours per night. As the days passed, the participants made increasingly riskier financial decisions, alarming on its own, but even worse, the zombies functioning at a sleep deficit couldn't even recognize that their behavior was changing.

Other studies have found that adequate sleep lowers stress, improves metabolism, reduces inflammation and increases life span. Are you getting sleepy?

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BRAIN FOOD

A study at the Chicago Health and Aging Project made a particularly convincing discovery in 2012 by tracking the health and eating habits of thousands of participants. They found a direct correlation between the development of Alzheimer's and a diet high in saturated fats, those found in dairy products, meat and some oils. And by contrast, diets low in saturated fat cut the risk of developing Alzheimer's by two-thirds. (Morris et al., 2012) That's pretty simple math. Limiting saturated fat in your diet reduces the risk of getting Alzheimer's by 66 percent.

The other "bad" fats, the trans fats found in fried foods, fast foods and pastries, were also implicated in declining memory function.

Swapping out bad fats with foods rich in vitamin E, such as almonds and green leafy veggies, can multiply the brain-boosting benefits. Vitamin E has long been known to prevent cell damage caused by free radicals, but now we know that eating foods rich in vitamin E also delays the onset of Alzheimer's and reduces the risk of memory loss — and not by a little. For some groups the risk is reduced by a stunning 70 percent.

Other micronutrients have proven to protect memory, including the B vitamins found in pork, poultry, spinach, fortified cereal and broccoli, among others.



GIVE WORDS WINGS

Researchers in Japan have made a rather remarkable finding while exploring the potential benefit of specific activities on dementia patients. The researchers conducted a battery of tests on their subjects to measure the frontal lobe function, including fluency, reflexes, mental flexibility, motor programming and conceptualization.

Over the course of six months, some of the subjects regularly read aloud and performed math problems while a control group did not. At the end of the six months, those performing the daily tasks showed significant improvement in their mental and physical performance, including the restoration of some communication skills and an increase in independence. Those in the control group showed continuous decline. (Kawashima et al., 2005)

This study bolsters other findings that there is measurable benefit in staying active as we age. Participating in social activity and critical thinking, even those who already have dementia, can slow its progress — and in some cases, it's possible to regain some lost function.

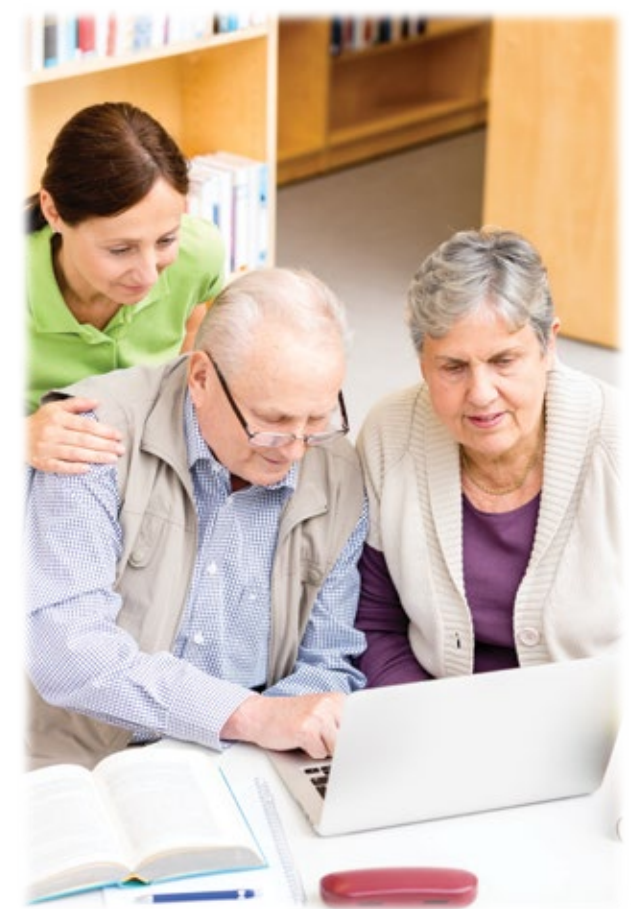
BRAIN CHANGING

If you feel like you're in a rut, you probably are. The human brain naturally finds neural pathways and then uses them over and over, making an actual rut through the gray matter similar to a well-worn path through the woods. Engaging in activities that require intense focus and new ways of thinking jumpstarts the brain, sending neurons to pioneer a network of new paths where there were none before. In one experiment, scientists found that four hours of focused learning doubled the number of these new connection points in the brain.

Different types of learning can promote development in specific parts of the brain. For instance, a 2006 study in London compared the brains of bus drivers, who continually drive the same route, to taxi drivers, who are required to commit the sprawling and complex city map to memory — and then apply that knowledge on a daily basis. Neuroimaging revealed that, compared to the bus drivers, cabbies had increased gray matter in the hippocampus, which plays an important role in consolidating memory from short term to long term and especially the type of memory critical to spatial navigation. (Maguire et al., 2006)

There is strong evidence that older adults who stay active socially, mentally and physically are protected from the onset of dementia, even if they have the APOE e4 allele gene that marks a greater predisposition for developing Alzheimer's. When we engage in learning, whether it's watercolor painting, tap dancing or speaking Sanskrit, the introduction of new thought processes quite literally changes the brain.

In fact, even the time and focus you exercised to read this article has changed your brain. Now that's a win/win. ♦



"Everything we do, every thought we've ever had, is produced by the human brain. But exactly how it operates remains one of the biggest unsolved mysteries, and it seems the more we probe its secrets, the more surprises we find." — Neil Degrasse Tyson

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