Retrieved on Jan 20th from http://www.fi.edu/learn/brain/exercise.html#physicalexercise

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| **Physical Exercise for a Better Brain** |
| http://www.fi.edu/learn/brain/images/th_rule.jpg |
| http://www.fi.edu/learn/brain/images/white.gif | http://www.fi.edu/learn/brain/images/white.gif | http://www.fi.edu/learn/brain/images/white.gif |
| Most of us know that physical exercise is good for our general health, but did you know that physical exercise is also good for your brain? If you think you’re going to get smarter sitting in front of your computer or watching television, think again. Here scientists present the evidence that a healthy human being is a human doing.[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Our Sedentary Society** |
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| Not too long ago, futurists envisioned humans evolving giant thumbs in response to a push-button world. They did not foresee humanity's real response to all its labor-saving conveniences – a sedentary, inactive society with a deteriorated vascular system and consequent decline in physical and mental health.Nearly half of young people ages 12 to 21 do not participate in vigorous physical activity on a regular basis. Fewer than one-in-four children report getting at least half an hour of any type of daily physical activity and do not attend any school physical education classes.[7](http://www.fi.edu/learn/brain/references.html#exercise7) |   | In June 2001, ABC News reported that school children spend 4.8 hours per day on the computer, watching TV, or playing video games.The impact of computers, video games, school funding cuts, and public apathy have combined to leave Illinois as the only state that still requires daily physical education in first through 12th grades. This is a far cry from the 1960s, when President John F. Kennedy made physical fitness a priority for Americans of all ages.These sedentary tendencies respresent a real health crisis. And, not just for couch-potatoes. Deep vein thrombosis (DVT) occurs when blood circulation slows, allowing clots to form and then, eventually, break free, causing death. DVT has been nicknamed “economy class syndrome,” because airplane passengers who sit throughout a long flight in the close quarters of economy class have become victims of DVT.[8](http://www.fi.edu/learn/brain/references.html#exercise8)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **About Physical Exercise** |
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| The word exercise derives from a Latin root meaning "to maintain, to keep, to ward off." To exercise means to practice, put into action, train, perform, use, improve.Exercise is a natural part of life, although these days we have to consciously include it in our daily routine. Biologically, it was part of survival, in the form of hunting and gathering or raising livestock and growing food. Historically, it was built into daily life, as regular hours of physical work or soldiering. What is now considered a form of exercise – walking –was originally a form of transportation. |   | http://www.fi.edu/learn/brain/images/renew/12346r.jpgPatterson, Kearney, NebraskaPhotograph courtesy of Nebraska State Historical Society, Digital ID: nbhips 12346[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Walking Benefits Brains** |
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| Walking is especially good for your brain, because it increases blood circulation and the oxygen and glucose that reach your brain. Walking is not strenuous, so your leg muscles don't take up extra oxygen and glucose like they do during other forms of exercise. As you walk, you effectively oxygenate your brain. Maybe this is why walking can "clear your head" and help you to think better. |   | Movement and exercise increase breathing and heart rate so that more blood flows to the brain, enhancing energy production and waste removal. Studies show that in response to exercise, cerebral blood vessels can grow, even in middle-aged sedentary animals.[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Walking Improved Memory-Study** |
| http://www.fi.edu/learn/brain/images/blue.gif | http://www.fi.edu/learn/brain/images/blue.gif | http://www.fi.edu/learn/brain/images/blue.gif |
| Studies of senior citizens who walk regularly showed significant improvement in memory skills compared to sedentary elderly people. |   | Walking also improved their learning ability, concentration, and abstract reasoning. Stroke risk was cut by 57% in people who walked as little as 20 minutes a day.[9](http://www.fi.edu/learn/brain/references.html#exercise9)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Women Who Walk Remember-Study** |
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| When the cognitive abilities of elderly women were compared, those who walked regularly were less likely to experience age-related memory loss and other declines in mental function.University of California at San Francisco researchers measured the brain function of nearly 6,000 women during an eight-year period. The results were correlated with the women's normal activity level, including their routine walking and stair-climbing."In the higher-energy groups, we saw much less cognitive decline," said neurologist Kristine Yaffe, MD. Of the women who walked the least (a half-mile per week), 24% had significant declines in their test scores, compared to only 17% of the most active women (17 miles per week). |   | It wasn't a matter of all or nothing. "We also found that for every extra mile walked per week there was a 13% less chance of cognitive decline," said Yaffe, who is Chief of Geriatric Psychiatry at the San Francisco Veterans Administration Medical Center. "So you don't need to be running marathons. The exciting thing is there was a 'dose' relationship which showed that even a little is good but more is better.""In the higher-energy groups, we saw much less cognitive decline" – a protective effect amounting to as much as 40% – according to Yaffe. "This is an important intervention that all of us can do and it could have huge implications in preventing cognitive decline."[10](http://www.fi.edu/learn/brain/references.html#exercise10)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Wake Up Your Brain in the Morning Exercise** |
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| In the morning, while you're still in bed, slowly begin to move your toes – any way that feels good. Wriggle, scrunch, and stretch. Move all your toes up and down several times, or work just your big toes. Wiggling your toes activates nerves that stimulate your brain and internal organs. |   | Do this exercise first thing each morning or after sitting for an extended period of time. It will help you to wake-up and become alert more quickly. Your whole body may feel pleasantly energized. Most important, your first steps – and those throughout the day – will be safer ones. (Falls are the second leading cause of spinal cord and brain injury among people over 65 years old.)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Foot Note** |
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| The human foot is one of the body's most complex engineering marvels. The eight arches in your feet do a remarkable job of evenly distributing the weight of your body, while 200 ligaments coordinate 40 different muscles that control the 56 bones in your feet – one fourth of all the bones in your body! |   | An intricate system of blood vessels and nerves connect the feet with the rest of the body. Your feet are good barometers of the aging process; inflexible toes, cold feet, and poor circulation are signposts of time.[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Physical Exercise Helps Higher Brain Functions-Study** |
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| Before enrolling in the trial, and four months later, the cognitive abilities of the participants were tested in four areas: memory, executive functioning, attention/concentration, and psychomotor speed.Compared to the medication group, the exercisers showed significant improvements in the higher mental processes of memory and in "executive functions" that involve planning, organization, and the ability to mentally juggle different intellectual tasks at the same time. |   | "What we found so fascinating was that exercise had its beneficial effect in specific areas of cognitive function that are rooted in the frontal and prefrontal regions of the brain," said Blumenthal. "The implications are that exercise might be able to offset some of the mental declines that we often associate with the aging process."[11](http://www.fi.edu/learn/brain/references.html#exercise11)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Run for More Brain Cells-Study** |
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| Ongoing animal studies at The Salk Institute show that running can boost brain cell survival in mice that have a neurodegenerative disease with properties similar to Alzheimer's.When these mice are sedentary, "it appears that most newly born brain cells die. We don't understand that fully, but it probably has something to do with an inability to cope with oxidative stress," said Carrolee Barlow, a Salk assistant professor and lead author of the study. "Running appears to 'rescue' many of these cells that would otherwise die." |   | Furthermore, the miles logged correlated directly with the numbers of increased cells, she said. "It's almost as if they were wearing pedometers, and those that ran more grew more cells."[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Running is a Brain Boost-Study** |
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| Running's brain-boosting effects were in the hippocampus, a region of the brain linked to learning and memory and known to be affected by Alzheimer's disease, Barlow said. "The results suggest that exercise might delay the onset and progression of some neurodegenerative diseases." |   | This study builds on work directed by Salk Professor and co-author Fred Gage, showing that running also leads to increased brain cell numbers in normal adult mice, elderly "senior citizen" mice, and a genetically "slow-learning" strain of mice. Gage's studies have shown that new cell growth occurs in human brains, too. Therefore, this suggests that the boosting effects of running may occur in people as well.[12](http://www.fi.edu/learn/brain/references.html#exercise12)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Physical Exercise Protects Your Brain as it Ages - Statistics** |
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| Physical exercise has a protective effect on the brain and its mental processes, and may even help prevent Alzheimer's disease. Based on exercise and health data from nearly 5,000 men and women over 65 years of age, those who exercised were less likely to lose their mental abilities or develop dementia, including Alzheimer's.Furthermore, the five-year study at the Laval University in Sainte-Foy, Quebec suggests that the more a person exercises the greater the protective benefits for the brain, particularly in women.Inactive individuals were twice as likely to develop Alzheimer's, compared to those with the highest levels of activity (exercised vigorously at least three times a week). But even light or moderate exercisers cut their risk significantly for Alzheimer's and mental decline.[13](http://www.fi.edu/learn/brain/references.html#exercise13) |   | http://www.fi.edu/learn/brain/images/renew/Senior-Bocci.jpg[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Intelligence at Any Age-Study** |
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| Since 1956, the Seattle Longitudinal Study has tracked more than 5,000 people, aged 20 to 90 years old. When participants began to experience cognitive decline, they were given a series of five one-hour training sessions designed to improve inductive reasoning and spatial orientation. |   | As a result, half of them improved significantly – demonstrating that mental enrichment increases fluid intelligence at any age. Lead researcher of the study, Dr. K. Warner Schaie, concluded: "The results of the cognitive training studies suggest that the decline in mental performance in many community-dwelling older people is probably due to disuse and is consequently reversible."[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Mental Challenge Protects Brain From Cognitive Decline-Study** |
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| Contrary to popular myth, you do not lose mass quantities of brains cells as you get older. "There isn't much difference between a 25-year old brain and a 75-year old brain," says Dr. Monte S. Buchsbaum, who has scanned a lot of brains as director of the Neuroscience PET Laboratory at Mount Sinai School of Medicine.Cognitive decline is not inevitable. When 6,000 older people were given mental tests throughout a ten-year period, almost 70% continued to maintain their brain power as they aged. |   | Certain areas of the brain, however, are more prone to damage and deterioration over time. One is the hippocampus , which transfers new memories to long-term storage elsewhere in the brain. Another vulnerable area is the basal ganglia, which coordinates commands to move muscles. Research indicates that mental exercise can improve these areas and positively affect memory and physical coordination.[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Intellectual Activity Fends off Alzheimer's-Study** |
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| Numerous studies show that better-educated people have less risk of Alzheimer's disease. In a Case Western Reserve study of 550 people, those more mentally and physically active in middle-age were three times less likely to later get the mind-robbing disease. |   | Increased intellectual activity during adulthood was especially protective. Examples included reading, doing puzzles, playing a musical instrument, painting, woodworking, playing cards or board games, and performing home repairs.[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Physical Exercise as an Antidepressant-Study** |
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| Blumenthal and a team of researchers at Duke University Medical Center found that an aerobic exercise program decreased depression and improved the cognitive abilities of middle-aged and elderly men and women.They followed 156 patients between the ages of 50 and 77 who had been diagnosed with major depressive disorder. They were randomly assigned to one of three groups: exercise, medication, or a combination of medication and exercise. The exercise group spent 30 minutes either riding a stationary bicycle or walking, or jogging three times a week. |   | To the surprise of the researchers, after 16 weeks, all three groups showed statistically significant and identical improvement in standard measurements of depression, implying that exercise was just as effective as medication in treating major depression.[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **An Active Life Fuels an Active Brain- Study** |
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| In a study of 193 people believed to have Alzheimer's disease, researchers found that people who participated in fewer leisure activities between the ages of 20 and 60 were 3.85 times more likely to develop Alzheimer's. |   | Most beneficial was spending time in intellectual pursuits. "A passive life is not best for the brain," said Dr. Robert P. Friedland at University Hospitals of Cleveland.[14](http://www.fi.edu/learn/brain/references.html#exercise14)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **"Elderobics" – Pedestrian Power-Study** |
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| In a sedentary group of people aged 60 to 75, University of Illinois researchers introduced them to a fitness regime. For six months the elders had either an aerobic or non-aerobic workout for up to 90 minutes, three times a week."We chose couch potatoes," said the study's lead author, cognitive neuroscientist Arthur Kramer. The 214 healthy adults hadn't been involved in any physical exercise for the previous 5 to 10 years. "Indeed most of our subjects hadn't done any formal exercise for more like 30 or 40 years."One group took long walks three times a week, and the other only did gentle toning and stretching exercises using weights. Walkers, who completed an hour-long loop around the university, improved significantly in the mental tests, as well as being fitter. An improvement of only 5-7% in cardio-respiratory fitness led to an improvement of up to 15% in mental tests. The non-walkers, however, did not gain any benefits for their brains. |   | "We see selective cognitive benefits which accompany improvement in aerobic fitness," says Kramer. Although benefits were not obvious in every type of test, improvements were clearly attributable to the aerobics workout.Even beyond age 70, cardiovascular exercise can improve memory and reasoning skills. "People who have chosen a lifetime of relative inactivity can benefit mentally from improved aerobic fitness. It's never too late."[15](http://www.fi.edu/learn/brain/references.html#exercise15)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Why Older Women Have Better Memory-Study** |
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| By improving cardiovascular health, exercise increases the flow of oxygen-rich blood to the brain. Over a lifetime, this makes a big difference to brain function. In fact, cardiovascular health appears to be the primary biological reason why elderly women tend to have better cognitive function than men.When Dutch researchers tested 600 people aged 85 and over, they found that the odds of having a better memory were 80% higher in women, even after considering factors such as formal education and depression. "Good cognitive speed was found in 33% of the women and 28% of the men," they reported. |   | Women at age 85 are known to be relatively free from cardiovascular disease, compared to men, and this relative absence of atherosclerosis is a likely biological explanation, according to Dr. A. J. M. de Craen of Leiden University Medical Center.[16](http://www.fi.edu/learn/brain/references.html#exercise16)[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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| **Blood Flow to Brain and Cognitive Decline-Theory** |
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| Psychologist James Blumenthal also points out the long-term importance of exercise for brain function. "We know that in general, exercise improves the heart's ability to pump blood more effectively, as well as increases the blood's oxygen-carrying capacity," he says. |   | "It is thought that one of the reasons why the elderly – especially those with coronary artery disease or hypertension – tend to suffer some degree of cognitive decline is in part due to a reduction in blood flow to the brain."[topics](http://www.fi.edu/learn/brain/exercise.html#top) |

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