

# Benefits of Exercise in Delaying the Onset of Alzheimer's Disease

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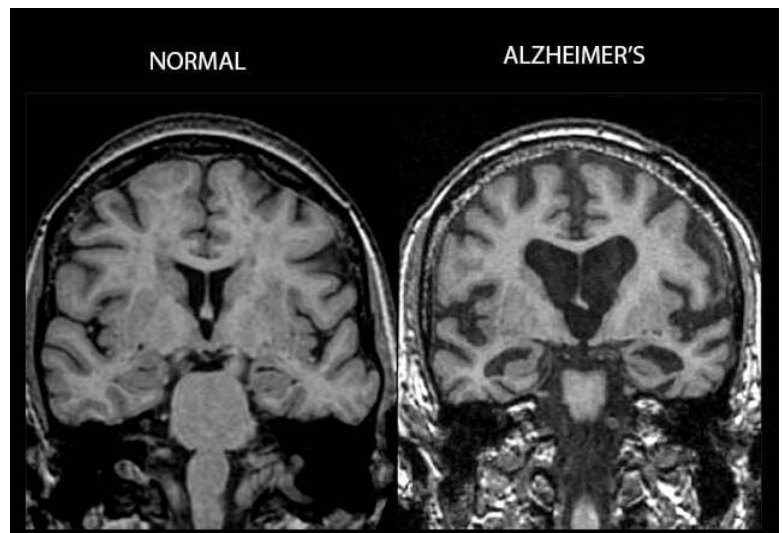
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## Key Points:

- **The progressive loss of neuron function from Alzheimer's disease can be delayed by increasing blood flow in the brain.**
- **Routine exercise is an important preventative measure for reducing the risk of Alzheimer's disease later in life.**
- **Vigorous exercise stimulates brain pathways that increase connectivity in Alzheimer's patients.**

Alzheimer's disease is a progressive brain deterioration disorder that impairs memory, thinking, judgement, personality, and behavior.<sup>1</sup> Alzheimer's is the seventh leading cause of death in the United States and currently six million people are living with disease in the U.S. alone.<sup>1</sup> Scientists have been working for decades trying to understand the complex changes the brain goes through in a patient with Alzheimer's disease. Healthy neurons stop functioning in the brain and die because of proteins forming amyloid plaque buildups. Accumulation of plaque buildups increase, neurons progressively die throughout the brain, and connectivity dwindles, resulting in shrunken brain tissue.

Exercise is shown to improve blood flow and new neuron formation in the brain.<sup>2</sup> Therefore, it can be used as a counteractive measure to the neurodegenerative nature of Alzheimer's disease. Not only can exercise be a treatment for Alzheimer's disease in the early and late stages, but it can also be a great prevention strategy. Higher physical activity levels are associated with reduced risk of Alzheimer's development and delaying onset.<sup>2</sup> In an experimental study, participants were instructed to wear wrist activity monitors to objectively track exercise data as opposed to questionnaires.<sup>2</sup> After 4 years of tracking participant's physical activity, it was revealed that there was strong association between total daily energy expenditure and both cognitive decline and Alzheimer's disease prevalence.<sup>2</sup> Increased levels of physical activity correlated with significantly reduced Alzheimer's disease risk.<sup>2</sup>

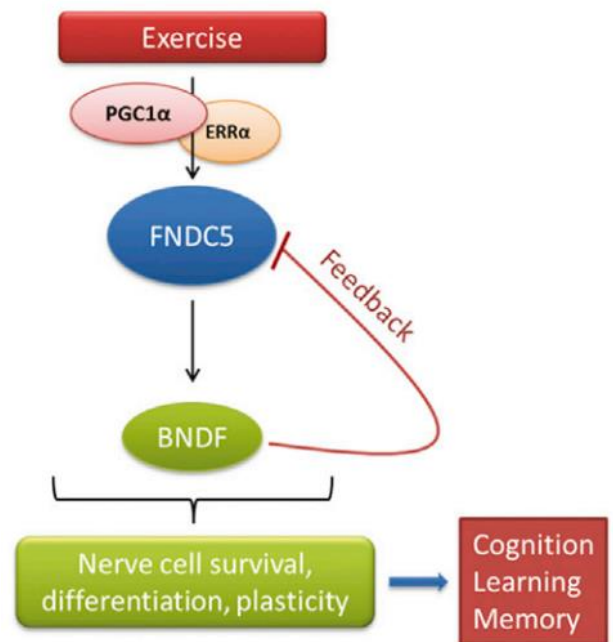


**Figure 1:** Representation of Alzheimer's brain atrophy that extremely damaging for cognitive processing.<sup>3</sup>

High-intensity exercise, even for just six minutes, could delay the onset of neurodegenerative disorders such as Alzheimer's disease.<sup>5</sup> Short, but intense bouts of exercise increase the production of the protein brain-derived neurotrophic factor (BDNF) which is critical for brain connectivity.<sup>5</sup> Figure 2 outlines the exercise-stimulated

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pathway that produces the neural-growth protein, BDNF. Increased BDNF in the brain promotes forming and storing memories, overall learning, and cognitive performance.<sup>5</sup> BDNF production was three times greater with six-minute bouts of vigorous cycling than ninety minutes of low intensity cycling.<sup>5</sup> One hypothesis for the increased BDNF production is due to the buildup of lactate during vigorous exercise, where the switch to lactate metabolism initiates BDNF producing pathways.<sup>5</sup> Whether utilized as a treatment method or a preventive measure for Alzheimer's disease, high intensity exercise poses benefits in maintaining brain connectivity.



**Figure 2:** BDNF pathway stimulated by exercise to improve brain growth and adaptation.<sup>4</sup>

## References

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