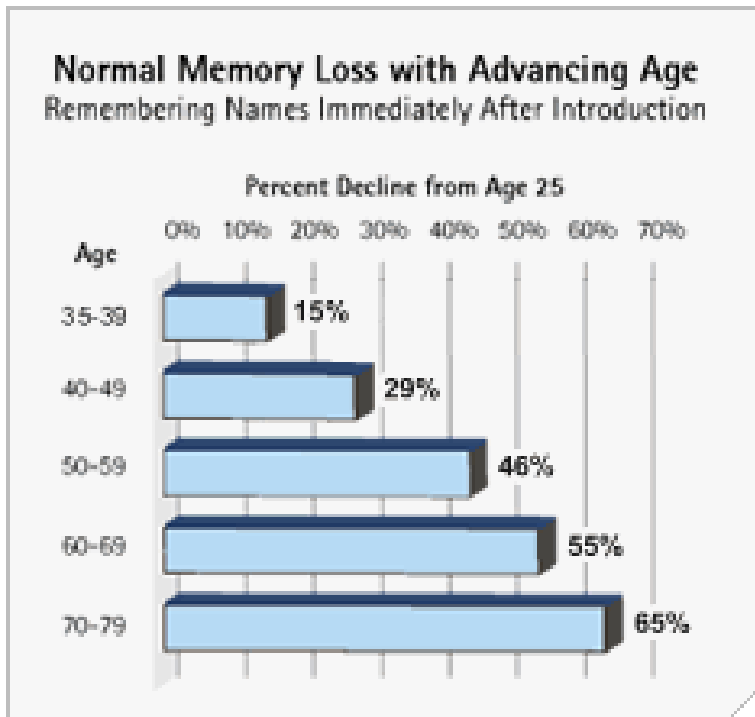


Research

What causes memory loss?

How can we prevent late-life Alzheimer's
disease?

Memory loss in general and specifically memory loss for names becomes more frequent with each advancing decade of life and reach 65% among those between ages of 70-79.



More serious memory loss and dementia occurs in up to 50% of Americans beyond the age of 80. Given that the elderly represent the fastest growing segment of the population worldwide, cognitive decline with aging has become a major global health issue. Care for the 5 million Americans with Alzheimer disease (AD) now cost more than 100 billion dollars per year. By 2050, the estimated number of patients with AD will reach 16 million. According to the Alzheimer’s Association, the healthcare system in the United States is already overwhelmed and will not be able to cope with the burden of caring for AD patients within the next 50 years.

Disabling memory loss is not limited to Western countries. Roughly, 24.3 million people globally have dementia, and 4.6 million new cases arise every year. There is a new case of dementia diagnosed every seven seconds. As the number of elderly rises rapidly and most families know someone diagnosed with Alzheimer’s disease, the fear for this condition has become an epidemic. A MetLife Survey in 2006 found that most Americans fear cancer the most. However, for those age 55 and older Alzheimer’s disease is the most feared condition.

Huge Increase in Alzheimer's, Dementia Predicted

Experts are now predicting that the global incidence of Alzheimer's disease and other forms of dementia will soar in the next few decades, especially in developing countries.

That prediction is made by an international group of 12 experts, two of them American, who were provided with "a systematic review of published studies on dementia" by Alzheimer's Disease International, a London-based organization. "We estimate that 24.3 million people have dementia today, with 4.6 million new cases of dementia every year," the experts report in the Dec. 17 issue of *The Lancet*. "The number of people [with dementia] will double every 20 years, to 81.1 million by 2040," they added.

The number of cases will double by 2040 in developed countries such as the United States, but will more than triple in India, China and other countries in south Asia and the western Pacific, the experts wrote. "We believe that the detailed estimates in this paper constitute the best currently available basis for policymaking, planning and the allocation of health and welfare resources," they said.

The prediction is very much in line with the forecast made two years ago for the United States by the Alzheimer's Association, said Maria Carrillo, the organization's director of medical and scientific affairs. "We have 5.3 million cases now," Carrillo said. "We predict a huge increase, to 6.5 million in 2025. That will overwhelm our economy and health-care system, and needs to be addressed in the next five to 10 years by research."

The Alzheimer's Association is currently seeking a \$300 million increase in its funding for dementia research, she said. The exact causes of Alzheimer's disease remain unknown, although it is thought to be related to a gradual build-up of amyloid beta protein plaques within the brain. Cerebrovascular changes have also been linked to increased risk for Alzheimer's, and stroke is a major contributor to other forms of dementia.

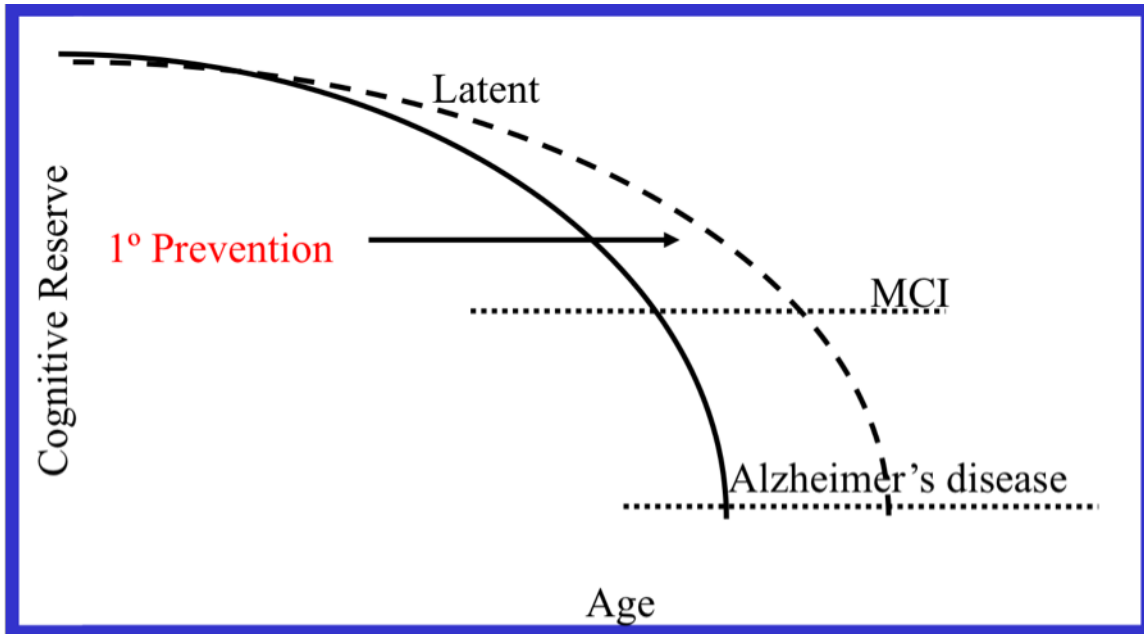
The Alzheimer's Disease International experts are recommending public health measures that focus on reducing risk factors for cerebral blood vessel damage, such as high blood pressure, smoking, diabetes and cholesterol. The U.S. Alzheimer's Association agrees with that approach, Carrillo said. "A lot of research has shown that leading a healthy lifestyle can help preserve mental function," she said. "You should be physically active, mentally active and socially active."

Mental activity is an important element, but physical activity counts as well, said Colin Milner, chief executive officer of the International Council on Active Aging, based in Canada. "Learning a foreign language, juggling, playing ping-pong, you need to engage your mind and your body," he said.

The numbers in the *Lancet* paper "aren't really a great surprise, because people aren't living healthy lives," Milner said. "Look at diabetes. They're predicting a 165 percent increase over the next five to 10 years. You need to be aware of the impact that *not* doing something can have on your mind and body."

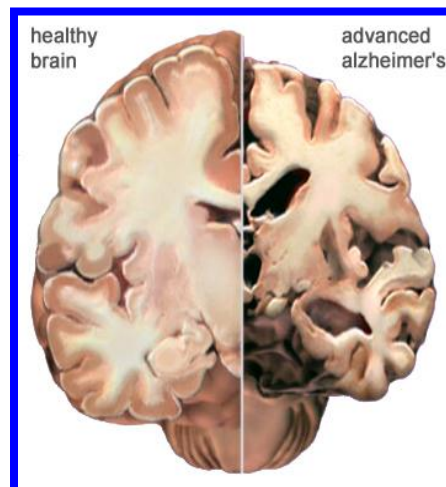
What is the goal of the Neurology Institute?

Primary Prevention. Our goal is to formulate a comprehensive program that helps middle-age and elderly people improve their brain health and achieve optimal cognitive performance. Late-life dementia is multifactorial and prevention strategies require a multi-disciplinary approach. The programs offered by the Neurology Institute formulate the potential risk factors for each individual and then offer him/her a specific “personalized prevention plan.”

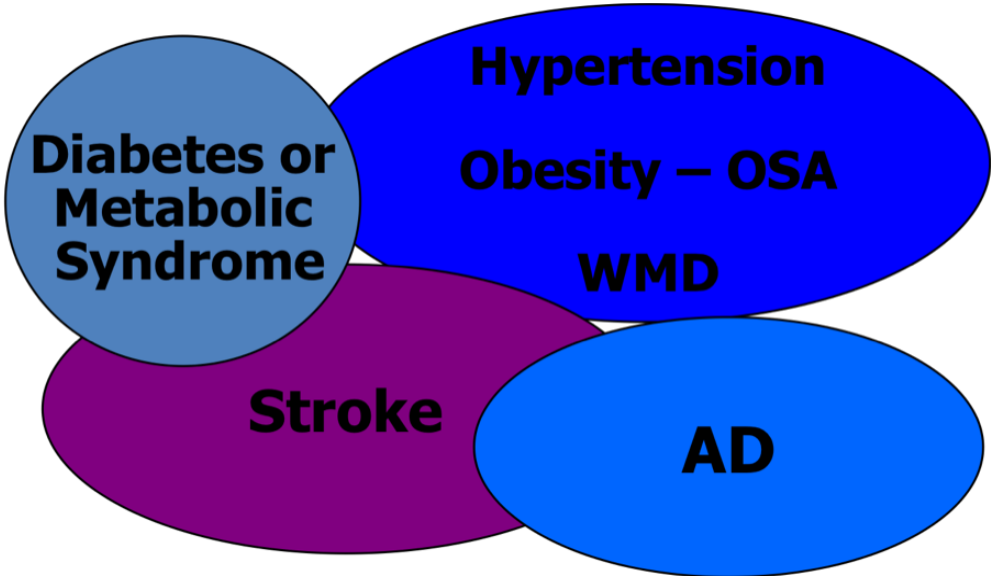


What causes memory loss and Alzheimer's disease?

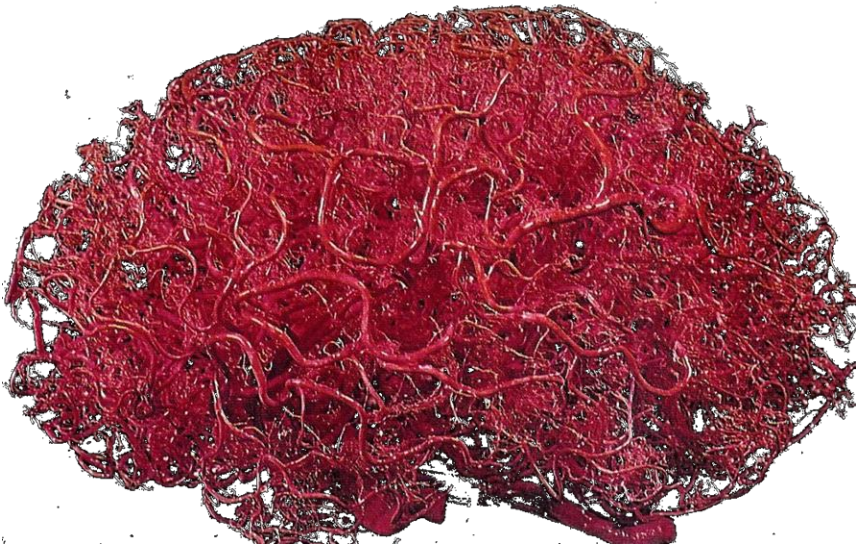
In Alzheimer's disease, as well as with advanced aging, a dozen factors combine to shrink the brain size by more than 30%.



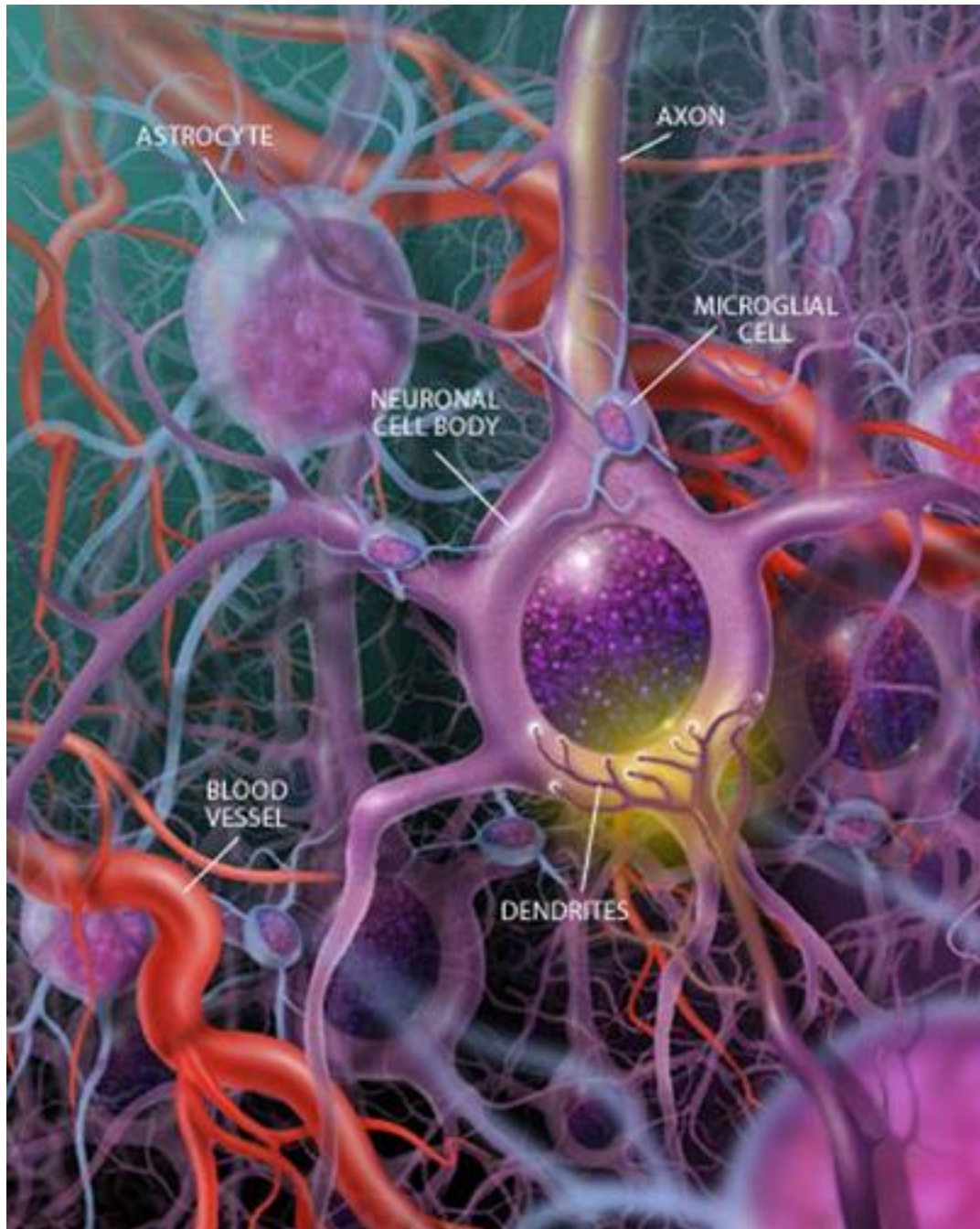
Most recent research studies by Dr. Fotuhi and others confirm that memory loss and confusion in the last decades of life represents a constellation of different pathologies that accumulate in the brain over decades. The specific footprint of Alzheimer’s disease is only one of the many causes of shrinkage in the brain. Other factors strongly associated with brain atrophy that eventually leads to dementia include:



Brain is a highly vascular organ and a continuous supply of adequate oxygen and nutrition is critical for its health and longevity.



As expected, brain cells are highly dependent on an individual's vascular health and optimal cardiac function. Among some of the most active cells anywhere in the body, neurons are extremely sensitive to factors that impair blood flow to the brain.

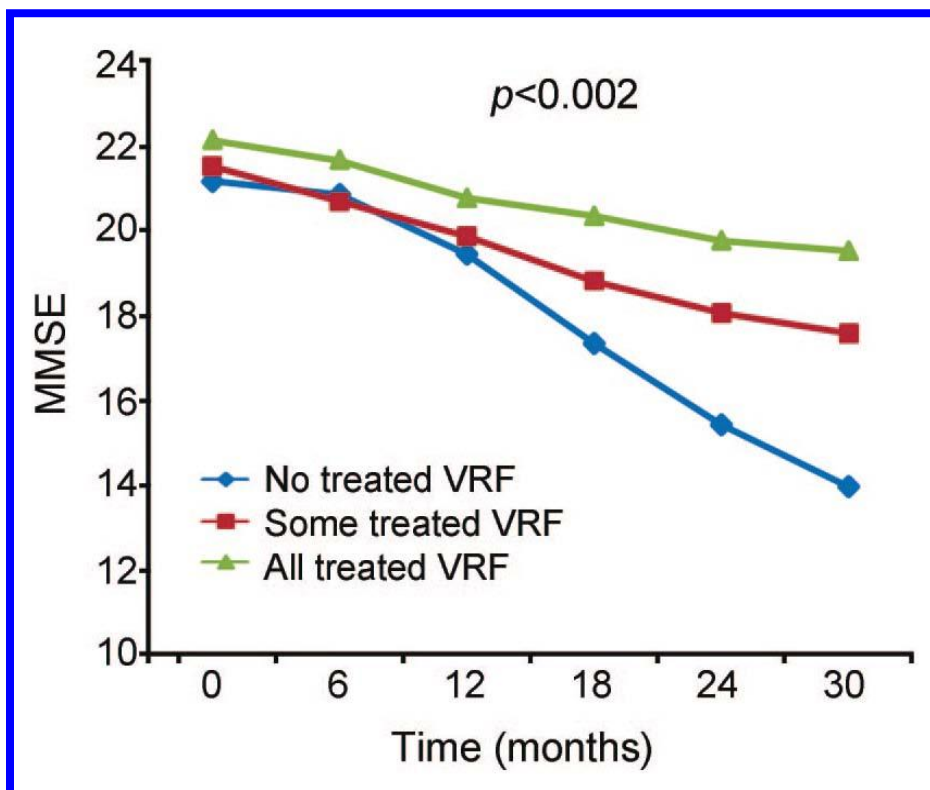


How can we prevent memory loss and late-life Alzheimer's disease?

Factors that improve body fitness and vascular health also improve brain health and reduce the risk of late-life memory loss and Alzheimer's disease. These include:

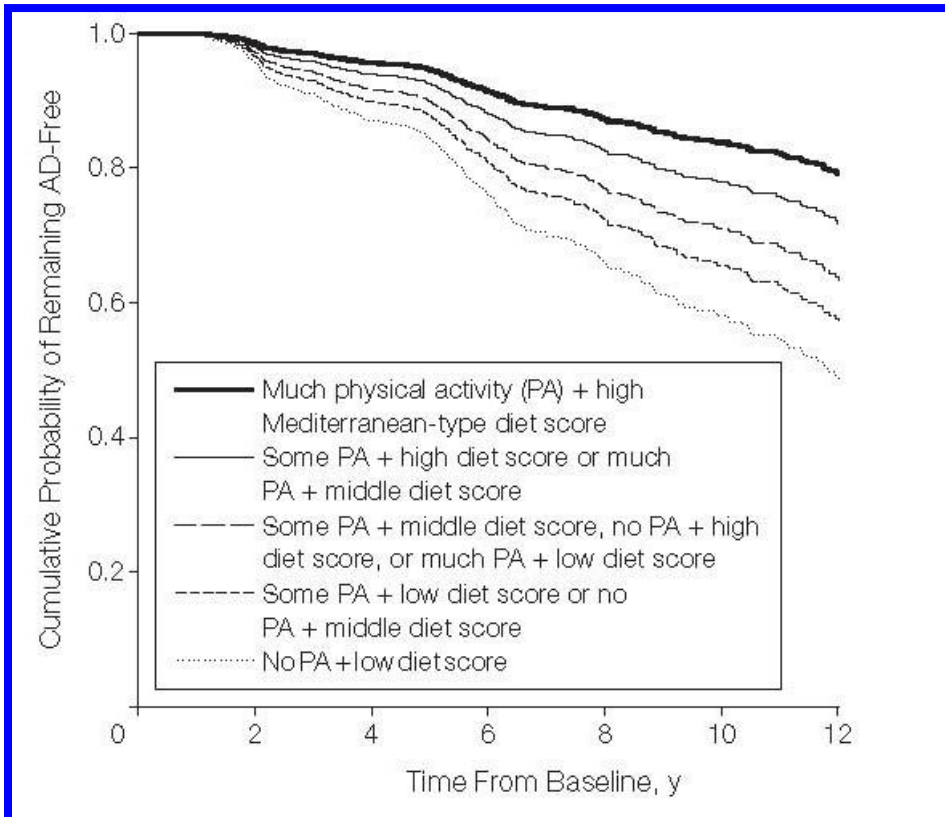
- physical exercise
- Mental/Cognitive exercise
- Meditation
- Nutrition

Even elderly patients who have developed cognitive deficits can slow down their further decline through treating their vascular risk factors (VRF), i.e. blood pressure, obesity, and diabetes. One study showed that patients who did not treat their vascular risk factors declined sharply over a period of 30 months (blue line, compared to treated patients: green line).



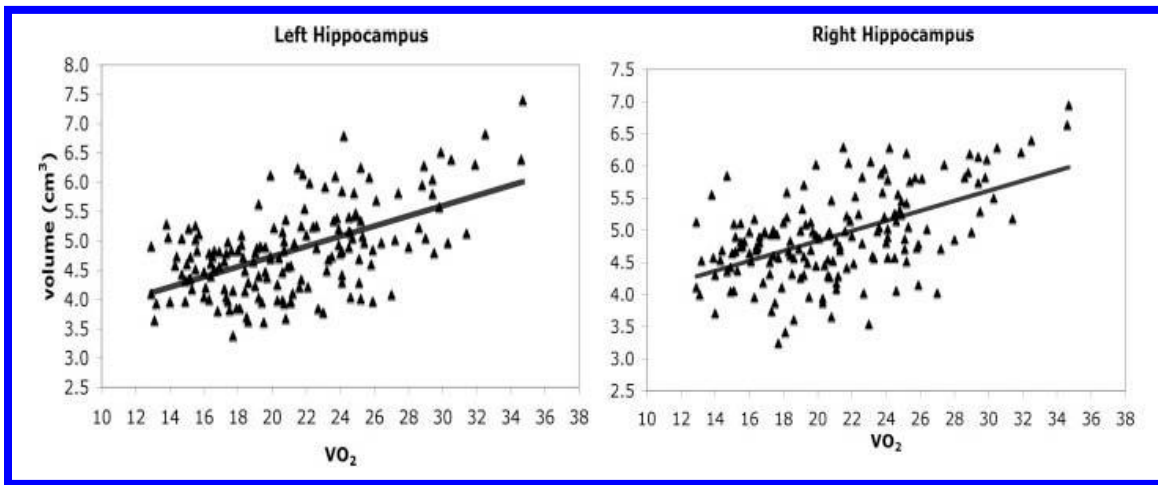
Deschaintre et al., Neurology 73:674–80, 2009

A recent study published in JAMA showed that people who consume a Mediterranean diet AND also exercise often are a lot more likely to remain free of Alzheimer's disease over a period of 12 years (top thick line). Participants who did not engage in any physical activity and did not consume a diet rich in anti-inflammatory and anti-oxidant ingredients declined sharply and were more prone to developing Alzheimer's disease (lowest line).



Scarmeas et al., JAMA 302 (6):627-37, 2009

Exercise and better fitness is associated with increased size of hippocampus and better performance in memory tests. The figure below shows how people who have better fitness have a bigger hippocampus (both on the left and right side).



Erickson et al., Hippocampus 19:1030–9, 2009

A recent study shows that exercise can significantly increase the size of hippocampus, even in three months. Notice the expansion of hippocampus, circled in blue, in top pictures (before exercise) to those in bottom pictures (after three months of exercise).

