

Health

Good Diet, Exercise Keep Brain Healthy

By [LiveScience Staff](#)

posted: 09 July 2008 02:52 pm ET

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A balanced diet and regular exercise can protect the brain and ward off mental disorders, a new review of research states.

"Food is like a pharmaceutical compound that affects the brain," said Fernando Gómez-Pinilla, a UCLA professor of neurosurgery and physiological science, who has spent years studying the [effects of food](#), exercise and sleep on the brain. His round-up of the scientific truth behind the brain-food connection confirms a lot of what has been suggested before.

"Diet, exercise and sleep have the potential to alter our brain health and mental function," he said. "This raises the exciting possibility that changes in diet are a viable strategy for enhancing cognitive abilities, protecting the brain from damage, and counteracting the [effects of aging](#)."

Gómez-Pinilla analyzed more than 160 studies about food's affect on the brain, an analysis published in the July issue of the journal Nature Reviews Neuroscience.

Omega-3s and mental health

Omega-3 fatty acids — [found in salmon](#), walnuts and kiwi fruit — provide many benefits, including improving learning and memory and helping to fight against such mental disorders as depression and mood disorders, schizophrenia, and dementia, said Gómez-Pinilla, a member of UCLA's Brain Research Institute and the Brain Injury Research Center.

Synapses in [the brain](#) connect neurons, and provide critical functions; much learning and memory occur at synapses, Gómez-Pinilla said.

"Omega-3 fatty acids support synaptic plasticity and seem to positively affect the expression of several molecules related to learning and memory that are found on synapses," Gómez-Pinilla said. "Omega-3 fatty acids are essential for normal brain function."

"Dietary deficiency of omega-3 fatty acids in humans has been associated with increased risk of several mental disorders, including attention-deficit disorder, dyslexia, dementia, depression, bipolar disorder and schizophrenia," Gómez-Pinilla said. "A deficiency of omega-3 fatty acids in rodents results in impaired learning and memory."

Children and omega-3s

Children who had increased amounts of omega-3 fatty acids performed better in school, in reading, spelling, and behavior, he said.

Improvement in [school performance](#) was observed in a group of students receiving omega-3 fatty acids, according to preliminary results from a study in England. In another study, 396 children in Australia, ages 6 to 12, who were given a drink with omega-3 fatty acids and other nutrients (iron, zinc, folic acid, and vitamins A, B6, B12 and C) showed higher scores on tests that measured verbal intelligence and learning and memory after six months and one year than a control group of students who did not receive the nutritional drink. This study was also conducted with 394 children in Indonesia. The results showed higher test scores in both boys and girls in Australia, but in only girls in Indonesia.

Getting omega-3 fatty acids from food rather than from capsule supplements can be more beneficial, providing additional nutrients, Gómez-Pinilla said.

Scientists are learning which components of omega-3 fatty acids seem to be especially important. One is DHA (docosahexaenoic acid), which is abundant in salmon. DHA, which reduces oxidative stress and enhances synaptic plasticity and learning and memory, is the most abundant omega-3 fatty acid in cell membranes in the brain.

Calorie restriction

Controlled meal skipping or intermittent [caloric restriction](#) might provide health benefits, he said.

Excess calories can reduce the flexibility of synapses and increase the vulnerability of cells to damage by causing the formation of free-radicals. Moderate caloric restriction could protect the brain by reducing oxidative damage to cellular proteins, lipids and nucleic acids, Gómez-Pinilla said.

The brain is highly susceptible to oxidative damage. Blueberries have been shown to have strong antioxidant capacity, he noted. And smaller food portions with the appropriate nutrients seem to be beneficial for the brain's molecules, he said.

Junk food, junk brain

In contrast to the healthy effects of diets that are rich in omega-3 fatty acids, diets with high contents of trans fats and saturated fats adversely affect cognition, studies indicate.

"Junk food" and [fast food](#) negatively affect the brain's synapses, said Gómez-Pinilla, who eats fast food less often since conducting this research.

Brain synapses and several molecules related to learning and memory are adversely affected by unhealthy diets, said Gómez-Pinilla.

Emerging research indicates that when the effects of diet on the brain are combined with the effects from exercise and a good night's sleep, you can strengthen the brain's synapses and provide other cognitive benefits, he added.

He noted that while some people have extremely good genes, most of us are not so lucky, and need a balanced diet, regular exercise and a good night's sleep.

The research was funded by the National Institutes of Health's National Institute of Neurological Disorders and Stroke.