

# Why fish oil is good for you

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It's good news that we are living longer, but bad news that the longer we live, the better our odds of developing late-onset Alzheimer's disease.

Many Alzheimer's researchers have long touted fish oil, by pill or diet, as an accessible and inexpensive "weapon" that may delay or prevent this debilitating disease. Now, UCLA scientists have confirmed that fish oil is indeed a deterrent against Alzheimer's, and they have identified the reasons why.

Reporting in the current issue of the *Journal of Neuroscience*, now online, Greg Cole, professor of medicine and neurology at the David Geffen School of Medicine at UCLA and associate director of UCLA's Alzheimer Disease Research Center, and his colleagues report that the omega-3 fatty acid docosahexaenoic acid (DHA) found in fish oil increases the production of LR11, a protein that is found at reduced levels in Alzheimer's patients and which is known to destroy the protein that forms the "plaques" associated with the disease.

The plaques are deposits of a protein called beta amyloid that is thought to be toxic to neurons in the brain, leading to Alzheimer's. Since having high levels of LR11 prevents the toxic plaques from being made, low levels in patients are believed to be a factor in causing the disease.

Alzheimer's is a debilitating neurodegenerative disease that causes memory loss, dementia, personality change and ultimately death. The national Alzheimer's Association estimates that 5.1 million Americans are currently afflicted with the disease and predicts that the number may

increase to between 11 million and 16 million people by the year 2050.

The researchers examined the effects of fish oil, or its component DHA, in multiple biological systems and administered the oil or fatty acid by diet and by adding it directly to neurons grown in the laboratory.

"We found that even low doses of DHA increased the levels of LR11 in rat neurons, while dietary DHA increased LR11 in brains of rats or older mice that had been genetically altered to develop Alzheimer's disease," said Cole, who is also associate director of the Geriatric Research Center at the Veterans Affairs Medical Center.

To show that the benefits of DHA were not limited to nonhuman animal cells, the researchers also confirmed a direct impact of DHA on human neuronal cells in culture as well. Thus, high levels of DHA leading to abundant LR11 seem to protect against Alzheimer's, Cole said, while low LR11 levels lead to formation of the amyloid plaques.

Fish oil and its key ingredient, omega-3 fatty acids (found in fatty fish like salmon), have been a mainstay of alternative health practitioners for years and have been endorsed by the American Heart Association to reduce the risk of cardiovascular disease.

Fatty acids like DHA are considered "essential" fatty acids because the body cannot make them from other sources and must obtain them through diet. Years of research have shown that DHA is the most abundant essential fatty acid in the brain, Cole said, and that it is critical to fetal and infant brain development. Studies have also linked low levels of DHA in the brain to cognitive impairment and have shown that lower levels may increase oxidative stress in the brains of Alzheimer's patients.

Based on the positive results, the National Institutes of Health is currently conducting a large-scale clinical trial with DHA in patients

with established Alzheimer's disease. For those patients, Cole said, it may be too late in the disease's progression for DHA to have much effect. But he is hopeful that the NIH will conduct a large-scale prevention clinical trial using fish oil at the earliest stages of the disease — particularly because it is unlikely that a pharmaceutical company will do so, since fish oil in pill form is readily available and inexpensive.

Still to be determined, he said, "is what the optimal dose should be. It could be that a smaller amount might be helpful, especially in a place like the south of France, where people are already on a Mediterranean diet."

Here in the United States, though, where fish consumption is not very high, the dose may need to be higher.

"There's a deficiency of DHA to begin with," Cole said, "and this may contribute to the low LR11 seen in many Alzheimer's patients."

Source: University of California - Los Angeles

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