Fran Lowry

November 30, 2011 (Chicago, Illinois) — People who eat baked or broiled fish every week may reduce their risk of developing mild cognitive impairment and Alzheimer's disease, according to research presented here at the Radiological Society of North America (RSNA) 97th Scientific Assembly and Annual Meeting. The finding does not apply to fried fish.

Participants in the Cardiovascular Health Study, a National Heart, Lung, and Blood Institute (NHLBI)-funded observational study of cardiovascular risk factors in adults 65 years and older, who consumed 1 to 4 portions of fish per week showed greater preservation of gray matter volume on magnetic resonance imaging (MRI) in several areas of the brain, compared with participants who did not.

Consumption of fried fish, however, was not protective, said Cyrus Raji, MD, a resident in internal medicine at the University of Pittsburgh Medical Center Mercy Hospital, Pennsylvania.

Dr. Raji's previous work has focused on modifiable lifestyle factors, the brain, and risk for Alzheimer's disease. He and his colleagues have shown that obesity can increase the risk for Alzheimer's disease by inducing brain shrinkage , and at last year's RSNA meeting, he presented data showing how physical activity can protect the brain , reducing the risk for Alzheimer's disease.

In the current study, he and his team assessed the dietary intake of fish in 260 cognitively normal people using the National Cancer Institute Food Frequency Questionnaire, a standardized food survey, at baseline in 1989/90. "This allows us to understand how frequently persons were taking in fish in our study," Dr. Raji said.

They found that 163 patients consumed fish on a weekly basis, and most ate fish 1 to 4 times per week.

About 10 years later, in 1998/99, each subject underwent a 3-dimensional volumetric MRI of the brain. Voxel-based morphometry, a brain mapping technique that measures grey matter volume, was used to model the relation between weekly fish consumption and brain structure at baseline and again 10 years later.

The researchers controlled for a number of confounding factors, including age, sex, race, education, white matter lesions, MRI-identified infarcts, waist/hip ratio, the presence or absence of apolipoprotein E4 (a gene that increases the risk of developing Alzheimer's disease), and physical activity (assessed as the number of city blocks walked in 1 week).

Jeeves Was Right

After accounting for these variables, the researchers found that people who ate baked or broiled fish had larger brain volumes in the hippocampus and frontal lobes, areas of the brain that are important in memory and cognition and that are frequently affected in Alzheimer's disease.

Specifically, consumption of fish at least once per week was positively associated with gray matter volumes in the hippocampus, precuneus, posterior cingulate, and orbital frontal cortex. Greater hippocampal, orbital frontal cortex, and posterior cingulate volumes in relation to fish consumption reduced the risk for 5-year cognitive decline 5-fold ($P = .02$).

There was no statistically significant relation between the consumption of fried fish and brain structure or cognitive decline.

Dr. Raji told *Medscape Medical News* that any kind of fish appears to be protective, as long as it is baked or broiled.

The study's main limitation, he added, is that it relied on self-report to assess fish consumption.

"Omega-3 fatty acids in fish can reduce chronic brain inflammation that can contribute to the development of Alzheimer's," Dr. Raji said, explaining why eating fish could prevent Alzheimer's disease.

"Doctors should tell their patients that eating baked or broiled fish on a weekly basis can lead to a healthier brain and a lower risk for Alzheimer's," he said. "Eating is something every one of us has to do every day to survive. We are faced with healthy or unhealthy dietary selections on a daily basis. By opting for a healthy choice, specifically baked or broiled fish, you may be making your brain healthier. This powerful concept is what we want to convey to the general public."

Max Wintermark, MD, chief of neuroradiology at the University of Virginia in Charlottesville, said that it is interesting that the researchers were able to find a relation between the consumption of fish and altered brain structure and cognitive decline.

"Sometimes you see some changes in imaging, but you don't necessarily know if it translates into something that is relevant for patients. In this study, that seems to be the case," he told *Medscape Medical News*
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Dr. Wintermark added that it is a well-designed study and, as part of the Cardiovascular Health Study, incorporates a "very high-quality" dataset.

"They did a very strong analysis; that being said, it's still 250 patients. I think it needs confirmation. You always have to be a little bit cautious and view these types of results with a little bit of reserve," he said.

On a more philosophical note, Dr. Wintermark added: "In medicine, we do very complex studies, and then what we find is what common sense tells us. Everybody knows it is good for your body to eat fish. So here is science bringing us back to common sense and common knowledge."

Dr. Raji and Dr. Wintermark have disclosed no relevant financial relationships.

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