

# Eating seafood and cognitive decline in older adults

Lynne Shinto, ND, MPH

**WHAT WAS THIS STUDY ABOUT?** In the article “*APOE*  $\epsilon$ 4 and the associations of seafood and long-chain omega-3 fatty acids with cognitive decline,” van de Rest and colleagues examined the connection between the amount of seafood eaten per week and cognitive decline over approximately 5 years in older adults living in retirement communities. The researchers were also interested in learning more about how a gene called *APOE*  $\epsilon$ 4 might influence the effect that seafood consumption has on cognitive decline.<sup>1</sup> The community-based study was designed to better understand changes in thinking and motor abilities and the risk of Alzheimer disease (AD) in older adults. The study was called the Rush Memory and Aging Project or MAP.<sup>2</sup>

In 2015, 46.8 million people worldwide had dementia, and this number is expected to double every 20 years. AD is the most common type of dementia.<sup>3</sup> There is currently no proven therapy that can prevent or cure AD, so it is important to understand and identify factors that might prevent or delay the onset of AD and other dementias. Researchers are interested in the fats contained in fish and seafood. These fats are called omega-3 fatty acids. These fats are of interest to researchers because the brain contains a high amount of omega-3 fatty acids. It is also known that these fatty acids are needed for a healthy brain. With aging, these fatty acids may decrease, so keeping healthy levels of them in the brain may prevent or delay cognitive decline. The *APOE*  $\epsilon$ 4 gene is involved in moving cholesterol to cells, including brain cells. This gene may also have an effect on how omega-3 fatty acids are moved into brain cells. People who have the *APOE*  $\epsilon$ 4 gene have an increased risk of AD. Those over age 65 are at the highest risk for AD.

**WHO WERE THE PARTICIPANTS?** The participants were older adults without dementia in the MAP study whose information was collected every year for about 4.9 years. The average age of this group was 81.4 years and about 75% were women. The MAP study followed the same group of people who lived in retirement communities in the Chicago area from 2004 to 2013. Every year, they filled out a survey about their diet. Researchers also gave them tests to rate their thinking ability. The diet survey asked about eating things like tuna fish sandwiches, fish sticks or fish

cakes, fresh fish, and shellfish like shrimp, crab, or lobster. Complete information from 915 participants on diet, thinking ability, and the *APOE*  $\epsilon$ 4 gene was used to produce the study results.

**WHAT WERE THE RESULTS?** This study showed that older adults without dementia who eat one or more servings of seafood per week have less cognitive decline than those who eat less than one serving of seafood per week. The study showed that seafood consumption was related to 2 specific areas of brain function. One of these areas was the ability to remember facts, like knowing the names of different types of animals. This is important for clear communication. The other area was the ability to learn and process new information. This is important in difficult decision-making during tasks like driving. The researchers did not see an effect on overall cognitive function. A smaller group of participants reported taking fish oil supplements (17.5% of the total participants). They had less decline in overall cognitive function and “episodic memory” than those who did not supplement with fish oil. Episodic memory involves the ability to remember specific events, like where you parked your car or your wedding day. The researchers saw a similar and bigger effect in those participants that had the *APOE*  $\epsilon$ 4 gene (19.5% of the total participants). Because this *APOE*  $\epsilon$ 4 effect has not been seen in other studies, the researchers noted that more studies need to be done to better understand how this gene influences the protective effect of eating seafood.

**WHY IS THIS STUDY IMPORTANT?** The study shows that older adults who reported eating at least one serving of seafood a week had less decline in specific thinking skills than those who ate little or no seafood. In addition, those who reported supplementing with fish oils showed less decline in overall thinking skills. Those people with the *APOE*  $\epsilon$ 4 gene seemed to benefit the most. How the *APOE*  $\epsilon$ 4 gene influences these effects remains unclear and needs further study. Earlier studies of dietary seafood have focused on overall thinking function. This study is important because it examines specific areas of cognitive function. This study simply tried to show whether there was a connection between seafood intake and cognition. The next step would be to study whether giving older people

diets high in omega-3 fatty acids or fish oil supplements protects them from cognitive decline compared to a placebo group on a “normal” diet.

## REFERENCES

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# About dementia

Lynne Shinto, ND, MPH

**WHAT IS DEMENTIA?** Dementia is a disorder of thinking ability or a decline in mental ability that affects a person's daily life. Dementia is not a specific disease. Rather, it describes a range of symptoms. Common symptoms of dementia are described in the list below.

- Loss of memory, especially for recent events. Examples would be forgetting a doctor's appointment or other important dates and events. An example of more severe memory loss would be not recognizing close family members or close friends.
- Trouble with language, including written and spoken communication. Examples would be calling common objects the wrong name or not being able to complete sentences because of not being able to find the correct word.
- Confusion and impaired orientation. Examples would be not knowing how to get to familiar places near home or not knowing the day, year, or season.
- Changes in mood or personality. Examples would be depression or sadness in a person who is normally happy, or an outgoing and social person becoming more withdrawn and antisocial.
- Apathy or loss of interest in activities that a person once enjoyed.
- Poor reasoning, decision-making, and judgment. An example would be giving away large sums of money to a telemarketer.
- Difficulty in doing familiar tasks. Examples would be trouble making meals, cleaning the house, or using common household items like a TV remote control or microwave oven.
- Impaired visual perception. Examples would be difficulty judging distance or determining colors. These changes might affect driving ability.

An isolated decline in memory that does not affect a person's normal daily function is not considered dementia.

There are many types of dementia. The most common type is Alzheimer disease, which accounts for 60%–80% of all dementias. Other types include vascular dementia (commonly known as "poststroke" dementia), Lewy body dementia, mixed dementia (with components of all 3), and frontotemporal dementia. Frontotemporal dementia is fairly rare

and is different in that behavior and emotional changes are more obvious than memory decline.

**WHAT CAUSES DEMENTIA?** Dementia results from damage to the brain that affects the way brain cells communicate with each other. This causes impaired thinking ability. Different types of dementia produce brain cell injury in different ways.

The cause of Alzheimer disease is still unclear. Two proteins called  $\beta$ -amyloid and tau build up in the brain and contribute to nerve cell damage and death. However, the relationship between the amount of these proteins in the brain and the degree of thinking problems does not always match. Vascular dementia is caused by injury to the blood vessels that supply oxygen and nutrients to the brain. Vessels can be injured by a single stroke or multiple small strokes. Lewy bodies are protein deposits in nerve cells that can result in cognitive and motor impairment in Lewy body dementia. The exact cause of frontotemporal dementia is not known. In this dementia brain cell loss causes shrinkage in the frontal and temporal areas of the brain.

**HOW IS DEMENTIA DIAGNOSED?** Dementia is diagnosed by a doctor who will take a careful history from the patient and a family member or close friend. The doctor will assess thinking ability by administering tests. Blood tests and brain scans are often used to rule out other possible causes of thinking problems.

**ARE THERE PREVENTIVE MEASURES?** Preventive measures for the 2 most common dementias, Alzheimer disease and vascular dementia, include being physically active, not smoking, and managing blood pressure, cholesterol, and blood sugar through diet and/or medications.

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[www.nia.nih.gov/alzheimers/topics/other-dementias](http://www.nia.nih.gov/alzheimers/topics/other-dementias)

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