

MIND and Mediterranean diets associated with fewer Alzheimer's plaques and tangles

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People who eat diets rich in green leafy vegetables as well as other vegetables, fruits, whole grains, olive oil, beans, nuts and fish may have fewer amyloid plaques and tau tangles in their brain—signs of

Alzheimer's disease—than people who do not consume such diets, according to a study published in the March 8, 2023, online issue of *Neurology*.

The study examined how closely people followed the MIND and Mediterranean diets. While similar, the Mediterranean diet recommends vegetables, fruit, and three or more servings of fish per week while the MIND diet prioritizes green leafy vegetables like spinach, kale and collard greens along with other vegetables. The MIND diet also prioritizes berries over other fruit and recommends one or more servings of fish per week. Both the MIND and Mediterranean diet recommend small amounts of wine.

While this study shows an association of regularly consuming these diets with fewer Alzheimer's disease plaques and tangles, it does not establish a cause and effect relationship.

"These results are exciting—improvement in people's diets in just one area—such as eating more than six servings of green leafy vegetables per week, or not eating fried foods—was associated with fewer amyloid plaques in the [brain](#) similar to being about four years younger," said study author Puja Agarwal, Ph.D., of RUSH University in Chicago.

"While our research doesn't prove that a [healthy diet](#) resulted in fewer brain deposits of amyloid plaques, also known as an indicator of Alzheimer's disease, we know there is a relationship and following the MIND and Mediterranean diets may be one way that people can improve their brain health and protect cognition as they age."

The study involved 581 people with an average age of 84 at the time of diet assessment who agreed to donate their brains at death to advance research on dementia. Participants completed annual questionnaires asking how much they ate of [food items](#) in various categories.

The participants died an average of seven years after the start of the study. Right before death, 39% of participants had been diagnosed with dementia. When examined after death, 66% met the criteria for Alzheimer's disease.

At autopsy, researchers examined participants' brains to determine the amounts of [amyloid plaques](#) and [tau tangles](#). Both are found in the brains of people with Alzheimer's disease but may also be found in the brains of older people with normal cognition. Researchers then looked back at the food questionnaires which were collected during follow-up and ranked the quality of diet for each person.

For the Mediterranean diet, there were 11 food categories. Participants were given a score of zero to 55, with higher scores if they adhered to the diet in these categories: whole grain cereals, fruits, vegetables, legumes, olive oil, fish and potatoes. They were given lower scores if they ate red meat, poultry and full-fat dairy products.

For the MIND diet, there were 15 categories. Participants were given a score of zero to 15, with one point each for 10 brain-healthy food groups including green leafy vegetables, other vegetables, nuts, berries, beans, whole grains, fish, poultry, [olive oil](#), and wine. They lost a point if they ate foods more than recommended in five unhealthy food groups, including red meats, butter and margarine, cheese, pastries and sweets, and fried and fast food.

Researchers then divided participants into three groups for each diet and compared those in the highest groups to those in the lowest groups. For the Mediterranean diet, people in the highest group had an average score of 35 while those in the lowest group had an average score of 26. For the MIND diet, the highest group had an average score of 9 while the lowest group had an average score of 6.

After adjusting for age at death, sex, education, total calorie intake and whether people had a gene linked to a greater risk of Alzheimer's disease, researchers found people who scored highest for adhering to the Mediterranean diet had average plaque and tangle amounts in their brains similar to being 18 years younger than people who scored lowest. Researchers also found people who scored highest for adhering to the MIND diet had average plaque and tangle amounts similar to being 12 years younger than those who scored lowest.

A MIND diet score one point higher corresponded to typical plaque amounts of participants who were 4.25 years younger in age.

When looking at single diet components, researchers found people who ate the highest amounts of green leafy vegetables, or seven or more servings per week, had plaque amounts in their brains corresponding to being almost 19 years younger than people who ate the fewest, with one or fewer servings per week.

"Our finding that eating more [green leafy vegetables](#) is in itself associated with fewer signs of Alzheimer's disease in the brain is intriguing enough for people to consider adding more of these vegetables to their [diet](#)," said Agarwal. "Future studies are needed to establish our findings further."

A limitation of the study was that participants were mostly white, non-Hispanic, and older, so the results cannot be generalized to other populations.

More information: Puja Agarwal et al, Association of Mediterranean-DASH Intervention for Neurodegenerative Delay and Mediterranean Diets With Alzheimer Disease Pathology, *Neurology* (2023). DOI: 10.1212/WNL.0000000000207176

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