

## Vegetable Consumption Slows Rate of Cognitive Decline **CME**

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October 24, 2006 — A study has shown an association between slowed cognitive decline and vegetable consumption.

Individuals who consumed at least 2.8 servings of vegetables per day slowed their rate of cognitive decline by roughly 40% compared with those who consumed less than 1 serving per day — a decrease that is equivalent to about 5 years of younger age.

"We found green leafy vegetables had the strongest association to slowed rate of cognitive decline and while we are not sure of the reason, some of our analyses suggest it may be due to dietary vitamin E in vegetables," principal investigator Martha Clare Morris, ScD, of Rush University Medical Center in Chicago, told Medscape.

The study appears in the October 24 issue of *Neurology*. The study included 3718 participants from the Chicago Health and Aging Project (CHAP), a 1993-2002 cohort study of residents aged 65 years and older from the south side of Chicago.

### **Is Vitamin E Responsible?**

Study data, including completion of a food frequency questionnaire and at least 2 of 3 cognitive function tests at baseline and 3- and 6-year follow-up periods, were collected.

According to the study, the mean cognitive score at baseline for the analyzed cohort was 0.18, and the overall mean change in score per year was a decline of 0.04 standardized units.

When adjusted for age, sex, race, and education, the rate of cognitive decline in individuals in the fourth quintile, who averaged 2.8 servings of vegetables per day, was slower by 0.019 standardized units per year compared with those with the lowest vegetable intake, which averaged 0.9 servings per day.

"At this point we can only speculate but when we controlled for vitamin E the relationship between vegetable consumption and a protective effect [on the brain] was no longer statistically significant," Morris said.

In addition, Dr. Morris said, vegetables are typically consumed with added fats, including salad dressings, mayonnaise, margarine, or butter, which increase vitamin E absorption and other fat-soluble antioxidant nutrients, such as carotenoids and flavonoids.

### **No Fruit Effect**

Dr. Morris said fruit consumption was not associated with a slowed decline in cognitive functioning — a finding that warrants further investigation.

"We know from previous animal studies that berries in particular, which are rich in antioxidants, have a protective effect on the brain. But it is difficult to measure this effect in a population-based study because berry consumption is simply not that frequent in the general population," Dr. Morris said.

While the results of the study are promising and suggest consumption of vegetables, including green leafy, yellow, and cruciferous types, may protect against age-related cognitive decline, more research is required.

Dr. Morris said her team plans to look at the consumption of vegetables in relation to the development of Alzheimer's disease. In addition, she said, they would like to gain a clearer understanding of the impact of fruit consumption on the brain.

"This is a very new field and to my knowledge there's really only been a handful of studies that have explored the effect of fruit and vegetable consumption on the human brain. We're not ready to make a recommendation that consumption of vegetables and fruits can protect the brain from cognitive decline. However, these results may offer patients one more reason to eat their veggies," Dr. Morris said.

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## Clinical Context

Antioxidants have been extensively studied for their effects on cognitive decline and dementia. A previous study by the current researchers, which was published in the July 2002 issue of the *Archives of Neurology*, found that intake of vitamin E reduced the rate of cognitive decline. Moreover, vitamin E was protective in terms of total intake as well as intake from foods. However, neither vitamin C nor beta-carotene intake was found to significantly affect the rate of cognitive decline.

The current study examines this same patient cohort to determine if consumption of fruits and vegetables, both of which are rich in antioxidants, may reduce the rate of cognitive decline among older adults.

## Study Highlights

- Study subjects were adults older than the age of 65 years who lived in one area of Chicago. Participants underwent assessment at baseline with a 139-item, validated food frequency questionnaire as well as a battery of 4 measures of cognition. Cognitive testing was repeated at 3 and 6 years following baseline testing.
- The current study focuses on subjects who completed at least 2 assessments of cognitive function. The main study outcome was the effect of fruit and vegetable consumption on the rate of cognitive decline. This result was adjusted for possible confounders affecting cognitive decline, including age, educational level, cognitive and physical activity, smoking, alcohol consumption, and medical illnesses.
- 3718 subjects were followed up for a mean of 5.5 years. The mean baseline age of participants was 74.3 years, and 62% of subjects were female. 60% of the cohort was black. Generally, compared with all subjects interviewed at baseline, the present study cohort was slightly younger and had better cognitive function.
- The mean cognitive score declined by 22.2% per year. The average daily consumption of fruits and vegetables was 4.5 servings.
- Combined fruit and vegetable intake failed to significantly affect the rate of cognitive decline.
- The rate of cognitive decline was reduced by 38% in comparing the first and fifth quintiles of vegetable intake, a significant result. Comparing all quintiles, a significant inverse trend was noted between vegetable consumption and the rate of cognitive decline. Older subjects experienced the greatest benefit with regard to vegetable consumption and the rate of cognitive decline.
- Fruit consumption had negligible effects on the rate of cognitive decline.
- The main study findings were unchanged when excluding subjects who had poor cognitive function at baseline and when adjusting for the use of vitamin supplements. However, the effects of vegetable intake were rendered insignificant when adjusting for the total intake of vitamin E, suggesting that consumption of vitamin E was a principal factor in the positive outcomes associated with vegetable intake.
- All classes of vegetables, except legumes, were found to reduce the rate of cognitive decline, with green leafy vegetables associated with the most profound effect.
- Previous research has demonstrated that intake of vitamin E reduced the rate of cognitive decline among older adults, whereas consumption of vitamin C and beta-carotene did not.
- In the current study, consumption of vegetables, but not fruits, reduced the rate of cognitive decline among older individuals. Green leafy vegetables had the most significant effect on the rate of cognitive decline.

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