

Folate and B12 may influence cognition in seniors

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Folate and vitamin B12, two important nutrients for the development of healthy nerves and blood cells, may work together to protect cognitive function among seniors, reports a new epidemiological study from the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University (USDA HNRCA).

According to Martha Savaria Morris, PhD, epidemiologist at the USDA HNRCA, "we found a strong relationship between high folate status and good cognitive function among people 60 and older who also had adequate levels of vitamin B12." The study, published in the January 2007 issue of the *American Journal of Clinical Nutrition*, also determined that low vitamin B12 status was associated with increased cognitive impairment.

Using data collected from the National Health and Nutrition Examination Survey (NHANES) between 1999 and 2002, Morris and colleagues found that people with normal vitamin B12 status and high serum folate, which is a measure of folate in the blood, had higher scores on a test of cognitive function. Blood tests were used to determine folate and vitamin B12 levels, and the cognitive function test assessed aptitudes such as response speed, sustained attention, visual spatial skills, associative learning, and memory. Cognitive impairment was identified when a subject fell into the bottom 20th percentile of the distribution on the test.

"People with normal vitamin B12 status performed better if their serum

folate was high," explains Morris, corresponding author of the study. "But for people with low vitamin B12 status, high serum folate was associated with poor performance on the cognitive test." Seniors with low vitamin B12 status and high serum folate were also significantly more likely than seniors in other categories to have anemia, a condition caused by reduced amounts of hemoglobin in oxygen-carrying red blood cells, or by a deficiency in the number or volume of such cells.

"For seniors, low vitamin B12 status and high serum folate was the worst combination," says Morris. "Specifically, anemia and cognitive impairment were observed nearly five times as often for people with this combination than among people with normal vitamin B12 and normal folate." Vitamin B12 deficiency, which affects many seniors due to age-related decreases in absorption, can impact the production of DNA needed for new cells, as well as neurological function.

Vitamin B12 is normally consumed in meat, fish, poultry, eggs, and dairy products, and folate is found in leafy green vegetables, citrus fruits, and beans. Although folate occurs naturally in many foods, the U.S. Food and Drug Administration in 1998 required that all enriched cereal-grain products be fortified with folic acid, the synthetic form of folate, in order to help prevent birth defects in infants.

Morris notes that the study's results are inconsistent with the idea that high folate status delays detection of vitamin B12 by masking one of its key signs: anemia. "When folate fortification was considered, opponents raised the possibility that because more folate might mask anemia, many cases of vitamin B12 deficiency would go undetected, causing people with the condition to suffer neuropsychiatric consequences. But in our study, the people with low vitamin B12 who also had high serum folate were more likely to exhibit anemia and cognitive impairment than subjects with low vitamin B12 status and normal serum folate. So although having high serum folate had an impact on cognitive function

in our study, it did not cure anemia, as opponents of food fortification have suggested."

Senior author Jacob Selhub, PhD, director of the Vitamin Metabolism Laboratory at the USDA HNRCA and professor at the Friedman School, says, "Our findings support the often-expressed idea that many seniors would benefit from more folate, but the research shows that we must look at the effects this would have on seniors with age-related vitamin B12 deficiency, who may be more numerous than once realized. There are also indications that too much folic acid and too little B12 is a general phenomenon that affects other systems in the body, and might be a factor in some other diseases."

As with any epidemiological study, Morris cautions that the results show association and not causation. She also notes that because the study only measured levels of total folate in the blood, it is uncertain whether the results were due to unmetabolized folic acid in the body. "We encourage further studies of these relationships and their underlying mechanisms," write Morris and her colleagues at Tufts. "We hope our findings both inform the continuing debate about folic acid fortification and influence future efforts to detect and treat low vitamin B12 status among seniors."

Source: Tufts University

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