



VITAMINS / SUPPLEMENTS

## Slowing Brain Aging With Vitamin B<sub>12</sub>

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An [important study](#) appeared in *JAMA Psychiatry* in June 2016, providing additional evidence that high blood levels of vitamin B<sub>12</sub> can slow the shrinking of the brain that commonly occurs after age 60. Previous studies have shown that vitamin B<sub>12</sub> and other B vitamins (folic acid and vitamin B<sub>6</sub>) can slow the rate of brain atrophy in older subjects with mild cognitive impairment and decrease the risk of progression to Alzheimer's disease.

Overall, the emerging evidence suggests if you can slow or prevent the shrinking of the brain, which is common after age 60, you may decrease your risk of dementia and Alzheimer's disease quite substantially.

The latest study presented data from the Swedish National Study on Aging and Care. The study followed 501 subjects, ages 60 years and older, from 2001-2009. All subjects were free of dementia at the beginning of study. MRI imaging of their brains were conducted in 299 of the subjects routinely during the six-year follow-up period. Results showed individuals with higher blood levels of vitamin B<sub>12</sub> showed a significant decrease in the rate of total brain tissue volume loss (atrophy) compared to individuals with lower blood levels of B<sub>12</sub>.

### Understanding the B<sub>12</sub> / Homocysteine Connection

Vitamin B<sub>12</sub> is required to make a number of brain neurotransmitters and has been shown to have neuroprotective effects, which may directly slow brain shrinking. It also lowers a chemical in the blood called homocysteine. High homocysteine is known to be extremely damaging to the brain and cerebrovascular blood vessels, and high blood levels of homocysteine are strongly correlated with brain atrophy and risk of Alzheimer's disease in many studies.



In the *JAMA Psychiatry* study, higher homocysteine also was linked to more rapid brain volume shrinkage. So, there are at least two ways by which vitamin B<sub>12</sub> may slow brain shrinking - by directly preventing loss of brain cells and by lowering homocysteine blood levels.

What's more, study participants with lower vitamin B<sub>12</sub> levels and/or high homocysteine levels also showed increased white matter hyperintensity (WMI) on their MRI scans, which is strongly tied to increased risk for cognitive decline and other mental health disorders.

#### Why Preventing Brain Shrinkage Matters

These studies are important because we know mild cognitive impairment (MCI) is the step that precedes development of Alzheimer's disease.<sup>1</sup> We also know people older than age 60 who do not have MCI still have a brain shrinkage rate of 0.5 percent a year; while people with MCI have a brain shrinkage rate of 1 percent - double that of someone with no cognitive decline. Alzheimer's patients show an average brain shrinkage of 2.5 percent per year. Thus, anything that slows brain shrinkage is considered to be an invaluable way to preserve cognition as we age.

#### Other B Vitamins Matter

This brings us to the Oxford Project to Investigate Memory and Aging (OPTIMA study and VITACOG study), for which researchers recruited 172 individuals older than age 70 who already had MCI. They gave half the subjects folic acid (800 mcg), vitamin B<sub>12</sub> (500 mcg) and vitamin B6 (20 mg) per day for two years; the other half received a placebo pill. B-vitamin supplementation slowed brain atrophy by

30 percent, on average, and in some cases up to 53 percent. [Cognitive tests](#) showed that the greater the rate of brain atrophy, the more rapid the decline in cognitive function.<sup>2</sup>

### Take-Home Points

The overall evidence suggests slowing brain atrophy is an important feature of maintaining cognitive function with aging. Thus far, only B-vitamin supplementation has been able to show this effect in human clinical intervention studies. No drugs have been able to do this, at least not this dramatically.

I think preventing total brain atrophy as we age is a fascinating area that is strongly linked to a patient's healthy life expectancy and quality of life, so I believe it is a topic to discuss with all patients 60 years and older. As such, simple blood tests to determine homocysteine, vitamin B<sub>12</sub> and red blood cell folic acid levels, should be undertaken to assess the patient's risk profile. In most cases, these blood levels can be optimized using a simple B-vitamin supplementation regimen.

### References

1. Hooshmand B, et al. Association of vitamin B<sub>12</sub>, folate, and sulfur amino acids with brain magnetic resonance imaging measures in older adults: a longitudinal population-based study. *JAMA Psychiatry*, June 2016;73(6).
2. Smith AD, et al. Homocysteine-lowering by B vitamins slows the rate of accelerated brain atrophy in mild cognitive impairment: a randomized controlled trial. *PLOS One*, September 2010;5(9):e12244.

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