Growth factor in brain tied to slower mental decline

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Older people with higher amounts of a key protein in their brains also had slower decline in their memory and thinking abilities than people with lower amounts of protein from the gene called brain-derived neurotrophic factor, or BDNF, according to a study published in the Jan. 27, 2016, online issue of *Neurology*, the medical journal of the American Academy of Neurology.

"This relationship was strongest among the people with the most signs of Alzheimer's disease pathology in their brains," said study author Aron S. Buchman, MD, of Rush University Medical Center in Chicago and a member of the American Academy of Neurology. "This suggests that a higher level of protein from BDNF gene expression may provide a buffer, or reserve, for the brain and protect it against the effects of the plaques and tangles that form in the brain as a part of Alzheimer's disease."

For the study, 535 people with an average age of 81 were followed until death, for an average of six years. They took yearly tests of their thinking and memory skills, and after death, a neurologist reviewed their records and determined whether they had dementia, some memory and thinking problems called mild cognitive impairment or no thinking and memory problems. Autopsies were conducted on their brains after death, and the amount of protein from BDNF gene expression in the brain was then measured. The participants were part of the Rush Memory and Aging Project and the Religious Orders Study.

The rate of cognitive decline was about 50 percent slower for those in the highest 10 percent of protein from BDNF gene expression compared to the lowest 10 percent. The effect of plaques and tangles in the brain on cognitive decline was reduced for people with high levels of BDNF. In the people with the highest amount of Alzheimer's disease hallmarks in their brains, cognitive decline was about 40 percent slower for people with the highest amount of protein from BDNF gene expression compared to those with the lowest amount.

On average, thinking and memory skills declined by about 0.10 units per year on the tests. Higher levels of protein from BDNF gene expression reduced the effect of plaques and tangles in the brain on cognitive decline by 0.02 units per year.

The researchers found that the plaques and tangles in the brain accounted for 27 percent of the variation in cognitive decline, demographics accounted for 3 percent and BDNF accounted for 2 percent.

Michal Schnaider Beeri, PhD, of the Icahn School of Medicine at Mount Sinai in New York, noted in an accompanying editorial that exercise has been shown to increase levels of BDNF in the blood, but that the relationship between BDNF protein levels in the blood and in the brain is not clear.

"More research is needed to confirm these findings, determine how this relationship between protein produced by BDNF gene expression and cognitive decline works and see if any strategies can be used to increase BDNF in the brain to protect or slow the rate of cognitive decline," said Buchman.

Buchman noted that the study does not prove that BDNF is the cause of a slower rate of cognitive decline; further work is needed to determine if activities which increase brain BDNF gene expression levels protect or slow the rate of cognitive decline in old age.

Provided by American Academy of Neurology