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Increased brain protein levels linked to Alzheimer's

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(PhysOrg.com) -- Elevated levels of a growth protein in the brains of Alzheimer's disease patients is linked to impaired neurogenesis, the process by which new neurons are generated, say researchers at the University of California, San Diego in today's edition of the *Journal of Neuroscience*.

Dr. Eliezer Masliah, professor of neurosciences and pathology in the UC San Diego School of Medicine, and colleagues report that increased levels of BMP6 — part of a family of bone morphogenetic proteins involved in cell signaling and growth — were found in the brains of Alzheimer's patients and in mouse models of the disease.

BMP6 is primarily known to be involved in bone growth and the proliferation of non-neuronal glial cells in developing embryos. Its purpose in adult brains is less clear. "As a growth factor, it might initially be expressed for protective effect, a response to accumulating amyloid plaque proteins in Alzheimer's patients," said first author Leslie Crews, a post-doctoral researcher in Masliah's lab.

But too much BMP6 appears to be increasingly detrimental. Researchers found that levels of BMP6 grew in step with the progression of Alzheimer's disease. "In early stages of AD, there was less protein than there was in later, more advanced stages," said Crews.

Higher-than-normal levels of BMP6 were found in the dentate gyrus of Alzheimer's patients and around characteristic amyloid plaques in the

hippocampus. Both regions of the brain are critical to memory formation and storage.

In cell cultures, the scientists found that BMP6 reduced the proliferation of cells, a discovery that suggests the protein could be a potential therapeutic target. "The next step is to see what happens when we normalize expression of BMP6," said Masliah. "If we can do that, it may possible to impact this part of AD's pathogenesis."

The protein provides an easier target than some molecules, said Crews, because it is secreted and circulates around cells in the brain. "We don't have to figure out how to get it into the brain and into cells," she said.

Co-authors of the study are Anthony Adame, Christina Patrick, Alexandra DeLaney, Emiley Pham and Edward Rockenstein of the Department of Neurosciences at UC San Diego and Lawrence Hansen of the Departments of Neurosciences and Pathology at UC San Diego.

Provided by University of California - San Diego