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Blood protein tied to Alzheimer's brain abnormalities through study

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Scientists are seeking ways to detect the earliest stages of Alzheimer's disease, since harmful changes may be taking place in the brain years before symptoms appear. Now, researchers report that a blood test detecting a specific protein in blood samples from cognitively normal older people may reflect the levels of beta-amyloid protein in the brain — a hallmark of the disease. Supported in part by the National Institutes of Health, the findings may eventually lead to a blood test that helps predict risk for Alzheimer's disease and who may be a good candidate for participating in clinical trials.

Madhav Thambisetty, M.D., Ph.D., of the Intramural Research Program at the National Institute on Aging (NIA), part of the NIH, was the lead author on the study with collaborators from the Institute of Psychiatry at King's College, London, and the Department of Radiology at Johns Hopkins University, Baltimore. The study appears in the Dec. 20, 2010, issue of the *Journal of Alzheimer's Disease*.

"Recent advances in imaging and biomarkers that help track the onset and progression of Alzheimer's disease show promise for early detection of the disease process, and for tracking the effectiveness of early interventions," said NIA Director Richard J. Hodes, M.D. "This is critically important in streamlining and conducting trials more efficiently so that we can find out about possible therapies that much sooner."

Using proteomics technology, a method of studying hundreds of proteins from a small blood sample, the researchers analyzed blood samples of 57

older and symptom-free volunteers to determine whether specific proteins were associated with amyloid burden in the brain. They measured brain amyloid using PET (positron emission tomography) scans with Pittsburgh Compound B, a tracer that binds to amyloid plaques. The volunteers are participating in the NIA's Baltimore Longitudinal Study of Aging (BLSA), America's longest-running scientific study of human aging.

The researchers found the amount of a specific protein called apolipoprotein E, or ApoE, in the blood samples was strongly associated with the level of beta amyloid in the brain. Those with high blood levels of the protein had significantly greater deposits of amyloid in the medial temporal lobe, the region of the brain important to memory function.

"These results are especially intriguing as this protein is made by the APOE gene, the most robust genetic risk factor for late-onset Alzheimer's," Thambisetty said. Late-onset Alzheimer's is the most common form of the disease and occurs around age 65 or later.

He now plans to test these findings in serial blood samples collected every year in BLSA volunteers to determine how changing blood levels of ApoE protein may relate to pathological changes in the brain over time.

"If the results are equally positive, we may be able to develop a blood test that provides a less invasive, inexpensive method that helps to detect the early pathological changes of Alzheimer's disease," he said.

Provided by National Institutes of Health

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