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Study predicts risk of memory loss in healthy, older adults

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The combined results of a genetic blood test and a five-minute functional MRI successfully classified more than three-quarters of healthy older adults, many of whom were destined to develop cognitive decline within 18 months of testing.

John Woodard, Ph.D., associate professor of psychology in the College of Liberal Arts and Sciences and Institute of Gerontology at Wayne State University, is lead author of "Predicting Cognitive Decline in Healthy Older Adults Using fMRI" published in the *Journal of Alzheimer's Disease* (vol. 21, no. 3).

"No one had studied these combinations of tests in such a large sample," Woodard said. The results have strong implications for determining who is most likely to benefit from preventive Alzheimer's disease treatments.

Woodard and his colleagues performed five tests on 78 healthy elders: a structural MRI (sMRI) that measures the size of the hippocampal region of the brain; a functional MRI (fMRI) that shows how the brain is activated during mental tasks; a blood test that identifies the APOE ε4 allele (a known genetic marker for Alzheimer's disease); and two standard neuropsychological tests that measure mood and ability.

The most effective combination of tests to predict near-term cognitive decline was the fMRI and the APOE ε4 test. The APOE ε4 allele alone correctly classified 61.5 percent of participants, but the combination of the ε4 allele and low activity on the fMRI test correctly classified 78.9

percent of participants, including 35 percent who showed significant cognitive decline 18 months post-testing.

Age, years of education, gender and family history of dementia were not accurate predictors of future cognitive decline. Dr. Woodard and his colleagues also found that persons with larger hippocampal volume, greater functional brain activity and no APOE ε4 allele were less likely to demonstrate cognitive decline over the following 18 months.

The APOE and fMRI tests that combined as the best predictors are readily available, not time-consuming, and don't require special skills or effort on the part of the participant.

"Use of these tests could play a major role in development of medications for prevention of Alzheimer's and other dementias," Woodard said. "If we can intervene before people become symptomatic, we might be able to slow the progression of the disease or eliminate it altogether."

Alzheimer's is age-correlated; the older the person, the greater the likelihood the person will display symptoms.

"If we could delay the onset of Alzheimer's disease by five years, we could cut the number of new cases in half," Dr. Woodard said. "If we could delay the onset of Alzheimer's disease by 10 years, we could potentially eliminate the disease completely."

More information: The complete study is available at www.j-alz.com/issues/21/vol21-3.html

Provided by Wayne State University