

Combination of Routine Tests Predicts Risk of Cognitive Decline

DETROIT— 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.

Dr. John Woodard of Wayne State University's Institute of Gerontology and Department of Psychology, is lead author of "Predicting Cognitive Decline in Healthy Older Adults Using fMRI" published in the current *Journal of Alzheimer's Disease*. "No one had studied these combinations of tests in such a large sample," Dr. Woodard said. The results have strong implications for determining who is most likely to benefit from preventative Alzheimer treatments.

Dr. Woodard and his colleagues performed five tests on 78 healthy elders: a structural MRI (sMRI) measured the size of the hippocampal region of the brain, a functional MRI (fMRI) showed how the brain is activated during mental tasks, a blood test identified the APOE ϵ 4 allele (a known genetic marker for Alzheimer's Disease), and two standard neuropsychological tests measured mood and ability.

The most effective combination of tests to predict near-term cognitive decline was the fMRI and the APOE ϵ 4 test. The APOE ϵ 4 allele alone correctly classified 61.5% of participants, but the combination of the ϵ 4 allele and low activity on the fMRI test correctly classified 78.9% of participants, including 35% 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 ϵ 4 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," Dr. 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 they will display symptoms. "If we could delay the onset of AD by five years, we could cut it in half," Dr. Woodard said. "If we could delay it 10 years, we could eliminate the disease altogether."

The complete study, "Predicting Cognitive Decline in Healthy Older Adults Using fMRI," appears in the *Journal of Alzheimer's Disease* (vol. 21, no.3) and at <http://www.j-alz.com/issues/21/vol21-3.html>.

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