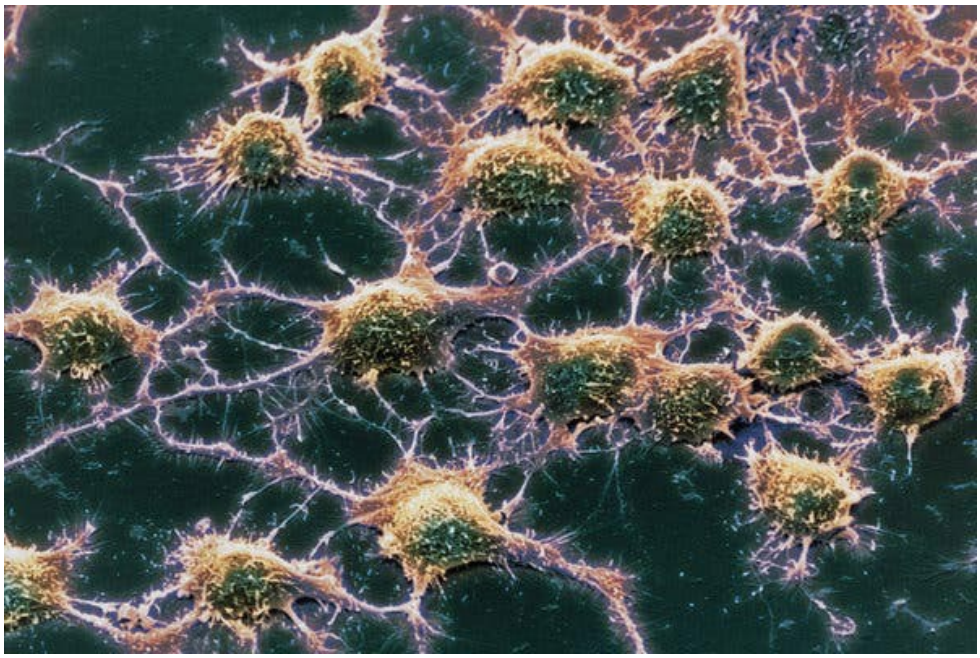
A Blood Test for Alzheimer's? It's Coming, Scientists Report

A test that measures beta amyloid protein in the blood is more accurate than a brain scan and may indicate trouble years earlier.



A colored scanning electron micrograph of neurons genetically engineered to produce amyloid, a protein that forms plaques in the brains of many Alzheimer's patients. Simon Fraser/Science Source

By Gina Kolata

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For decades, researchers have sought a blood test for beta amyloid, the protein that is a hallmark of Alzheimer's disease. Several groups and companies have made progress, and on Thursday, scientists at Washington University in St. Louis reported that they had devised the most sensitive blood test yet.

The test will not be available for clinical use for years, and in any event, amyloid is not a perfect predictor of Alzheimer's disease: Most symptomless older people with amyloid deposits in their brains will not develop dementia.

But the protein is a significant risk factor, and the new blood test identified

patients with amyloid deposits before brain scans did. That will be important to scientists conducting trials of drugs to prevent Alzheimer's. They need to find participants in the earliest stages of the disease.

At present, a diagnosis of Alzheimer's disease is not easy to make. Doctors rely mostly on tests of mental acuity and interviews with the patient and family members. Studies have shown that community doctors are only 50 to 60 percent accurate in diagnosing the condition — about the same as tossing a coin.

Methods that can improve accuracy, like PET scans of the brain, are expensive and often not available.

The new test relies on mass spectrometry, a tool used in analytical chemistry that, with recent technical advances, can find elusive beta amyloid molecules in blood with high precision. The lead investigator, Dr. Randall Bateman, a neurologist at Washington University, has been working on a mass spectrometry test for 20 years.

He and a colleague, Dr. David Holtzman, founded a company ten years ago and licensed patents from their university to commercialize a mass spectrometry test if they ever developed one.

Amyloid is a normal brain protein, formed from the breakdown a much bigger protein. No one knows what its function is. "We don't know if it *has* a function," said Dr. Suzanne Schindler, a neurologist and first author of the new paper. "It might just be a piece of trash."

The idea behind the blood test is somewhat paradoxical: If blood amyloid levels are very low, the patient may well have plaques in the brain. The reason, said Dr. Schindler, is that amyloid is "sticky." As it gets trapped in clumps in the brain, levels dip in the blood.

The new study involved 158 volunteers mostly in their 60s and 70s. Most were cognitively normal. They came to Washington University periodically for tests of memory and reasoning, and received spinal taps and brain scans.

Dr. Schindler and her colleagues used mass spectrometry to test the volunteers' stored blood for beta amyloid. Then they asked if the beta amyloid levels predicted the results of PET scans that the participants received over the years.

Mass spectrometry identified asymptomatic people as accumulating beta amyloid in their brains when PET scans were still negative, the researchers found. The scans only turned up beta amyloid in the brain years later.

The researchers combined the blood test results with other factors known to influence the risk of Alzheimer's disease — age, and the presence or absence of a gene variant, ApoE4 — and found the blood test was 94 percent accurate in predicting the presence of plaques even in mostly asymptomatic people.

There is no treatment for Alzheimer's, and very early diagnosis of any disease can be problematic, since it may not progress. So the first use for this blood test will probably be to screen people for clinical trials of drugs to prevent Alzheimer's disease, said Dr. Michael Weiner, a neurologist at the University of California, San Francisco.

"If you are doing a prevention trial, you are looking for evidence of the disease that is silent," he said.

About a quarter of people in their mid-70s are starting to accumulate amyloid in plaques in their brains, but their memories and reasoning abilities are intact. To identify patients for prevention trials, researchers have to perform a lot of PET scans at a cost about $5,000 each, Dr. Weiner said.

Locating just 1,000 patients for an Alzheimer's prevention trial may cost $25 million in PET scans alone, he estimated. A simple blood test would cost much less. "It's fantastic," Dr. Weiner said.