

New approach could lead to blood test to diagnose Alzheimer's in earliest stage

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Blood offers promise as a way to detect Alzheimer's disease at its earliest onset, Mayo Clinic researchers say. They envision a test that would detect distinct metabolic signatures in blood plasma that are synonymous with the disease—years before patients begin showing cognitive decline. Their study was recently published online in the journal *PLOS ONE*.

Researchers analyzed cerebrospinal fluid and [plasma samples](#) from 45 people in the Mayo Clinic Study on Aging and Mayo Clinic Alzheimer's Disease Center (15 with no [cognitive decline](#), 15 with [mild cognitive impairment](#) and 15 with Alzheimer's disease). They detected significant changes in the cerebrospinal fluid and plasma in those with cognitive decline and Alzheimer's. Most important, changes in plasma accurately reflected changes in the cerebrospinal fluid, validating blood as a reliable source for the biomarker development.

The team uses a relatively new technique called metabolomics, which measures the [chemical fingerprints](#) of metabolic pathways in the cell—sugars, lipids, nucleotides, amino acids and fatty acids—to detect the changes. Metabolomics assesses what is happening in the body at a given time and at a fine level of detail, giving scientists insight into the cellular processes that underlie a disease. In this case, the metabolomic profiles showed changes in metabolites related to mitochondrial function and energy metabolism, further confirming that altered mitochondrial energetics is at the root of the disease process.

The researchers hope that identified changes in the [metabolic pathways](#) could lead to the panel of biomarkers, which can eventually be used on a larger scale for early diagnosis, monitoring of Alzheimer's progression, and evaluating therapeutic approaches, says co-author Eugenia Trushina, Ph.D., a Mayo Clinic pharmacologist.

"We want to use these biomarkers to diagnose the Alzheimer's disease before symptoms appear—which can be decades before people start exhibiting memory loss," Dr. Trushina says. "The earlier we can detect the disease, the better treatment options we will be able to offer."

Provided by Mayo Clinic

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