

New evidence for a blood-based biomarker for Alzheimer's disease

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A potential blood-based biomarker for Alzheimer's and other neurodegenerative diseases seems even more promising thanks to new research from a Massachusetts General Hospital-led study. According to this team's work, neurofilament light chain (NfL) has great potential as a biomarker for early detection of Alzheimer's disease and could be also useful for monitoring treatment response for that condition.

The study was carried out by a team co-led by Yakeel T. Quiroz, Ph.D., Assistant Professor at Harvard Medical School, and Director of the Familial Dementia Neuroimaging Lab at Massachusetts General Hospital (MGH). Their work was published recently in *The Lancet Neurology*.

Additional co-first authors were Henrik Zetterberg, Ph.D., of Sahlgrenska University Hospital in Sweden, and Eric Reiman, MD, from the University of Arizona.

"We wanted to determine the earliest age at which plasma NfL levels could distinguish individuals at

high risk of Alzheimer's," says Quiroz, who is also an MGH Research Scholar 2020-2025.

They found that NfL levels increased with age among people at genetic risk because of a specific mutation (PSEN1 E280A) and began to differentiate carriers from noncarriers at age 22, an average of 22 years before their estimated age of cognitive impairment (age 44).

Neurofilament light chain (NfL) is a biomarker of neurodegeneration—damage to neurons. Measures of NfL concentrations in cerebral spinal fluid (CSF) and blood have been used to detect and track neurodegeneration in individuals with Alzheimer's disease and other brain disorders.

The team used an ultra-sensitive single molecule array immunoassay to measure NfL concentrations in serum and plasma. Earlier studies have shown close correlations between blood-based and CSF measurements in people and animal models of [neurodegenerative diseases](#).

The team studied over 2,000 members of the world's largest kindred with familial Alzheimer's because of a single mutation (PSEN1 E280A)—the familial Alzheimer's disease Colombian kindred, which were aged 8-75 years and had no other neurological or health conditions.

Next they used a single molecule array immunoassay to examine the relationship between plasma NfL concentrations and age to establish the earliest age at which NfL concentrations start to diverge between mutation carriers and non-carriers. The team enrolled 1070 PSEN1 E280A mutation carriers and 1074 non-carriers with baseline assessments.

Plasma NfL measurements increased with age in both groups (p

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