Quanterix®

PUBLICATION BRIEF

Alzheimer's Disease

NEUROLOGY

Simoa® Immunoassays Enable Ultrasensitive Detection of Blood-Based Biomarkers Associated with Alzheimer's Disease

Alzheimer's disease (AD) is a devastating neurodegenerative disorder characterized by memory loss, cognitive decline, and behavioral changes that affects millions of people worldwide. The disease follows a progressive pattern starting with pathophysiological changes occurring in the brain before clinical symptoms, then mild cognitive impairment (MCI) due to AD, followed by dementia. Early detection and accurate diagnosis of AD is critical to improving patient care, developing treatments, and finding a cure. Positron emission tomography (PET) brain imaging and cerebral spinal fluid (CSF) sampling have been established as useful diagnostic tools and can detect AD before symptoms appear in patients. However, these methods are expensive, invasive, and not practical for large-scale research or routine screening of at-risk individuals.

Recent advances in ultrasensitive quantification of AD neurological biomarkers in CSF and blood have opened new avenues for detecting AD associated biomarkers in its early stages. Some of these biomarkers include total tau protein, phosphorylated tau isoforms, amyloid beta 42/40 ratio, neurofilament light chain (NfL), and glial fibrillary acidic protein (GFAP). While CNS-derived protein biomarker concentrations tend to be higher in CSF than in other biofluids, blood-based biomarker detection methods are more practical for routine use. Nonetheless, measuring biomarkers at such low levels requires advanced technology capable of ultra-sensitive measurements.

Quanterix's Simoa® ultrasensitive digital technology can reliably quantify blood-based biomarkers associated with AD at femtogram-level concentrations – far below the standard Lower Limit of Quantification (LLOQ) of typical immunoassays. This technology supports researchers in transforming our understanding of AD pathology, opens new doors for diagnostic and prognostic AD work-up, and has the potential to improve clinical trial design and outcomes.

Solutions to Advance Your Research

OPTIONS OF SIMOA®:

- *Purchase assays for use on the Quanterix SR-X™, or Simoa HD-X™ Analyzer platform*
- *Submit samples to our **Accelerator Laboratory** for analysis*
- *Choose between singleplex and multiplex assay options to measure individual or multiple biomarkers of interest*

BENEFITS OF SIMOA®:

- *Access biomarker data with unparalleled sensitivity and accuracy*
- *Study health and disease with a less invasive approach*
- *Transform the way we detect diseases*
- *Advance scientific understanding of physiological effects, prognosis, and management of AD*

The Quanterix SR-X™:

The first benchtop instrument to offer true multiplex detection at both acute and baseline levels.

The Simoa® HD-X™ Analyzer:

Delivering fully automated biomarker detection you can count on.

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Simoa® Technology Enables Best-in-Class Research to Advance Scientific Breakthroughs in AD

Quanterix's ultrasensitive Simoa® technology offers a non-invasive screening method to facilitate biomarker data generation and assist scientists and clinicians in their research. Below is a curated list of peer-reviewed publications that use Quanterix Simoa® technology in AD research.

Plasma Aβ42/40 ratio, p-tau181, GFAP, and NfL across the Alzheimer's disease continuum: A cross-sectional and longitudinal study in the AIBL cohort
Alzheimers Dement. 2023;19(4):1117-1134
doi:10.1002/alz.12724

Plasma phosphorylated tau181 predicts cognitive and functional decline
Ann Clin Transl Neurol. 2023;10(1):18-31
doi:10.1002/acn3.51695

Two Randomized Phase 3 Studies of Aducanumab in Early Alzheimer's Disease
J Prev Alzheimers Dis. 2022;9(2):197-210
doi:10.14283/jpad.2022.30

Differential diagnostic performance of a panel of plasma biomarkers for different types of dementia
Alzheimers Dement (Amst). 2022;14(1):e12285
doi:10.1002/dad2.12285

Plasma p-tau231, p-tau181, PET Biomarkers, and Cognitive Change in Older Adults
Ann Neurol. 2022;91(4):548-560
doi:10.1002/ana.26308

Clinical and analytical comparison of six Simoa assays for plasma P-tau isoforms P-tau181, P-tau217, and P-tau23
Alzheimers Res Ther. 2021;13(1):198
doi:10.1186/s13195-021-00939-9

P-tau235: a novel biomarker for staging preclinical Alzheimer's disease
EMBO Mol Med. 2021;13(12):e15098
doi:10.15252/emmm.202115098

Differences Between Plasma and Cerebrospinal Fluid Glial Fibrillary Acidic Protein Levels Across the Alzheimer Disease Continuum
JAMA Neurol. 2021;78(12):1471-1483
doi:10.1001/jamaneurol.2021.3671

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