p-tau217

- Predicting brain health in community-dwelling elderly populations by integrating Gaussian mixture model and plasma biomarkers
- The impact of estimated cardiorespiratory fitness on Alzheimer's disease biomarkers and their relationships with cognitive decline
- Comprehensive evaluation of plasma tau biomarkers for detecting and monitoring Alzheimer's disease in a multicenter and multiethnic aging population
- Multimorbidity patterns and blood biomarkers of Alzheimer's disease in community-dwelling cognitively unimpaired older adults
- Plasma p-tau217 predicting brain-wide tau accumulation in preclinical AD
- Timing of Changes in Alzheimer's Disease Plasma Biomarkers as Assessed by Amyloid and Tau PET Clocks
- Prediction of amyloid and tau brain deposition and cognitive decline in people with Down syndrome using plasma biomarkers: a longitudinal cohort study
- Advances in Circulating Biomarkers for Neurodegenerative Diseases, Traumatic Brain Injuries, and Central Nervous System Tumors

Phosphorylated tau (p-tau) is a specific blood biomarker for Alzheimer's disease diagnosis, with p-tau217 considered to have the most utility.

P-tau217, or phosphorylated tau 217, is a specific form of the tau protein that is phosphorylated at the 217th amino acid residue. Tau is a protein that plays a crucial role in the normal functioning of nerve cells by stabilizing microtubules.

Research has shown that measuring levels of phosphorylated tau at specific sites, such as p-tau217, in cerebrospinal fluid or blood may be a potential biomarker for Alzheimer's disease and other tauopathies. Biomarkers like p-tau217 can help in the early detection and diagnosis of these neurodegenerative conditions, as well as in monitoring disease progression and assessing the effectiveness of potential treatments.

The availability of p-tau217 tests for research and clinical use has been limited. Expanding access to this highly accurate AD biomarker is crucial for wider evaluation and implementation of AD blood tests.

Objective: To determine the utility of a novel and commercially available immunoassay for plasma p-tau217 to detect AD pathology and evaluate reference ranges for abnormal amyloid β (Aβ) and longitudinal change across 3 selected cohorts.

Design, setting, and participants: This cohort study examined data from 3 single-center observational cohorts: cross-sectional and longitudinal data from the Translational Biomarkers in Aging and Dementia (TRIAD) cohort (visits October 2017-August 2021) and Wisconsin Registry for Alzheimer's Prevention (WRAP) cohort (visits February 2007-November 2020) and cross-sectional data from the Sant Pau Initiative on Neurodegeneration (SPIN) cohort (baseline visits March 2009-November 2021). Participants included individuals with and without cognitive impairment grouped by amyloid and tau (AT) status using PET or CSF biomarkers. Data were analyzed from February to June 2023.

Exposures: Magnetic resonance imaging, Aβ positron emission tomography (PET), tau PET, cerebrospinal fluid (CSF) biomarkers (Aβ42/40 and p-tau immunoassays), and plasma p-tau217 (ALZpath pTau217 assay).

Main outcomes and measures: Accuracy of plasma p-tau217 in detecting abnormal amyloid and tau pathology, longitudinal p-tau217 change according to baseline pathology status.

Results: The study included 786 participants (mean [SD] age, 66.3 [9.7] years; 504 females [64.1%] and 282 males [35.9%]). High accuracy was observed in identifying elevated Aβ (area under the curve [AUC], 0.92-0.96; 95% CI, 0.89-0.99) and tau pathology (AUC, 0.93-0.97; 95% CI, 0.84-0.99) across all cohorts. These accuracies were comparable with CSF biomarkers in determining abnormal PET signals. The detection of abnormal Aβ pathology using a 3-range reference yielded reproducible results and reduced confirmatory testing by approximately 80%. Longitudinally, plasma p-tau217 values showed an annual increase only in Aβ-positive individuals, with the highest increase observed in those with tau positivity.

Conclusions and Relevance: This study found that a commercially available plasma p-tau217 immunoassay accurately identified biological AD, comparable with results using CSF biomarkers, with reproducible cut-offs across cohorts. It detected longitudinal changes, including at the preclinical stage [1)]

1)

Ashton NJ, Brum WS, Di Molfetta G, Benedet AL, Arslan B, Jonaitis E, Langhough RE, Cody K, Wilson R, Carlsson CM, Vanmechelen E, Montoliu-Gaya L, Lantero-Rodriguez J, Rahmouni N, Tissot C, Stevenson J, Servaes S, Therriault J, Pascoal T, Lleó A, Alcolea D, Fortea J, Rosa-Neto P, Johnson S, Jeromin A, Blennow K, Zetterberg H. Diagnostic Accuracy of a Plasma Phosphorylated Tau 217 Immunoassay for Alzheimer Disease Pathology. JAMA Neurol. 2024 Jan 22. doi: 10.1001/jamaneurol.2023.5319. Epub ahead of print. PMID: 38252443.