

# Early Detection of Alzheimer's Disease Through Blood-Based Biomarkers

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## Abstract

We identify novel blood-based biomarkers for early detection of Alzheimer's disease. Our longitudinal study demonstrates that these biomarkers can predict cognitive decline years before clinical symptoms appear.

## Introduction

Alzheimer's disease affects millions worldwide, with limited treatment options. Early detection is crucial for intervention but currently relies on expensive brain imaging or invasive CSF sampling. Blood-based biomarkers offer a more accessible alternative. We conducted a 5-year longitudinal study of 500 participants, measuring plasma levels of amyloid-beta, tau, and neurofilament light chain. Machine learning models combining these biomarkers achieved 85% accuracy in predicting progression to Alzheimer's dementia. Participants with elevated biomarkers showed cognitive decline 3-5 years before clinical diagnosis. These findings suggest blood tests could enable population-level screening for Alzheimer's risk.