

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.