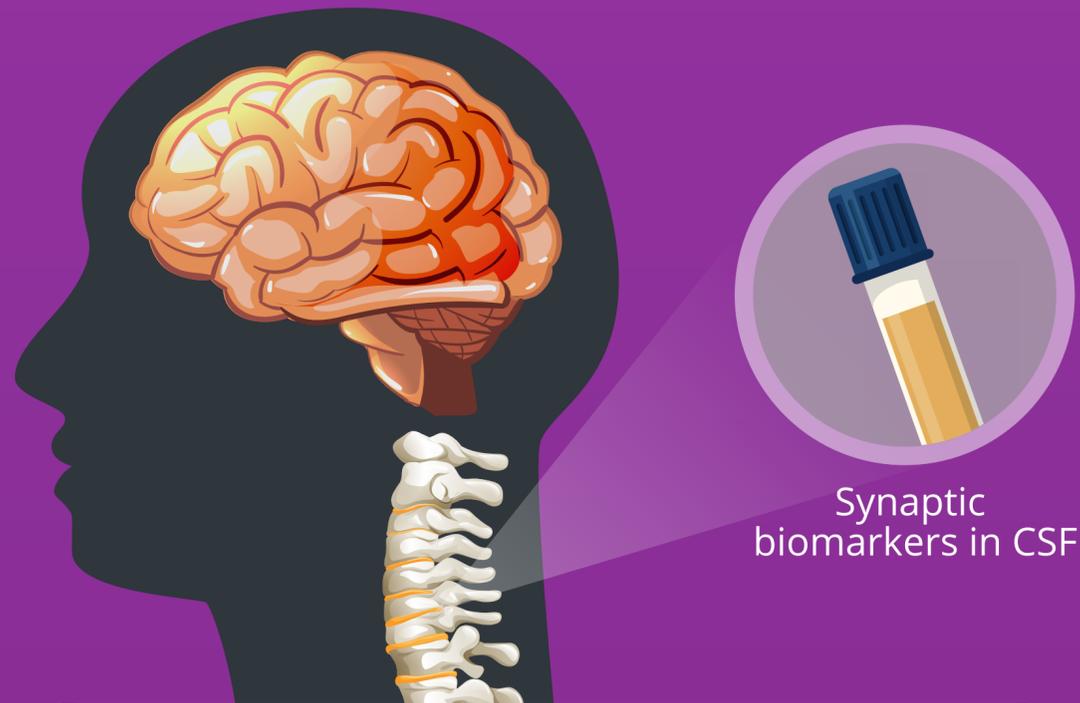


# Synaptic Biomarkers in Early Stage of Alzheimer Disease

Synaptic dysfunction occurs early in Alzheimer disease (AD), and is closely associated with cognitive decline

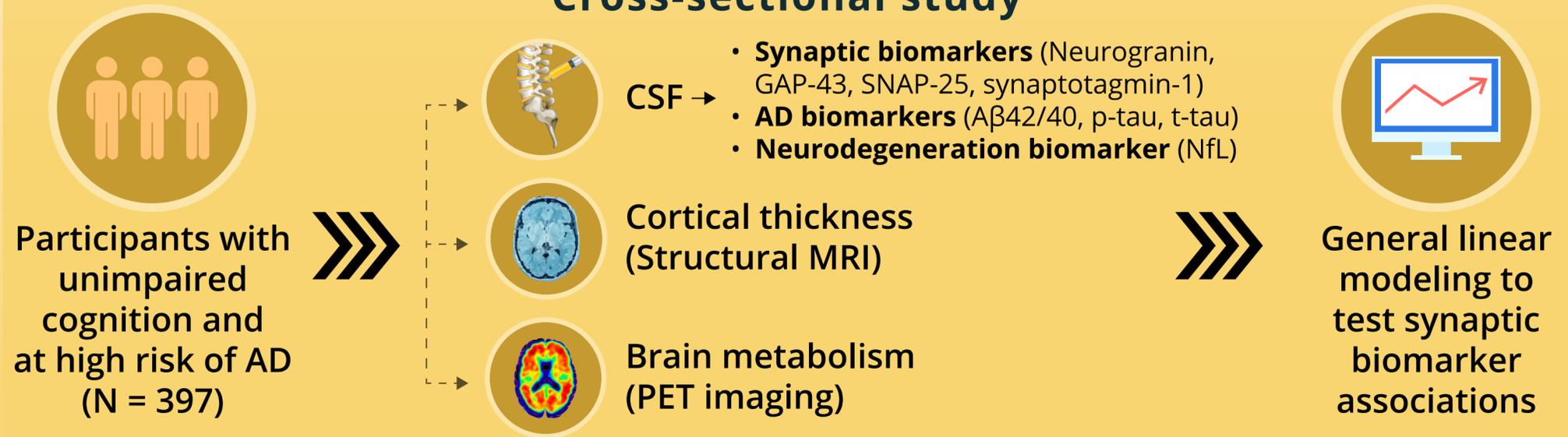
Recent evidence suggests that synaptic cerebrospinal fluid (CSF) biomarkers can discriminate symptomatic AD from other dementias



## Study question

Are synaptic biomarkers altered in preclinical stage of AD?

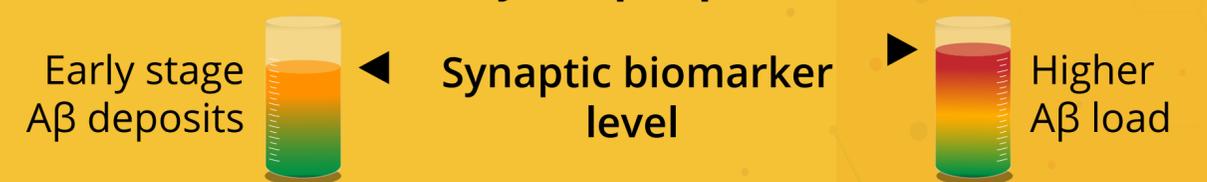
## Cross-sectional study



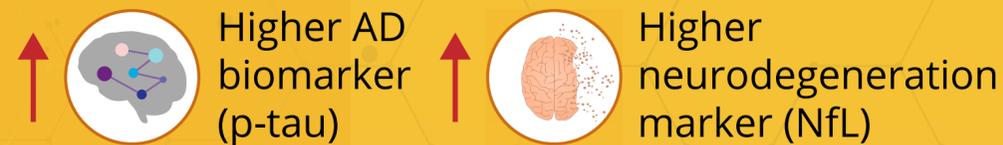
## Synaptic biomarkers increased with age



## Synaptic biomarkers were associated with amyloid $\beta$ (A $\beta$ ) load



## Higher synaptic biomarker levels were associated with



## Higher synaptic biomarker (Neurogranin and GAP-43) levels were associated with



CSF synaptic biomarkers are increased in preclinical stages of AD even with low A $\beta$  burden