

Title: Comparison of diagnostic performance of CSF biomarkers with plasma pTau217 concentrations in predicting clinically diagnosed Alzheimer's disease

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Background

The feasibility of detecting amyloid beta (A β), Ttau, and tau phosphorylated at threonine-181 (pTau181) in CSF makes them valuable biomarkers for Alzheimer's Disease (AD) diagnosis.¹ Additionally, several studies have suggested that plasma pTau217 is a robust biomarker for AD diagnosis and monitoring its progression. This study compares the performance of a novel plasma pTau217; ALZpath pTau217 assay with CSF amyloid and pTau181 biomarkers in predicting the clinical diagnosis of AD.

Methods

A cohort consisted of cases clinically diagnosed with AD referred to the UBC Hospital Clinic for dementia assessment (n=55)

EDTA plasma samples

CSF samples

The pTau217 levels were measured using immune assays, ALZpath Simoa pTau 217 v2 kits (Quanterix MA USA) on the Quanterix HD-X Analyzer platform

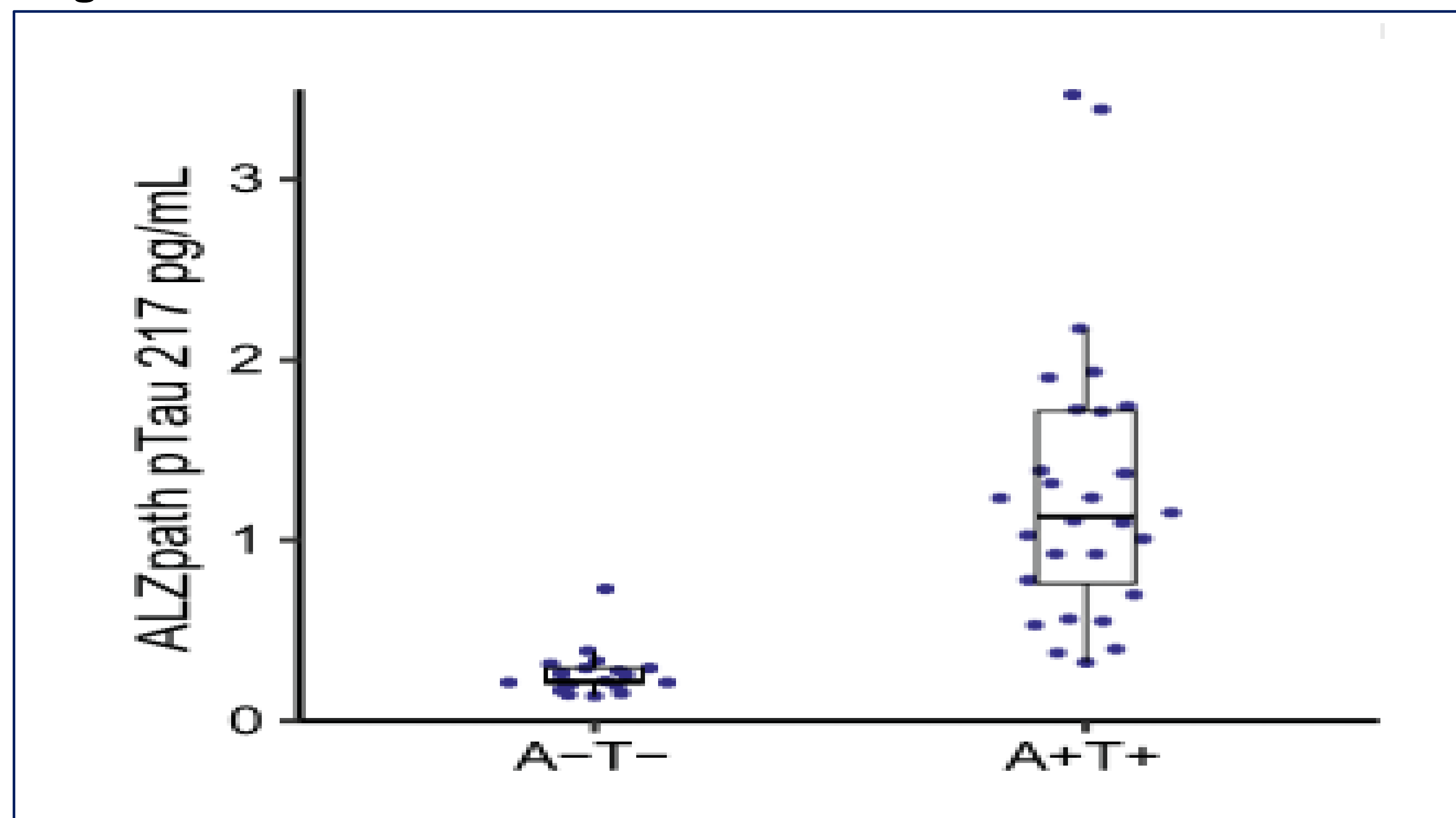
CSF A β 42/40 ratio and pTau181 levels were measured using Lumipulse G β -Amyloid 1-40, Lumipulse G β -Amyloid 1-42, and Lumipulse G pTau181 kits (Fujirebio Europe N.V., Belgium) on the Lumipulse G1200 platform.

The correlation between plasma pTau217 and CSF A β 42/40 ratio and pTau181 was determined using the Spearman correlation test.

Results

- Amyloid positivity was determined by a CSF A β 42/40 ratio of less than 0.073, including both positive (≤ 0.058) and likely positive (0.059 – 0.072) cases (Figure 1). Tau positivity was determined by CSF p-tau181 levels > 50.2 pg/mL.
- Ptau217 concentrations were significantly increased in the amyloid and tau positive (A+T+) group compared to the A-T- group.
- ALZpath pTau217 assay had very high correlation with both CSF amyloid (AUC 0.95; 95% CI 0.89 – 1.00) and tau status (AUC 0.95 ; 95% CI 0.90 – 1.00), (Figure 2).
- Plasma pTau217 correlates negatively with CSF A β 42/40 levels ($r = -0.72$, p-value < 0.0001) (Figure 3) and positively with CSF p-tau181 levels ($r = 0.80$, p-value < 0.001) Figure 3).

Figure 1



Results

Figure 2

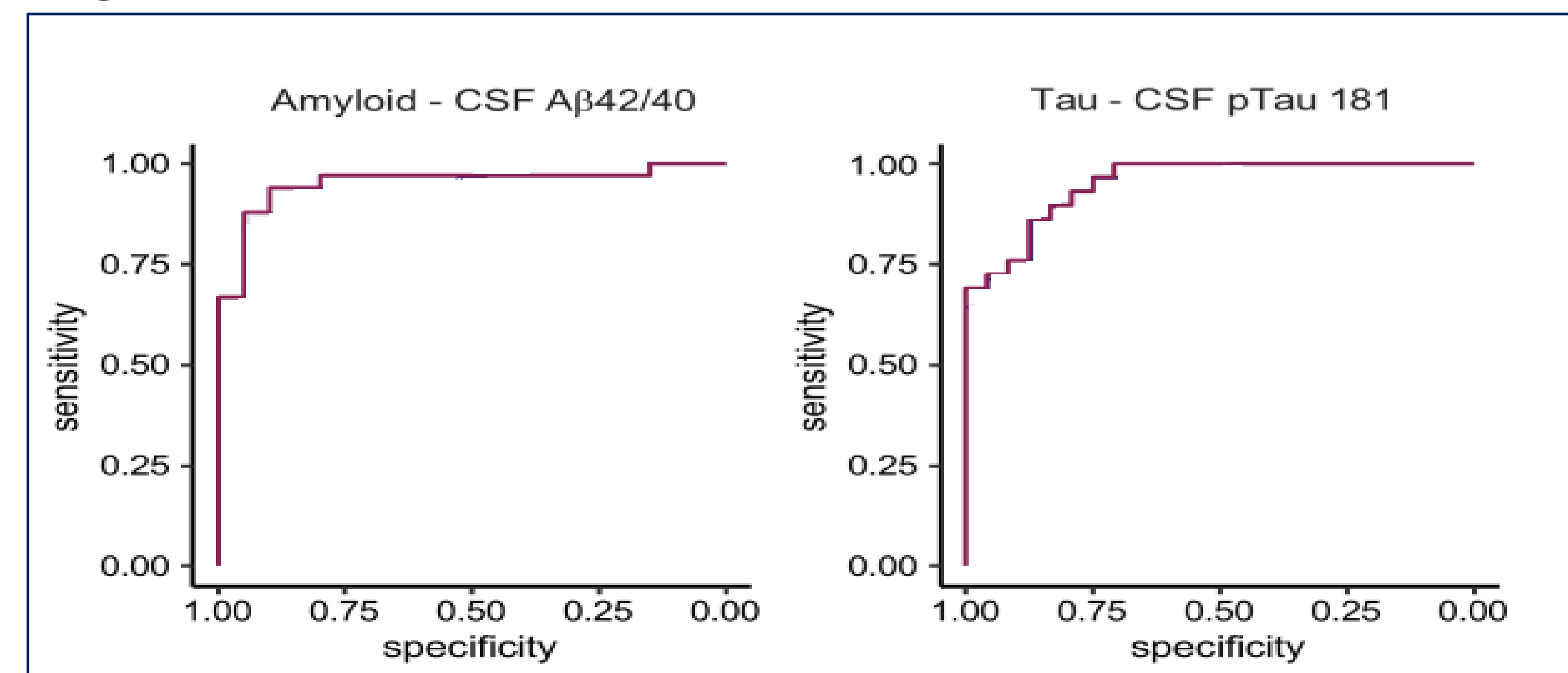
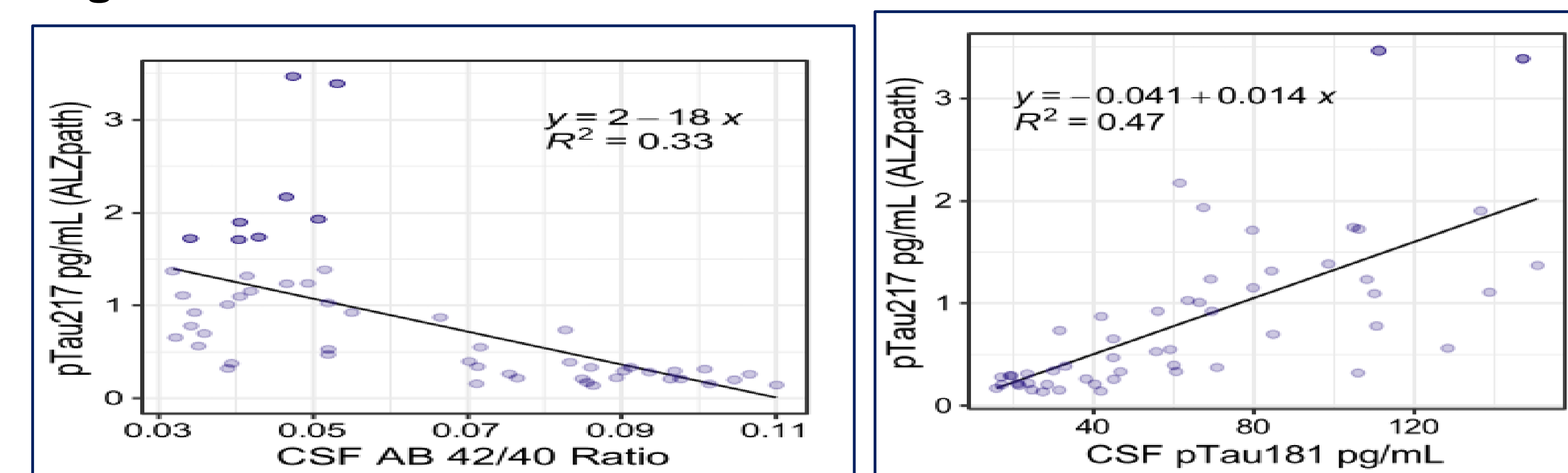


Figure 3



Conclusion

Plasma pTau217 correlated with CSF A β 42/40 ratio and pTau181 concentrations, demonstrating good performance in clinically predicting AD.

References

1. Olsson B, Lautner R, Andreasson U, Öhrfelt A, Portelius E, Bjerke M, et al. CSF and blood biomarkers for the diagnosis of Alzheimer's disease: a systematic review and meta-analysis. *Lancet Neurol.* 2016;4422:1–12.

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