

Diagnostic performance of plasma GFAP in preclinical stages of Alzheimer's disease using the Lumipulse platform

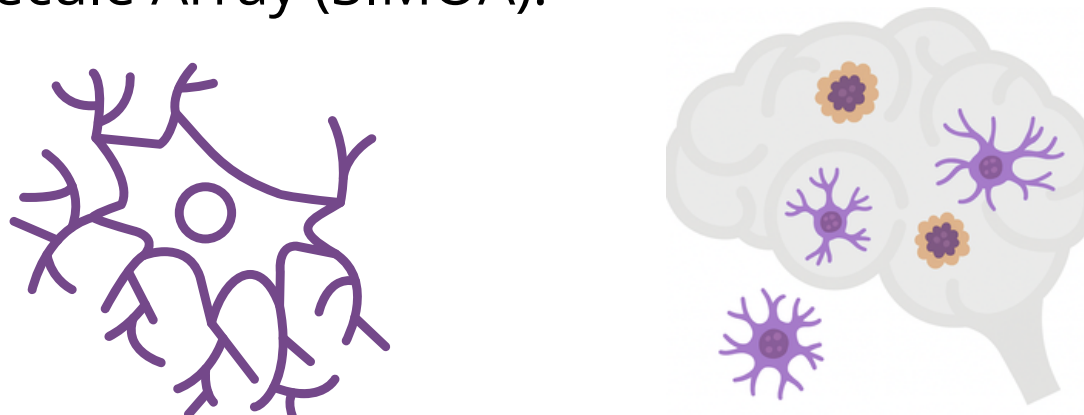


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Plasma GFAP measured with the fully automated Lumipulse platform correlates with core CSF Alzheimer's disease biomarkers in cognitively unimpaired individuals and shows excellent agreement with SIMOA, supporting its implementation in routine clinical practice as an accessible biomarker of astrocyte activation.

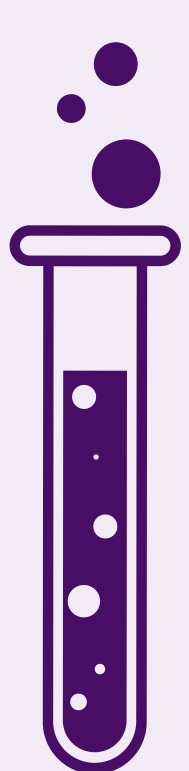
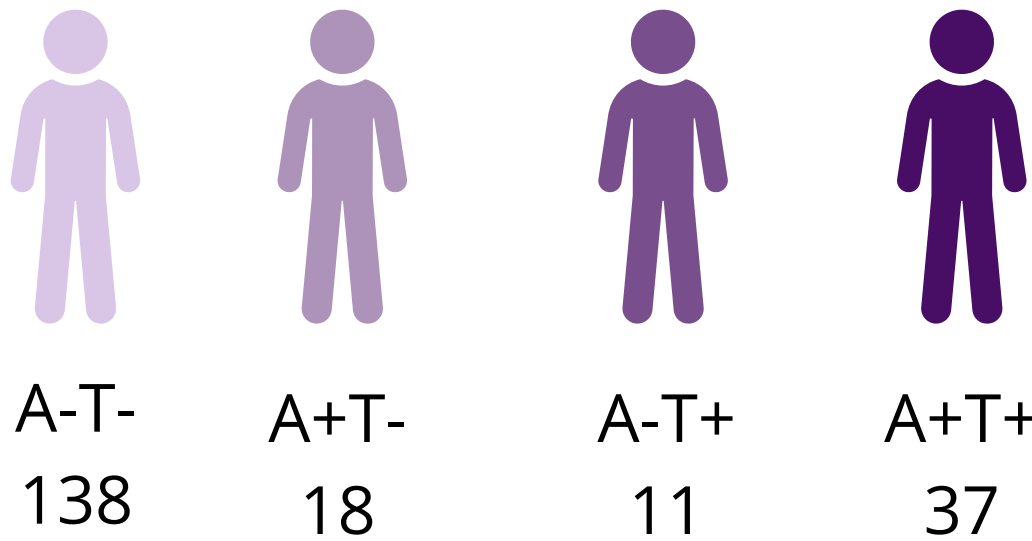
INTRODUCTION

Plasma glial fibrillary acidic protein (GFAP) is a promising biomarker of astrocytic reactivity in preclinical Alzheimer's Disease (AD). However, most evidence to date comes from ultrasensitive research assays, with limited data from automated clinical platforms. We aimed to evaluate the diagnostic performance of plasma GFAP in cognitively unimpaired (CU) individuals using the fully automated Lumipulse platform, and to assess its concordance with a highly sensitive research-based immunoassay, Single Molecule Array (SIMOA).



METHODS

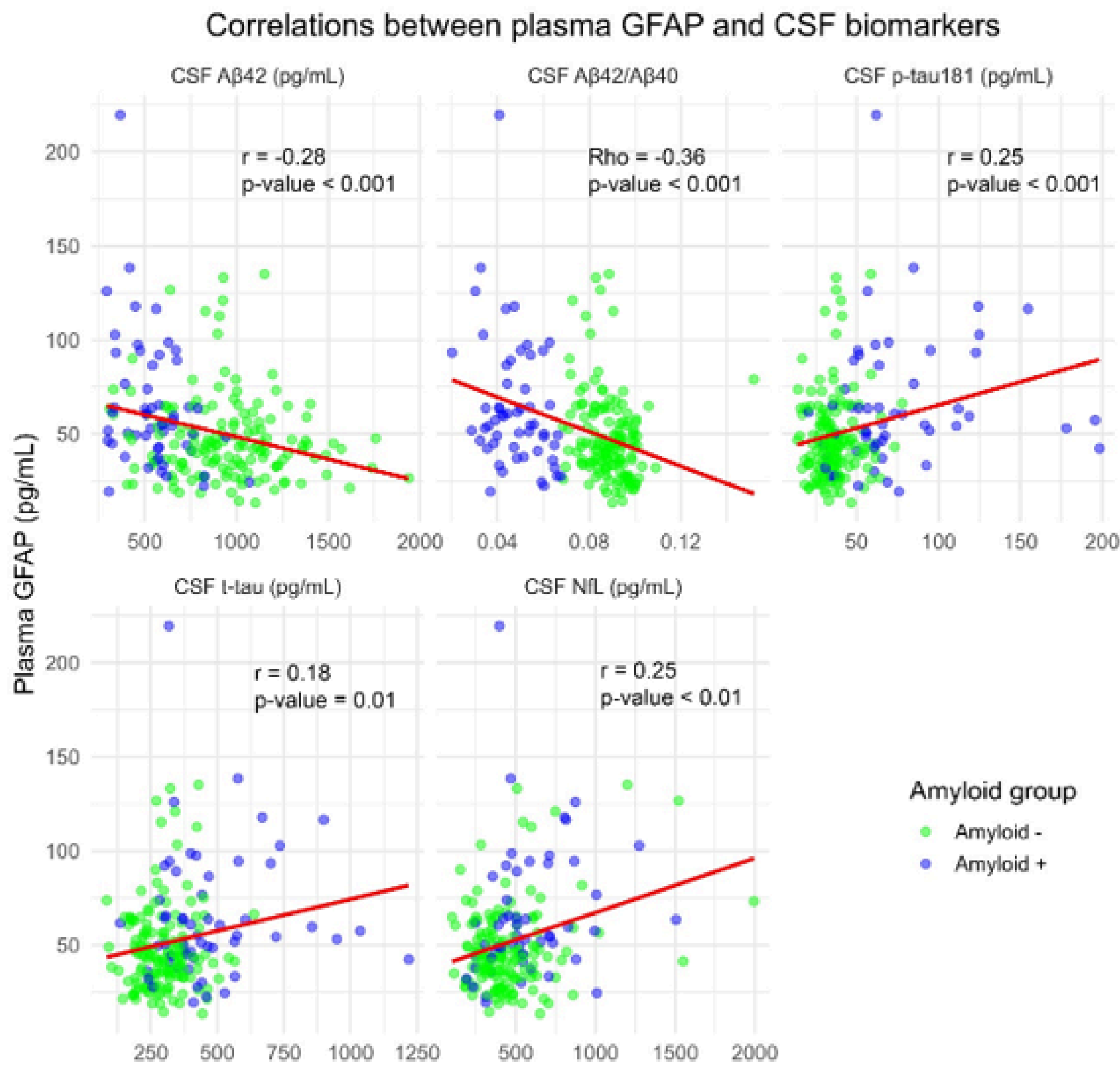
Plasma GFAP, and CSF Aβ42/40, p-tau181, t-tau, and NfL were analyzed in 204 CU participants using the Lumipulse G600II platform. In a subset of 143 individuals, it was also measured with SIMOA. We examined correlations between plasma GFAP and CSF biomarkers, after adjusting for age, sex, and ApoE ε4, and compared plasma GFAP concentrations across AT groups. The ability of plasma GFAP to discriminate amyloid status was assessed using logistic regression and receiver operating curve (ROC) analyses. Agreement between Lumipulse and SIMOA techniques was evaluated using Passing-Bablok regression and Bland-Altman analysis.



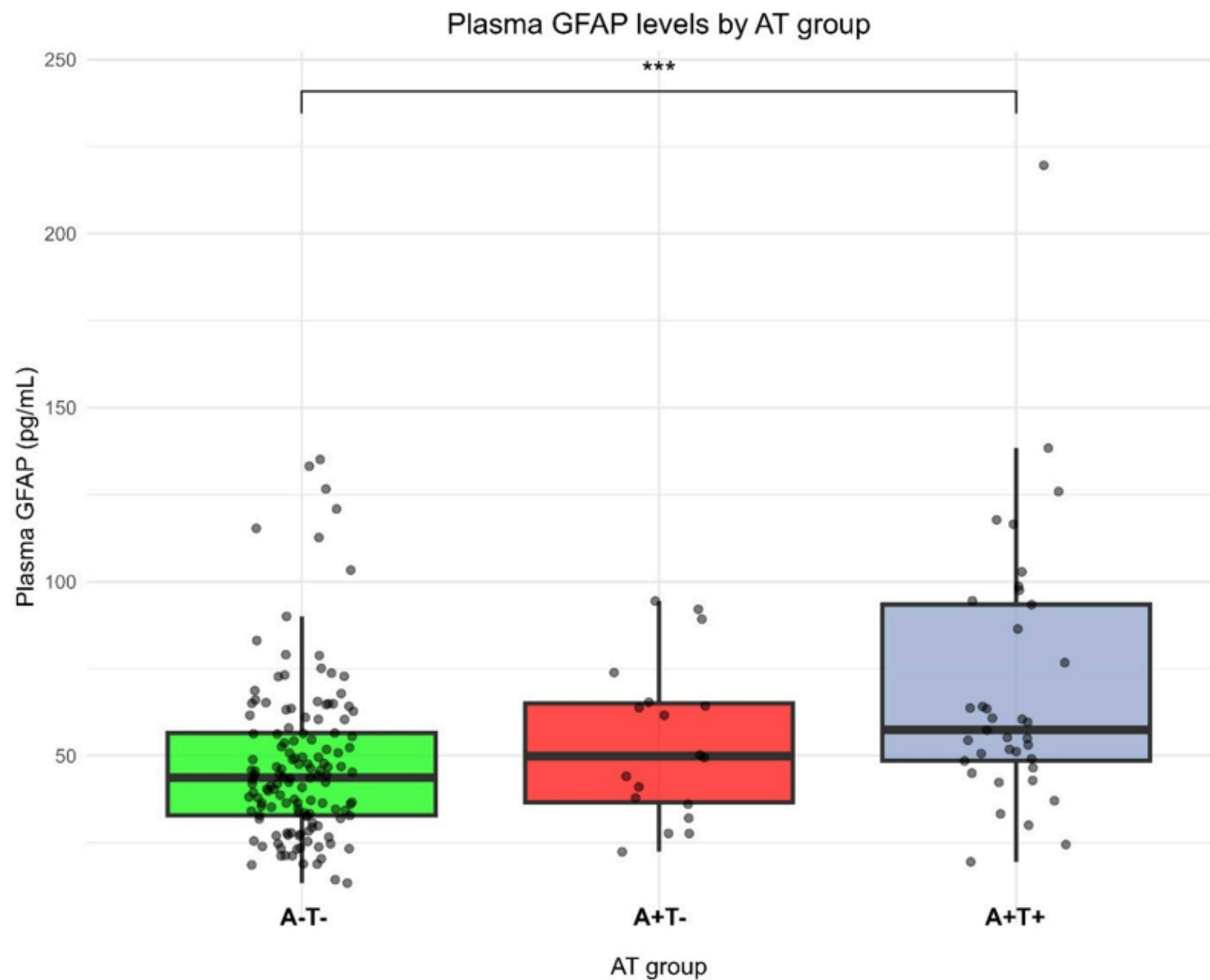
Lumipulse G600II
Fully automated platform

RESULTS

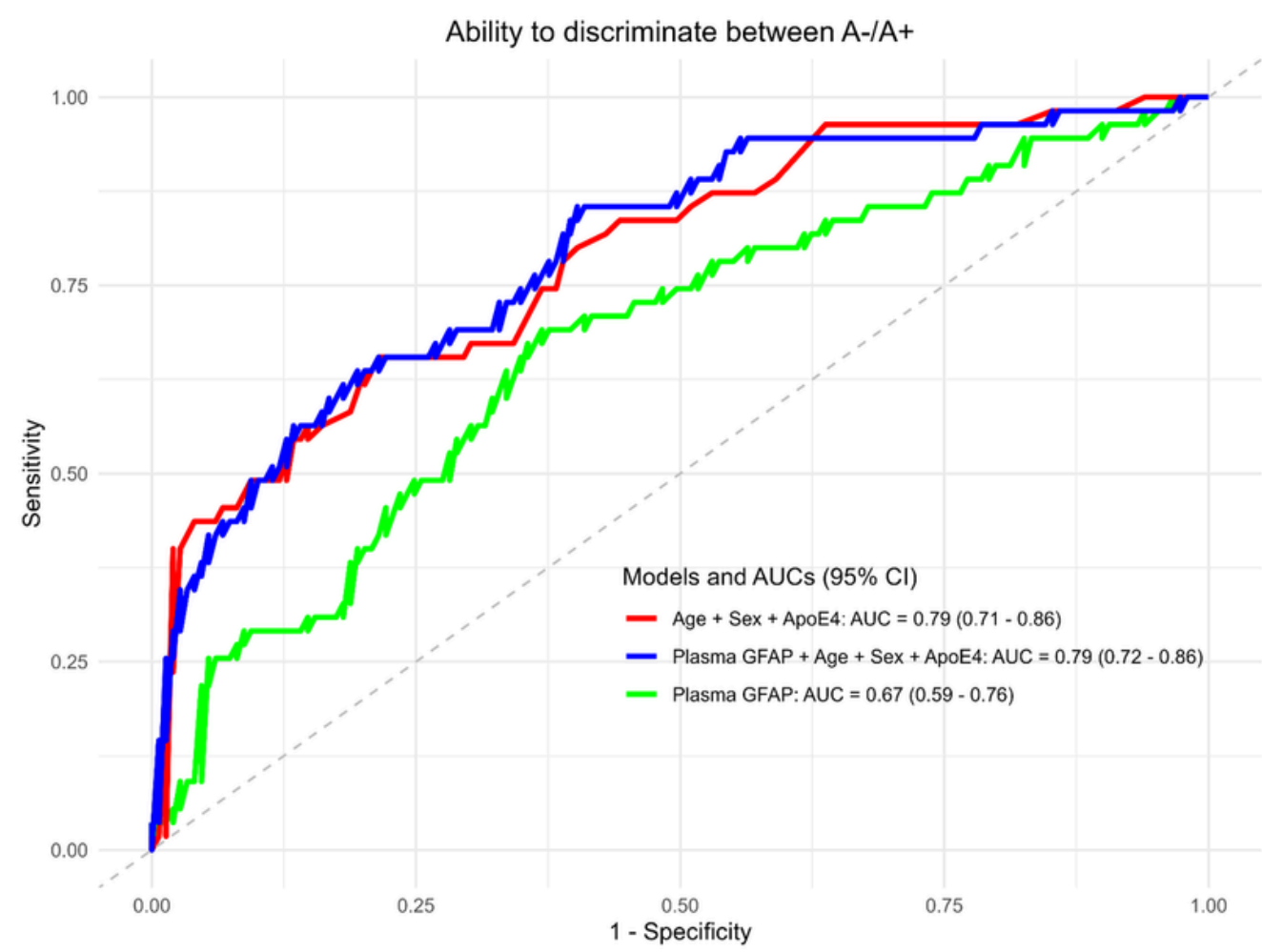
1 Correlation between plasma GFAP and CSF AD biomarker
Plasma GFAP correlated significantly with Aβ42, Aβ42/Aβ40, ptau181, t-tau and NfL. After adjusting by covariates, the correlation with CSF Aβ42 and Aβ42/Aβ40 ratio remained significant. Plasma GFAP concentrations were higher in A+ compared with A- subjects, and in T+ compared with T-.



2 Plasma GFAP concentrations across AT groups
A+T+ subjects showed higher plasma GFAP levels than A-T- (difference = 22.2 pg/mL; p value <0,0001).

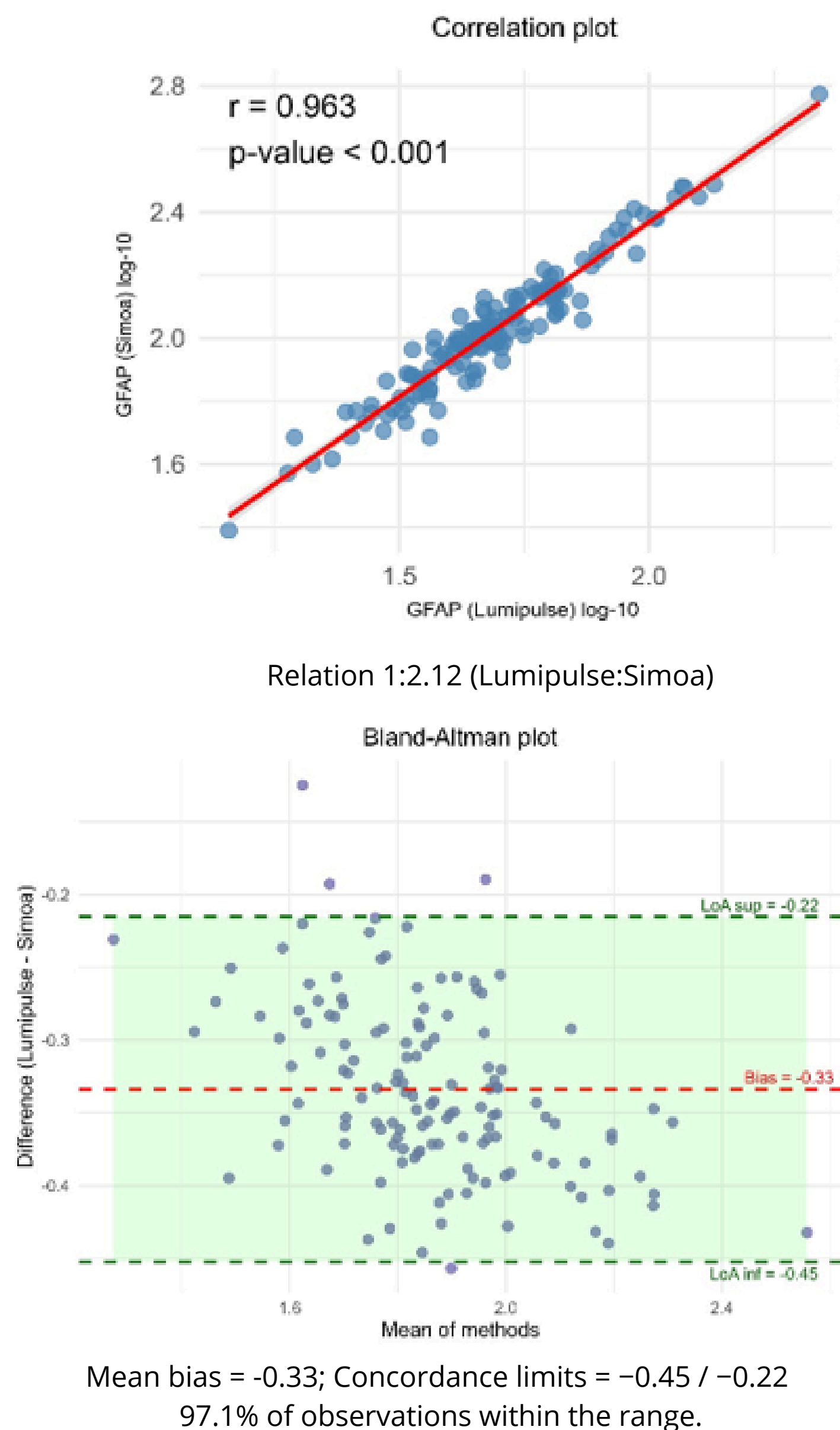


3 Discriminative performance of plasma GFAP for amyloid status
Plasma GFAP discriminated amyloid status (A+ vs. A-) with an AUC of 0.67.



4 Agreement between Lumipulse and SIMOA measurements

Lumipulse and SIMOA measurements showed a strong correlation, and good agreement.



CONCLUSIONS

- Plasma GFAP measured with the fully automated Lumipulse platform correlates with core CSF AD biomarkers in cognitively unimpaired individuals.
- GFAP concentrations were higher in A+ and T+ subjects, compared to A- and T-, with the highest levels in A+T+.
- Plasma GFAP shows moderate ability to discriminate amyloid status.
- Lumipulse and SIMOA measurements show excellent correlation and good agreement.
- Our findings support the implementation of plasma GFAP measured with Lumipulse in routine clinical practice as an accessible biomarker of astrocyte activation in preclinical AD.

REFERENCES

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