

Plasma p-tau 217 Associations with Verbal Learning and Memory Performance in A Community-Based Asian American Cohort

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Background

- Alzheimer's disease (AD) is characterized by the accumulation of amyloid- β (A β) plaques and tau protein, which can be detected through positron emission tomography (PET) imaging or cerebrospinal fluid (CSF) biomarkers.
- However, the clinical utility of PET and CSF assessments is constrained by high cost and invasive nature.
- Recent advances in plasma-based biomarkers offer an accessible and efficient alternative for detecting AD-related pathology.
- Although approximately 25% of individuals with AD globally are of Chinese descent, the efficacy of plasma AD biomarkers in Asian populations remains largely unexplored.
- Moreover, most prior studies focused on clinical cohorts already cognitively impaired, highlighting diagnostic accuracy and comparisons with neuroimaging and CSF rather than direct associations with cognitive outcomes.
- This study examined the relationship between plasma biomarkers and memory performance in a community-dwelling Asian population.

Methods

- Participants:**
 - Participants were drawn from the Asian Americans & Racism: Individual and Structural Experiences (ARISE) project.
 - A pilot initiative funded by R56 aiming to recruit 500 older Asian American adults in California, including Chinese, Taiwanese, Korean, and Vietnamese.
 - This study analyzed data from 324 relatively healthy participants who completed blood collection and cognitive testing administered in their preferred languages (Mandarin, Cantonese, Korean, or Vietnamese).
- Measurements:**
 - Verbal encoding performance was assessed using the total score across the five learning trials of the Auditory Verbal Learning Test (AVLT), and memory retrieval performance was assessed using the delayed recall score.
 - Blood samples were analyzed for plasma A β ₄₀, A β ₄₂, phosphorylated tau (p-tau217), neurofilament light chain (NfL), and glial fibrillary acidic protein (GFAP) using the Multiplex Simoa N4PE and Assay pTau217 v2 tests.
- The ratio of A β ₄₂/A β ₄₀ was evaluated as one biomarker predictor.
- Biomarkers were log-transformed due to positive skew.
- Linear regression models adjusted for age and gender.

Results

- Plasma AD biomarker levels did not differ by ethnicity or gender, except for GFAP, which was higher in male ($t(304)=2.974$, $p=.002$).
- When comparing to the quartile with the best biomarker, participants in the worse plasma p-tau217 quartile was associated with both lower encoding (Q2: $\beta=-1.2$ (95% CI: -4.31, 1.91), $p=.448$; Q3: $\beta=-1.23$ (95% CI: -4.37, 1.91) $p=.441$; Q4: $\beta=-4.34$ (95% CI: -7.59, -1.10), $p=0.009$) and memory retrieval performance (Q2: $\beta=-0.771$ (95% CI: -1.77, 0.23), $p=.131$; Q3: $\beta=-0.503$ (95% CI: -1.51, 0.50) $p=0.327$; Q4: $\beta=-1.407$ (95% CI: -2.45, -0.36), $p=.009$).
- No significant associations were found for GFAP, NfL, or A β ₄₂/A β ₄₀ ratio with either memory outcomes.

Table 1. Participant Characteristics (N=345)

		Mean Age	Mean Cognitive Screening Score	N	Percentage (%)
Gender	Male	75.45	89.32	139	40.29
	Female	73.27	90.65	206	59.71
Ethnicity	Chinese	74.62	95.00	123	35.65
	Korean	75.37	87.67	54	15.65
	Vietnamese	73.09	87.32	168	48.70

Figure 1. Learning and Delay Recall Raw Score by Ethnicity Group

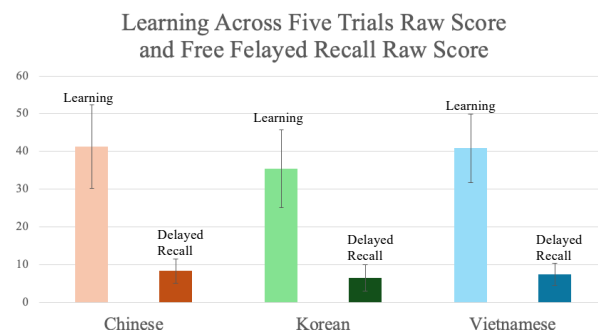
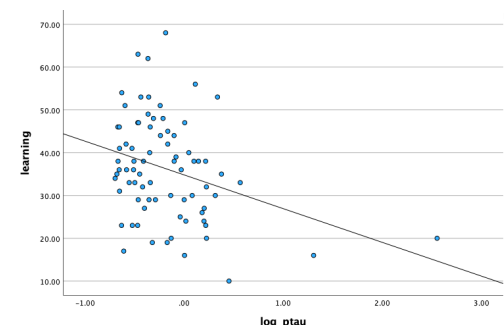


Table 2. Biomarkers Mean and SD

	Mean	SD
Abeta 40 pg/ml	90.11	31.63
Abeta 42 pg/ml	5.46	1.94
Ratio 42/40	0.06	0.01
pTau217 pg/ml	0.48	0.78
GFAP pg/ml	98.37	51.71
NfL pg/ml	21.37	13.3

Figure 2. Linear Regression between Learning and log-transformed p-tau



Conclusions

- Key Findings**
 - Plasma AD biomarkers associated with learning and memory performance
 - Sample: relatively healthy Asian American older adults
 - Higher plasma p tau217 linked to:
 - poorer verbal encoding
 - poorer memory retrieval
 - Findings suggest p tau217 may reflect early neurodegenerative changes, even before clinical symptoms
- Clinical and Research Implications**
 - Supports utility of plasma biomarkers for early cognitive detection
 - Demonstrates feasibility in Asian American populations
 - Promotes culturally inclusive and equitable AD screening approaches

Acknowledgements

We wish to thank all the support from our academic and community partners. ARISE is supported by the National Institutes of Health/National Institute on Aging (R56AG079510). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

- Jonaitis, E. M., Janelidze, S., Cody, K. A., Langhough, R., Du, L., Chin, N. A., ... & Johnson, S. C. (2023). Plasma phosphorylated tau 217 in preclinical Alzheimer's disease. *Brain Communications*, 5(2), fcad057.
- Cecchetti, G., Agosta, F., Rugarli, G., Ghirelli, A., Zavarella, M., ... & Filippi, M. (2024). Diagnostic accuracy of automated Lumipulse plasma pTau-217 in Alzheimer's disease: a real-world study. *Journal of Neurology*, 271(10), 6739-6749.
- Arranz, J., Zhu, N., Rubio-Guerra, S., Rodriguez-Baz, I., Ferrer, R., Camona-Iragui, M., ... & Alcolea, D. (2024). Diagnostic performance of plasma pTau217, pTau181, A β 1-42 and A β 1-40 in the LUMIPULSE automated platform for the detection of Alzheimer disease. *Alzheimer's Research & Therapy*, 16(1), 139.
- Gan, C. L., Zhang, T., & Lee, T. H. (2020). The genetics of Alzheimer's disease in the Chinese population. *International Journal of Molecular Sciences*, 21(7), 2381.

