



Not All Blood is Equal: A Comparison of Tasso+, Dried Plasma Spots, and Venipuncture for the Measurement of p-Tau217

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INTRODUCTION

- Blood-based biomarkers are a valuable tool for the identification of Alzheimer's disease (AD) pathology¹
- Phosphorylated tau-217 (p-tau217) can accurately identify brain amyloid-beta pathology^{2,3}
- p-Tau217 has been shown to predict pathology in **preclinical disease** – could be used for **population-level screening**
- Collection relies on **venipuncture** – introducing **logistical challenges**
 - Cold-chain shipping
 - Phlebotomists
 - Immediate sample centrifugation and processing
- Alternative approaches** are needed to enable **large-scale research** and, potentially, **broader clinical implementation**

STUDY AIMS

In the DROP-AD study, we evaluated the correlation between **venous p-tau217** and **capillary p-tau217** measured in three **novel capillary blood collection devices** – the Tasso+, the Capitainer SEP10 card, and the Telimmune DUO card.

METHODS

Study Design:

- This is a validation study designed to evaluate the performance of biomarkers for neurodegenerative disease in novel capillary blood methods

Participants / Samples:

- 87 participants across the clinical spectrum of **cognitively unimpaired, MCI, and dementia** were recruited at Banner Sun Health Research Institute (Sun City, AZ)

- Participants had samples collected in clinic using three methods (Figure 1):

- Tasso+ devices with EDTA tubes**
- Finger-prick sampling using Capitainer SEP10 cards**
- Standard venipuncture**

- In the lab, venous and Tasso+ whole blood were pipetted onto Telimmune DUO plasma separation cards

Measurements:

- Plasma was extracted from dried plasma spots (DPS) using the Quanterix Dried Blood Spot Kit

- p-Tau217 was measured in DPS and matched venous plasma samples using the ACC p-tau217 assay on the Quanterix HD-X platform

- 83 venous and Tasso non-card plasma samples were analyzed for additional biomarkers using the NULISeq CNS 120 panel on the Alamar Argo HT platform

Statistical Analysis:

- Statistical analyses were performed in R (version 4.5.2) using Rstudio

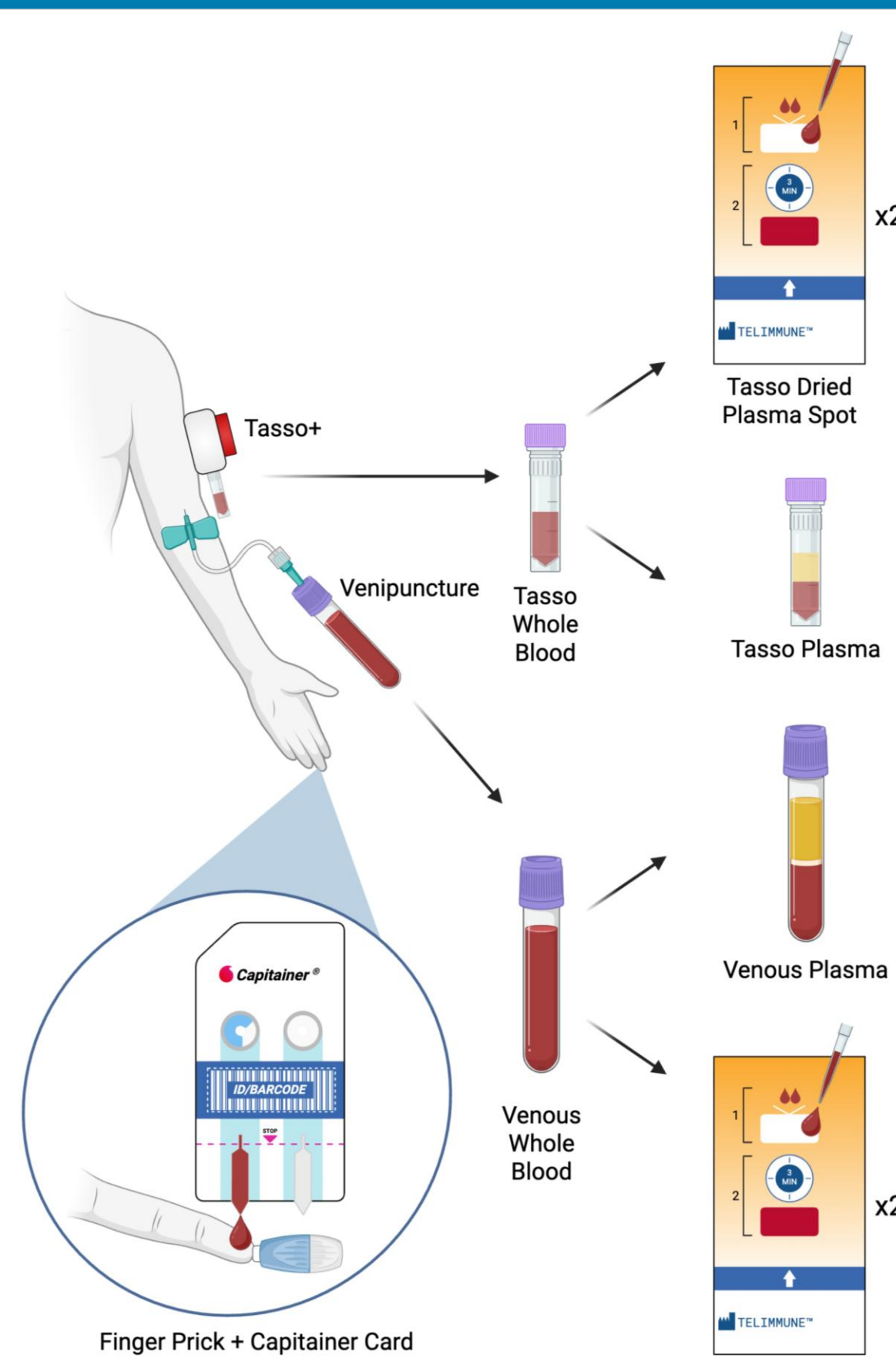


Figure 1. Devices used for DROP AD 2.0 and laboratory processing workflow. Created using BioRender

RESULTS

Dried Blood Card Results

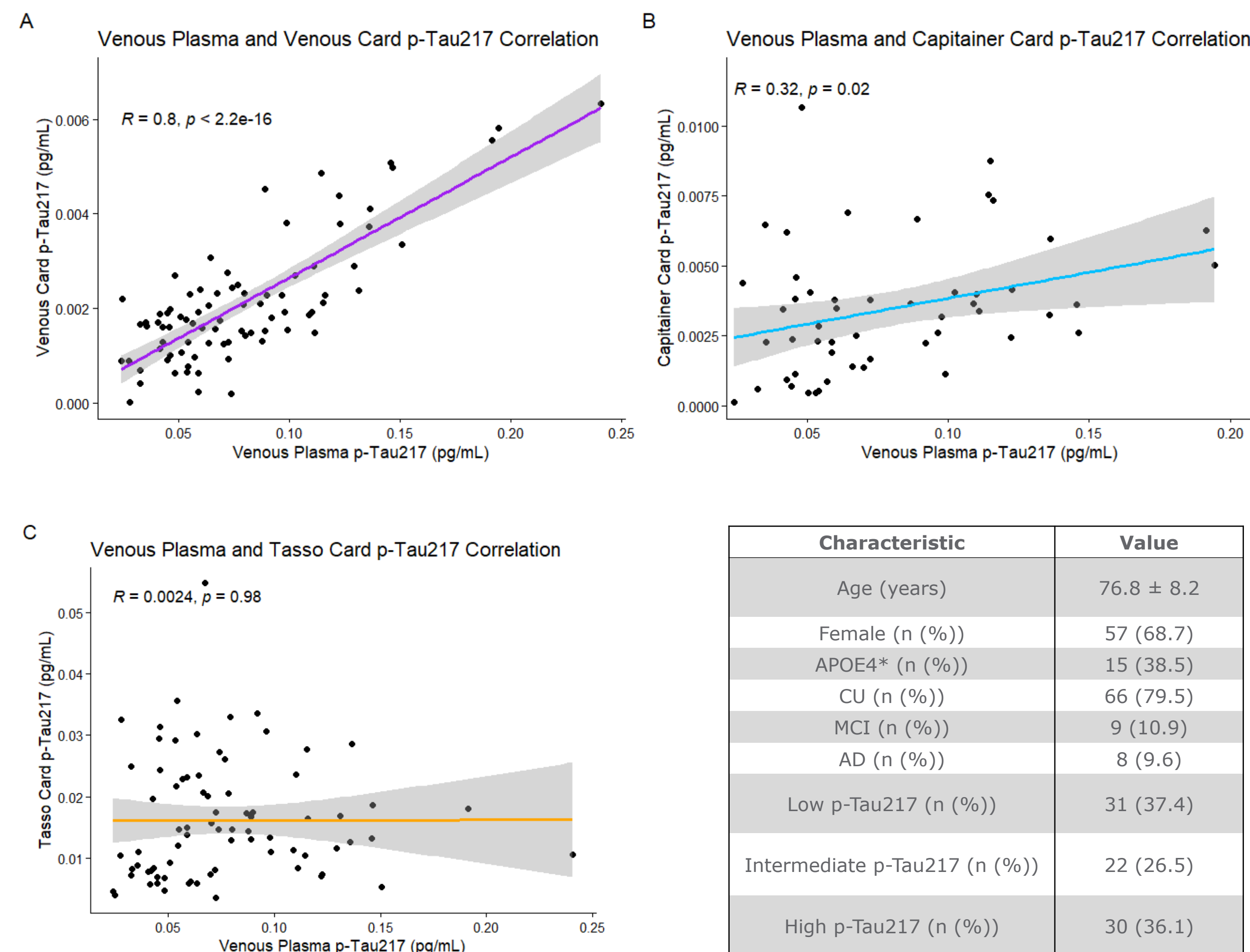


Figure 2. Correlations between venous and capillary blood card-derived p-tau217. (A) Venous blood spotted on a Telimmune DPS card vs venous plasma (B) Capitainer card plasma vs venous plasma (C) Tasso plasma spotted on a Telimmune DPS card vs venous plasma

Table 1. Demographic values for the 83 participants included in analysis. 4 were not included due to low Tasso volume

Tasso+ Results

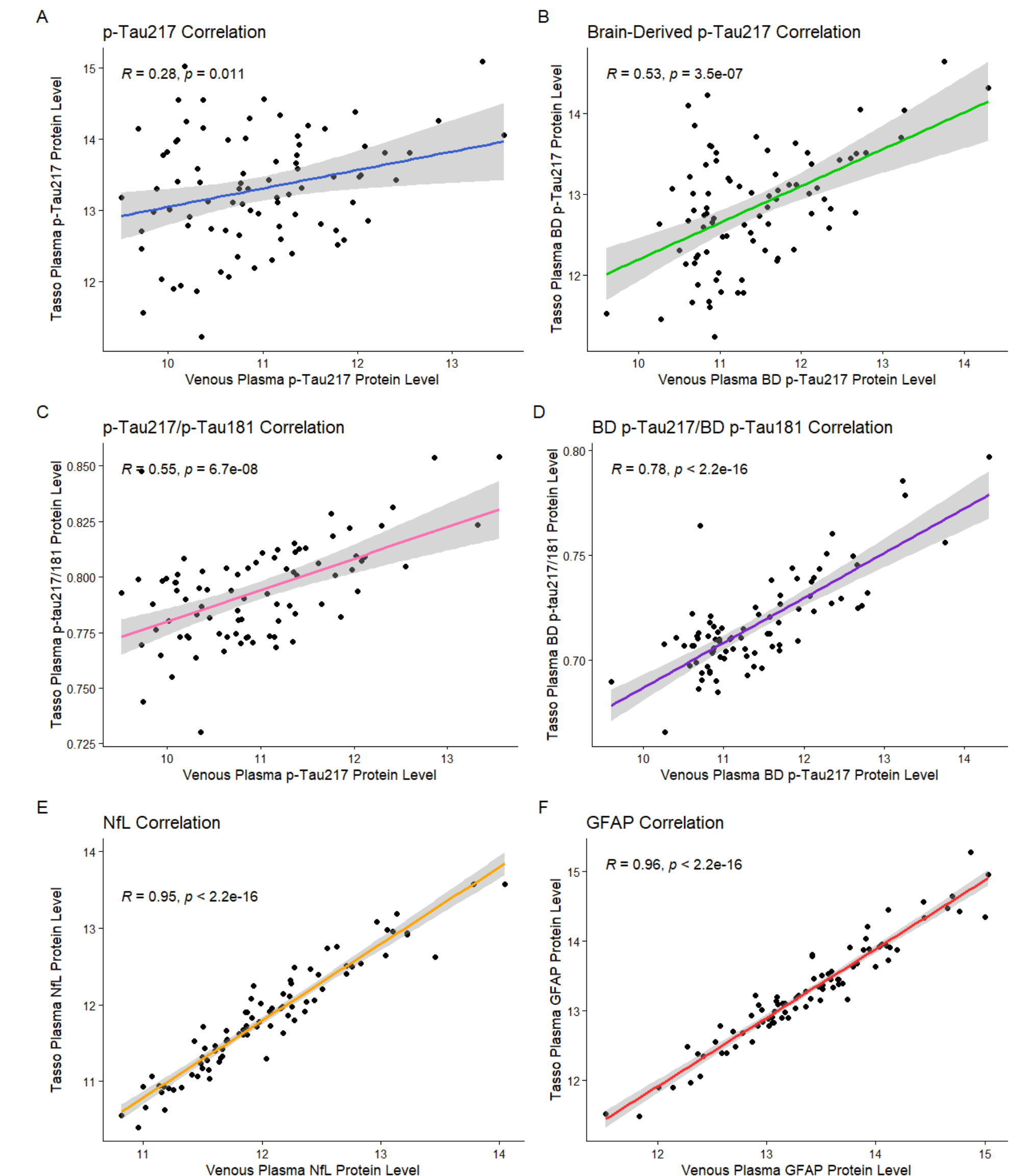


Figure 3. Correlations between Tasso plasma and venous plasma for various biomarkers of interest. (A) p-tau217 (B) brain-derived (BD) p-tau217 (C) p-tau217/p-tau181 ratio (D) BD p-tau217/BD p-tau181 ratio (E) neurofilament light (NFL) (F) glial fibrillary acidic protein (GFAP)

CONCLUSION / DISCUSSION

- There is a strong correlation between p-tau217 measured in venous plasma and Telimmune venous card plasma
 - Indicates that **Telimmune cards could be used to avoid immediate centrifugation and cold-chain shipping difficulties**, but venous blood draw is still required
 - p-tau217 can be successfully extracted from DPS cards
- There is a moderate-to-weak correlation between p-tau217 measured in venous plasma and Capitainer card plasma
- There is no correlation between p-tau217 measured in venous plasma and Telimmune Tasso card plasma
- The concentration of brain-derived and peripheral p-tau217, p-tau231, and p-tau181 was higher in Tasso+ plasma than in venous plasma
- In Tasso+ plasma that has not been spotted onto a card, a **p-tau217/p-tau181 ratio correlates better to p-tau217 in venous plasma** than Tasso p-tau217 alone for both peripheral and brain-derived p-tau217
- If attempting to measure p-tau217 in capillary blood, the BD p-tau217/BD p-tau181 has the strongest correlation with venous BD p-tau217
- Other biomarkers for neurodegenerative disease – ie. NFL and GFAP – exhibit extremely strong correlations between venous and Tasso plasma
- Caution is warranted when using Tasso-based collection methods, as **agreement with venous plasma appears to be protein or ratio-dependent**

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