Serum Tau and Inflammation in Cognitively Unimpaired Adults with CVD Risk

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In cognitively unimpaired adults with elevated cardiovascular disease risk, vascular dysfunction and systemic inflammation were associated with circulating Alzheimer's disease biomarkers and cognitive performance, supporting vascular-inflammation pathways as early targets for dementia prevention.

Background

- Cardiovascular risk factors may contribute to Alzheimer's disease and related dementia risk before overt cognitive impairment is clinically detectable.
- Arterial stiffness and elevated blood pressure can promote cerebrovascular dysfunction, which may interact with systemic inflammation to accelerate neurodegenerative processes.
- Integrating vascular measures, inflammatory biomarkers, and blood-based AD biomarkers may improve early risk stratification in adults at elevated cardiovascular and cognitive risk.

Purpose

To determine whether vascular dysfunction and systemic inflammation are associated with blood-based Alzheimer's disease biomarkers and cognitive performance in cognitively unimpaired adults with elevated cardiovascular disease risk.

Methods

Participants: Cognitively unimpaired adults with ≥2 cardiovascular disease risk factors

Study design: Cross-sectional analysis of baseline study data

Vascular measures: Pulse wave velocity, brachial blood pressure, and aortic blood pressure

Serum biomarkers: Inflammatory (CRP, IL-1β, TREM-1) and AD (p-tau$_{217}$, t-tau)

Cognition: Multidomain cognitive battery

Funding

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Results

The sample was cognitively unimpaired and had substantial cardiometabolic burden. Biomarker patterns differed by race, and vascular and inflammatory measures were associated with circulating AD biomarkers and cognitive performance.

Figure 1. Biomarker differences by race. *Black/African American participants had lower serum p-tau217 and total tau, but higher CRP and TREM-1, compared with non-Hispanic White participants*

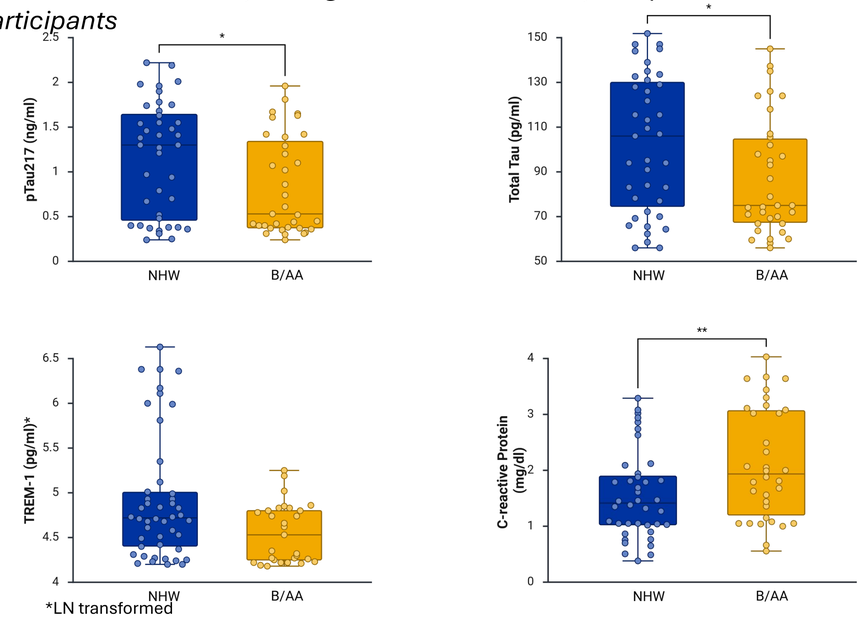
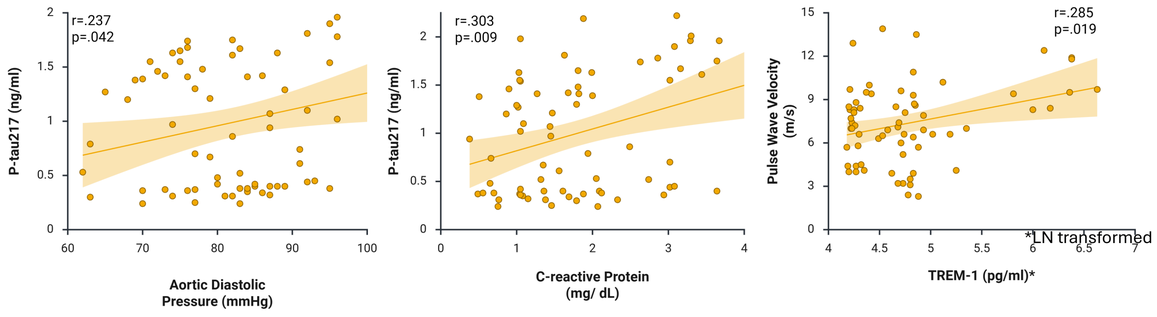


Figure 2. Vascular, inflammatory, and AD biomarker associations. *Higher p-tau217 was associated with higher aortic diastolic blood pressure and CRP, while higher TREM-1 was associated with greater pulse wave velocity.*



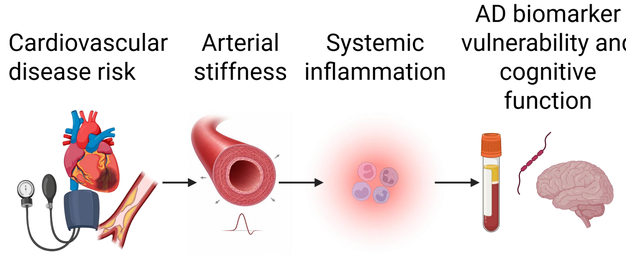
Cognitive performance. *Higher TREM-1 was also associated with worse delayed recall performance (Buschke delayed recall r=-.239, p=.039) and visuospatial performance (JOLO r=-.265, p=.022).*

Demographics and Clinical

Characteristic (N=75)	Mean ± SD N (%)
Age (years)	67 ± 8
Women	46 (61%)
Black and African American	35 (47%)
Blood Pressure (mmHg)	129 ± 19 / 81 ± 11
Body Mass Index (kg/m^2)	29.7
Hypertension	68 (90%)
High Cholesterol	68 (90%)
Type 2 Diabetes	17 (23%)
MOCA Score	26 ± 3

Discussion

- Vascular dysfunction and inflammation linked with cognition and circulating AD biomarkers
- Vascular-inflammation pathways may be early prevention targets in high-CVD-risk adults
- Racial differences highlight need for race-aware biomarker cutoffs and longitudinal validation
- Integrated vascular, inflammatory, and AD biomarker models may improve early risk stratification



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