

CSF sPDGFRβ Is Associated With BBB Dysfunction, Tau Pathology, and Cognitive Decline in Alzheimer’s Disease

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CSF sPDGFRβ is a biomarker of neurovascular injury, BBB dysfunction, tau pathology, and cognitive decline in Alzheimer's disease.				
INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
Background: Cerebrospinal fluid (CSF) soluble PDGFRβ reflects pericyte injury and blood–brain barrier (BBB) dysfunction. Its relationship with tau pathology and cognitive decline in Alzheimer's disease (AD) was systematically evaluated.	Systematic review and meta-analysis of six studies (699 participants). Databases: PubMed, Embase and Web of Science. Correlations were pooled using Fisher's z transformation; regression estimates synthesized using inverse-variance models.	Results Higher CSF sPDGFRβ was significantly associated with: • Blood-brain barrier (BBB) dysfunction ($I^2=0\%$, $Z=8.62$, $p<0.00001$) • Total/phosphorylated tau ($I^2=0\%$, $Z=5.70$, $p<0.0001$) • Worse cognition ($Z=4.40$, $p<0.001$) • Faster longitudinal cognitive decline ($Z=3.13$, $p=0.002$).	CSF sPDGFRβ is a reproducible biomarker linking pericyte injury, BBB dysfunction, tau pathology and cognitive decline, supporting neurovascular pathways as targets for early diagnosis and therapy.	1. James Scott Miners et al. (2019). CSF evidence of pericyte damage in Alzheimer's disease is associated with markers of blood-brain barrier dysfunction and disease pathology 2. Anna de Kort et al. (2021). Normal cerebrospinal fluid concentrations of PDGFRβ in patients with cerebral amyloid angiopathy and Alzheimer's disease 3. Xinyi Lv et al. (2023). Changes in CSF sPDGFRβ level and their association with blood–brain barrier breakdown in Alzheimer's disease with or without small cerebrovascular lesions 4. Lukas Preis et al. (2024). Assessing blood-brain barrier dysfunction and its association with Alzheimer's pathology, cognitive impairment and neuroinflammation 5. Laurel Edwards et al. (2025). Interactive effects of blood–brain barrier breakdown and Alzheimer's disease biomarker status on cognitive decline in older adults without dementia 6. Cécile Vrillon et al. (2025). Dissection of blood–brain barrier dysfunction through CSF PDGFRβ and amyloid, tau, neuroinflammation, and synaptic CSF biomarkers in neurodegenerative disorders
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