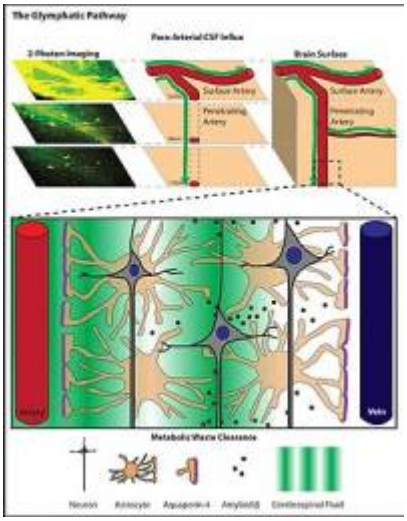
Glymphatic dysfunction



- The future of biomarkers for vascular contributions to cognitive impairment and dementia (VCID): proceedings of the 2025 annual workshop of the Albert research institute for white matter and cognition
- The Relationship Between Glymphatic Function, White Matter Hyperintensity and Cognition: A Structural Equation Model MRI Study
- Clinical progression and genetic pathways in body-first and brain-first Parkinson's disease
- Astrocyte-driven vasoconstriction impairs glymphatic clearance in a human tauopathy-on-chip model
- Impaired glymphatic system function in relapsing-remitting multiple Sclerosis: Insights from diffusion tensor imaging along the perivascular space (DTI-ALPS)
- Perivascular space fluid diffusivity predicts clinical deterioration in prodromal and early-stage Parkinson's disease
- Blood-brain barrier dysfunction in hepatic encephalopathy: pathophysiology, diagnostic assessment and therapeutic perspectives
- Association between frontal pole atrophy and glymphatic dysfunction in patients with bipolar disorder

Bezerra et al., hypothesized that glymphatic dysfunction is a major pathogenetic mechanism underpinning idiopathic intracranial hypertension (IIH). The rationale for the hypothesis springs from MRI studies, which have shown many signs related to IIH without evidence of overproduction of CSF. They proposed that diffuse retention of interstitial fluid (IF) is a direct consequence of an imbalance of glymphatic flow. This imbalance, in turn, may result from an augmented flow from the arterial PVS into the IF, by impaired outflow of the IF into the paravenous spaces, or both. This hypothesis is supported by the facts that (i) visual loss, one of the main complications of IIH, is secondary to the impaired drainage of the optic nerve, a nerve richly surrounded by water channels and with a long extracranial course in its meningeal sheath; (ii) there is a high association between IIH and obesity, a condition related to paravascular inflammation and lymphatic disturbance, and (iii) glymphatic dysfunction has been related to the deposition of β-amyloid in Alzheimer's disease. They concluded that the concept of glymphatic dysfunction provides a new perspective for understanding the pathophysiology of IIH; it may likewise entice the development of novel therapeutic approaches aiming at enhancing the flow between the CSF, the glymphatic system, and the dural sinuses [1)].

The Glymphatic system is considerably affected after TBI, thus participating in the development of brain edema formation. Cisternostomy, by opening the brain cisterns to atmospheric pressure, could decrease the intracerebral pressure due to a backshift of CSF through the Virchow-Robin spaces. [2].

Diagnosis

Enlarged perivascular spaces (ePVS) may be an indicator of glymphatic dysfunction.

Glymphatic dysfunction after craniectomy

see Glymphatic dysfunction after craniectomy

References

1)
Bezerra MLS, Ferreira ACAF, de Oliveira-Souza R. Pseudotumor Cerebri and Glymphatic Dysfunction. Front Neurol. 2018 Jan 16;8:734. doi: 10.3389/fneur.2017.00734. eCollection 2017. PubMed PMID: 29387036; PubMed Central PMCID: PMC5775972.
2)
Cherian I, Bernardo A, Grasso G. Cisternostomy for Traumatic Brain Injury: Pathophysiologic Mechanisms and Surgical Technical Notes. World Neurosurg. 2016 May;89:51-7. doi: 10.1016/j.wneu.2016.01.072. Epub 2016 Feb 4. PubMed PMID: 26851743.