

## **Abstract**

Due to the absence of an active lymphatic system of the brain and the responsible nodal system, it has long been unclear how interstitial metabolic waste products, in particular amyloid- $\beta$ , tau-protein,  $\alpha$ -synuclein and other biomarkers associated with the development of neurodegenerative diseases, are eliminated. A key role in this process is played by the glymphatic system, a complex network of tunnel-shaped perivascular spaces (PVSs) that conduct the flow of cerebrospinal fluid. These spaces are surrounded by astrocytes, responsible for the transport of fluids and the removal of metabolites. Studies suggest that the glymphatic system is subject to an endogenous circadian clock, and there is an established correlation between the volume of perivascular spaces and, with it, the rate of cerebrospinal fluid flow and sleep. Factors affecting the function of the glymphatic system include pulsation of blood vessels, spatial orientation of the body and functionality of aquaporin-4 (AQP4). Dysfunction of the glymphatic system plays a key role in the aging of the brain and the development of various neurodegenerative diseases. The aim of the work is to summarize the known knowledge about the regulation of the glymphatic system and its influence on the development and prevention of neurodegenerative diseases. Understanding the mechanisms of these processes is essential for developing new strategies for the prevention and treatment of a wide range of diseases and maintaining brain health.

**Keywords:** glymphatic system, circadian clock, amyloid- $\beta$ , AQP4, brain health, Alzheimer's disease