ZNZ Symposium, Friday 11 September 2015

Plenary Talk
Prof. Maiken Nedergaard, University of Rochester

Astrocytes as master regulators of the sleep-wake cycle

How does the Brain take out the garbage?

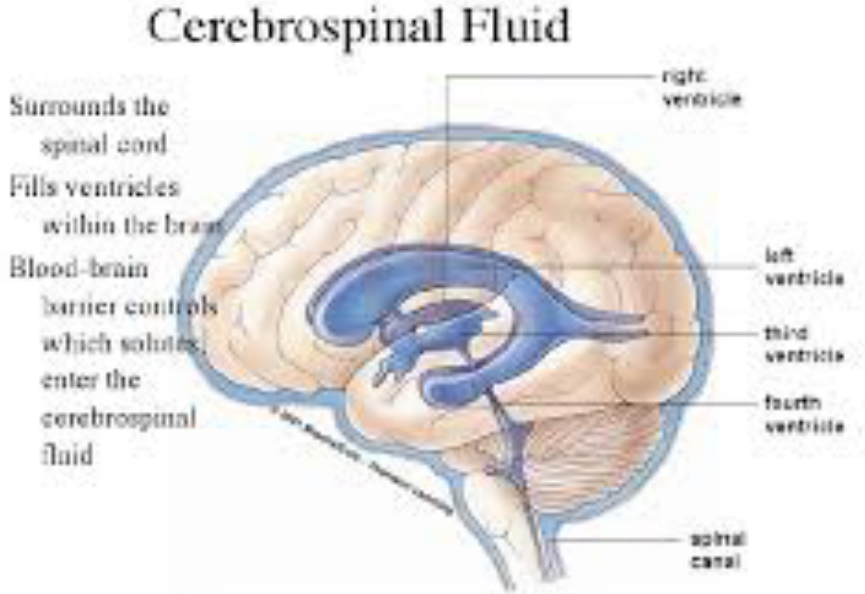
Why is this important?

- It had been a mystery for centuries.
- Why such a mystery?
- The Brain lacks a lymphatic system, which is responsible of cleansing the tissues of…
  - potentially harmful metabolic waste products.
  - Excess of interstitial fluid.
  - accumulations of soluble proteins.

Understanding how this process functions in the healthy nervous system holds the key to developing treatment options for a wide variety of neurological diseases, especially those characterized by the improper accumulation of misfolded proteins.

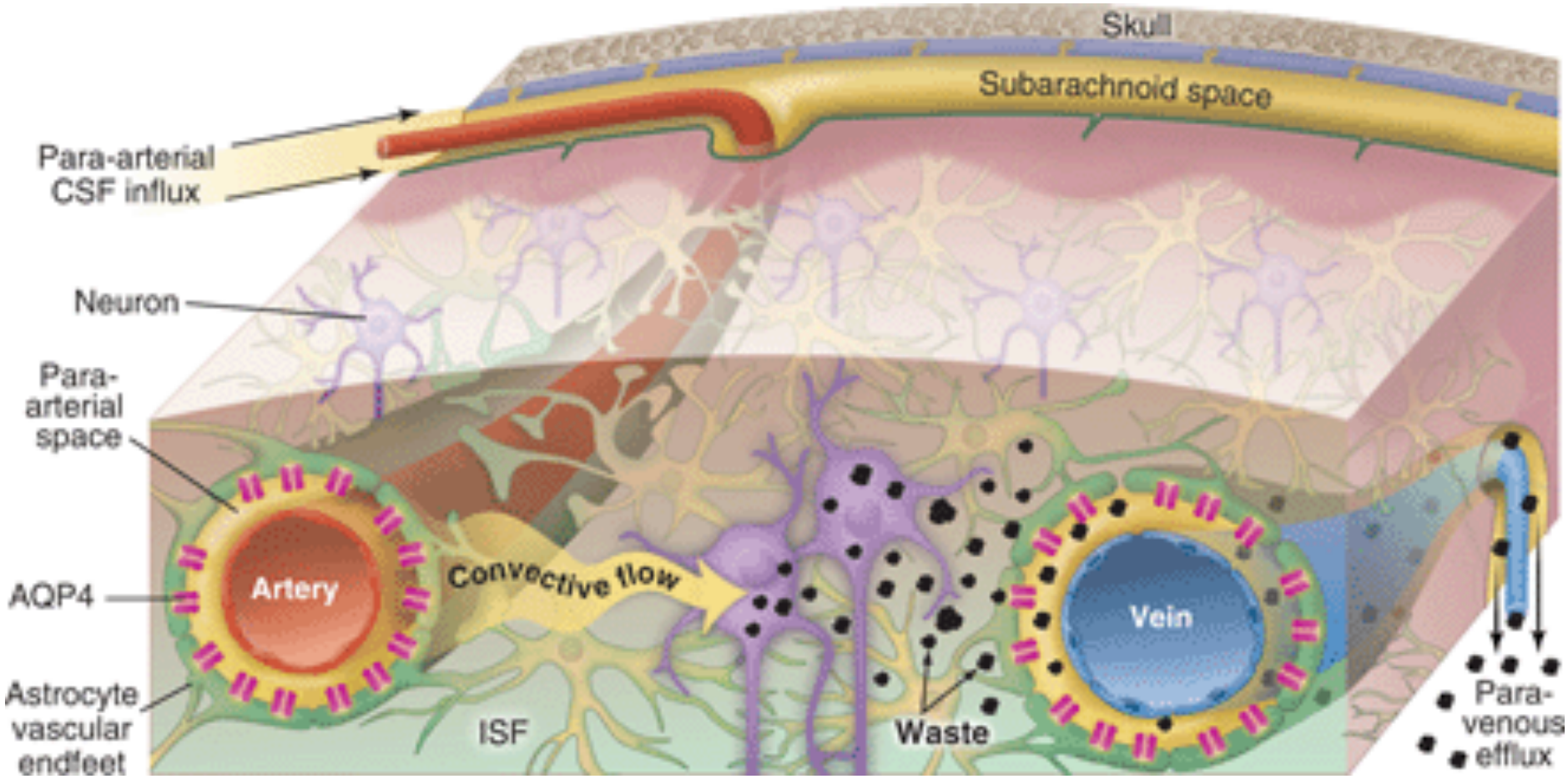
How is it done in the Brain?

- Many researchers had suggested that the cerebrospinal fluid (CSF) compartment constitutes a sink for interstitial solute and fluid clearance from the brain parenchyma.
- Some exchange of solutes must occur between the interstitial fluid (ISF) and the cerebrospinal fluid (CSF).
  - CSF circulates within the brain ventricular system

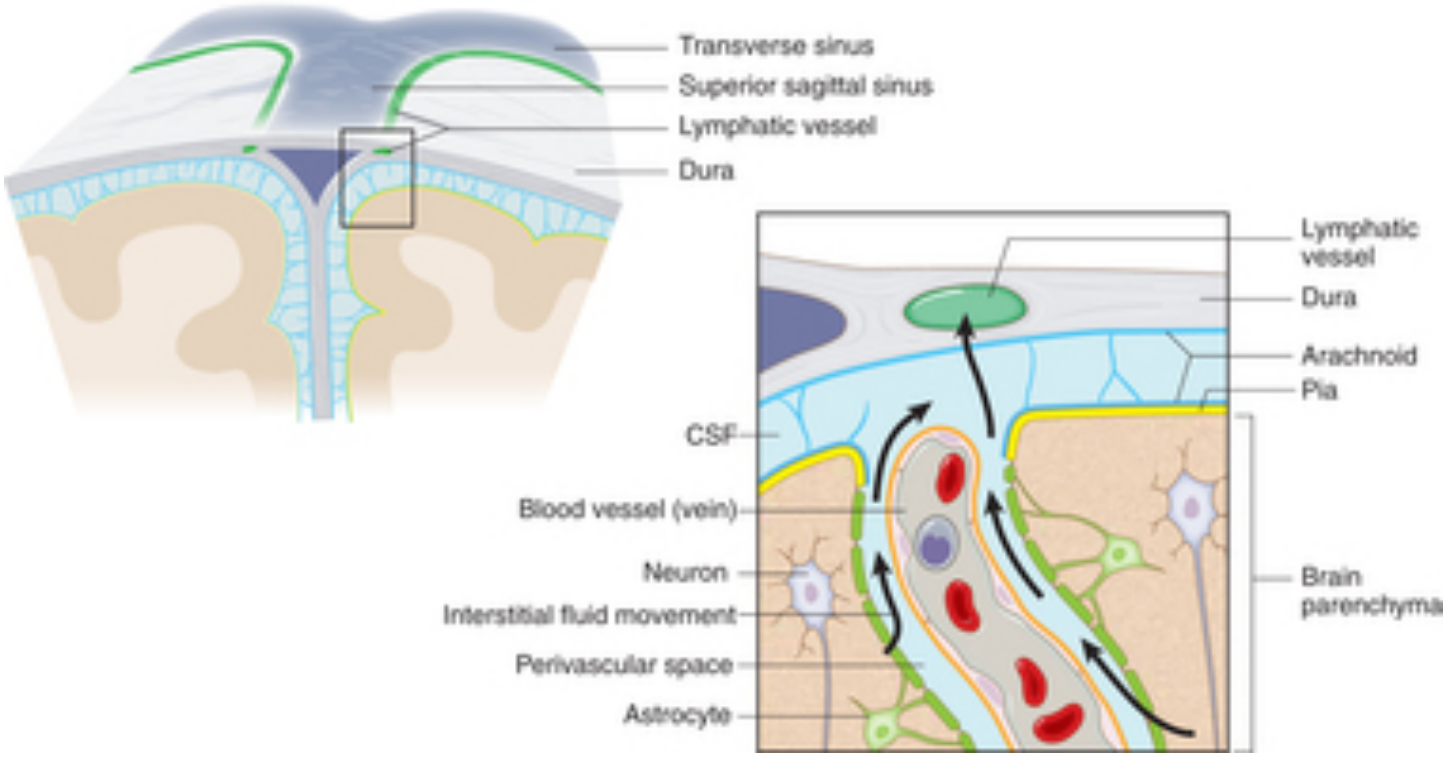


1. How does the CSF penetrate throughout all corners of the brain?
2. Exchange cannot be driven by diffusion: too slow.

The Glymphatic System



The meningeal lymphatic System



Connection between the glymphatic system and the meningeal lymphatic system.

Cleaning happens during sleep