1176-92-285 **Robert Eisenberg*** (bob.eisenberg@gmail.com). *Flushing Waste in the Central Nervous System.*

The central nervous system has a tiny extracellular space easily filled by flows from nerve and glia. Potassium ions in that space can block signaling in nerve fibers and thus become a toxic waste. Sleep is said to flush toxic wastes from the brain, in the glymphatic hypothesis. Qualitative hypotheses like this are difficult to test and can lead to more discussion than knowledge. Numbers are needed because flows in complex structures are complex. We construct models that are field theories built on conservation laws written as partial differential equations in 3 dimensions and time. Models can include channels/transporters as they are discovered and other structures in the brain. The differential equations fit experimental data in some detail, as do equations of the lens of the eye. Simplified models can be derived by perturbation expansion, with errors determined from numerical solution. Simplified models are crucial for communication with the biological and clinical community and are helpful in the design of new experiments. Computation shows that extracellular potassium is maintained by bulk flow, mostly in the glia. The glia acts as a pipe that moves potassium by convection away from the nerve membrane, presumably into blood vessels, as proposed by the glymphatic hypothesis. (Received January 25, 2022)