

Cerebrospinal Fluid

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The knowledge of Cerebrospinal Fluid (CSF) and its movements is changing rapidly in these years. The different mechanisms behind many unique patterns of CSF movements are continuously discovered. Modern research on human health and, thereby, the CNS and the related systems to CSF, is taking place at a speed that was difficult to imagine even ten years ago.

Just few weeks ago a fourth meningeal layer/membrane was reported. Another possible aspect of control and flow of CSF around the brain is being discovered. The described fourth membrane SLYM (figure 9) adds to a long list of the complex role played by CSF.

A simple model of CSF fluctuations as an explanation for the craniosacral rhythm that we palpate with our hands has been updated today due to new science and measuring capabilities. Therefore the model of CSF movement postulated in the Pressurestat Model needs to be updated while the relation to health effects of CST in relation the CSF movements continues to have a long list of positive outcomes.

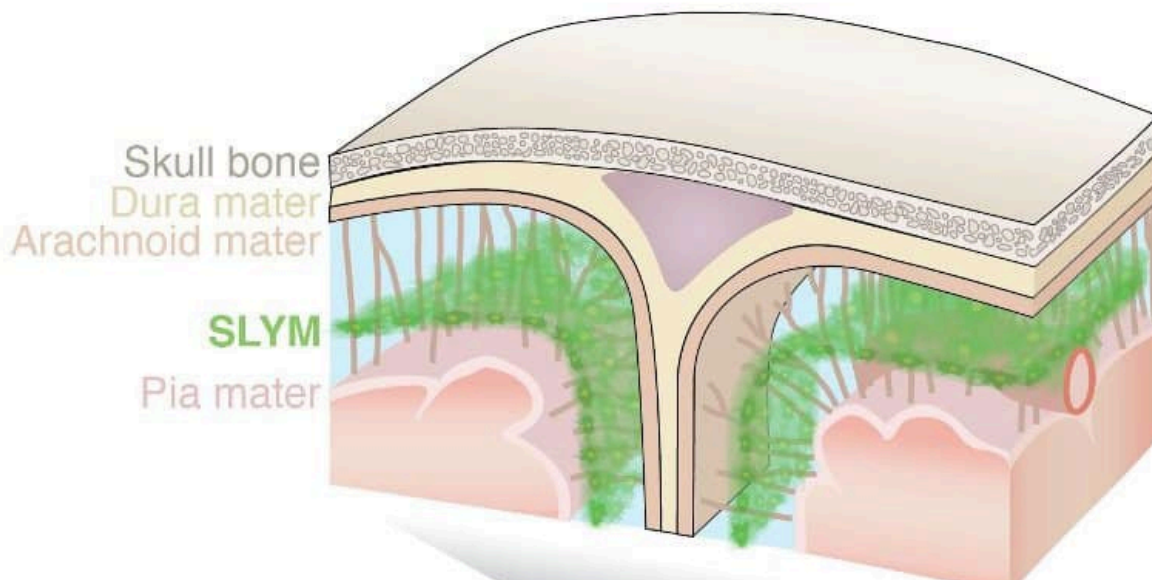


Figure 9. The fourth membrane SLYM.

Movement of CSF involves many different mechanisms with both general and local acting parts. The use of cilia on the ependymal cells to make local movements of CSF in the third ventricle is today well-studied. The rotational local movement of CSF can today be monitored by advanced scanning techniques (Figure 10).

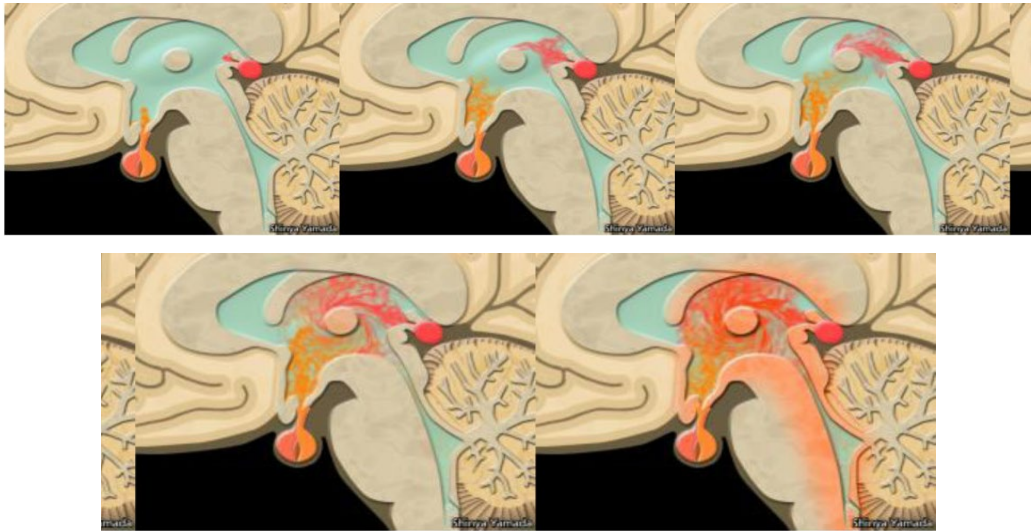


Figure 10. Molecular marking of liquid areas in the third ventricle near hypothalamus area (orange) and pineal gland area (red). The local directing of liquids in the third ventricle is illustrated. Another example of CSF movement is the different rhythmic movements in the fourth ventricle at different states of consciousness (Figure 11). The pulsation in CSF in the fourth ventricle is created by the respiratory breathing during a state of being awake. The pulsation in CSF in the fourth ventricle during deep sleep is with 2-3 cycles/min, signified by a state with a slow delta brain wave of 2-3 cycles/min, that simultaneously opens the glymphatic system.

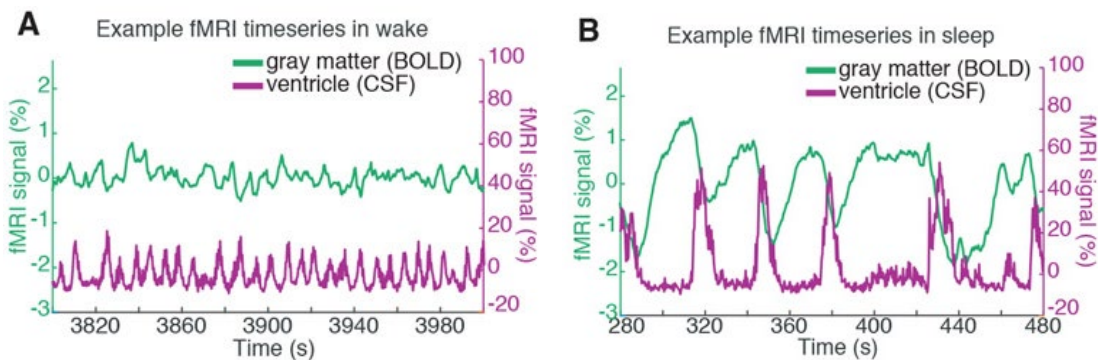


Figure 11. CSF rhythmic movements in the fourth ventricle during a state of awake (A) and in deep sleep (B).