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A model for the oscillatory flow in the cerebral aqueduct STEPHANIE SINCOMB, University of California, San Diego, WILFRIED COENEN, Universidad Carlos III de Madrid, ERNESTO CRIADO-HIDALGO, University of California, San Diego, KE WEI, KEVIN KING, Huntington Medical Research Institutes, VICTOR HAUGHTON, University of Wisconsin Madison, ANTONIO SANCHEZ, JUAN LASHERAS, University of California, San Diego — The transmantle pressure (TMP) (the pressure difference between the lateral ventricles of the brain and the cranial subarachnoid space) has been reasoned to play a key role in the development of some neurogenerative diseases, such as idiopathic Normal Pressure Hydrocephalus (iNPH). Direct measurement of this quantity requires very accurate simultaneous readings from two separate high-resolution pressure sensors implanted in the brain, an invasive procedure with considerable health risk factors. Despite considerable past efforts, there still is an unmet demand to develop non-invasive techniques capable of calculating the temporal variation of the TMP along the cardiac cycle. We present a simplified model to indirectly calculate the TMP from phase contrast MRI velocity measurements of the cerebrospinal fluid (CSF) in the cerebral aqueduct connecting the third and fourth brain ventricles. We further apply this non-invasive method to human subjects with ages ranging from 25 to 92 years showing that the TMP monotonically increases with age.

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