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A 2D microfluidic model of CSF motion in periarterial spaces of the brain[1] KEELIN QUIRK, Mount Holyoke College, DOUGLAS KELLEY, University of Rochester, KERSTIN NORDSTROM, Mount Holyoke College, MOUNT HOLYOKE CRAM LAB TEAM, UNIVERSITY OF ROCHESTER MIXING LAB TEAM — We have developed microfluidic devices to serve as two-dimensional models of periarterial spaces in the human brain. Using particle tracking velocimetry, we analyzed flow induced by a peristaltic wave in a frequency range representative of human heartbeats. We found that the induced flow moved in the same direction on average as the peristaltic wave. However, the induced flow oscillated forward and backward during each pulsation. We have found a power law relationship between the root-mean-square (RMS) velocity of the induced flow and the driving frequency. We have also developed detailed characterizations of the fluid motion at each frequency by creating phase plots of the oscillatory motion and analyzing the velocity distributions and their moments. Our observation that induced flow oscillated but moved in the same direction as the peristaltic wave on average was consistent with previous models of peristalsis. We concluded that the peristaltic wave along a flexible membrane induced fluid motion that was similar to what has been observed during *in vivo* experiments, and that the induced mean and RMS velocities decreased as the frequency increased.

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