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Coupling a mechanosensitive channel with a vesicle under shear flow ON SHUN PAK, Princeton University, YUAN NAN YOUNG, New Jersey Institute of Technology, SHRAVAN VEERAPANENI, University of Michigan, HOWARD STONE, Princeton University — Mechanosensitive channels enable cells to respond to their local environment. Continuum mechanical models have been proposed to describe how bilayer deformation induced by the transmembrane protein and the membrane tension influence the free energy of channel gating under static conditions. The dynamics of mechanosensitive channels under flow conditions however remains largely unexplored. Cells under flow display interesting features not observed under static environments. Here we present a model coupling a mechanosensitive channel with the dynamics of a vesicle under shear flow to investigate how the channel gating responds to hydrodynamic stress. The model could be used to investigate the release of signaling molecules, transport of ions or drugs across cell membranes under flow in biological systems, as well as the design and control of channel gating in synthetic cells.

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