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Hydrodynamic Contributions to Amoeboid Cell Motility OWEN LEWIS, ROBERT GUY, University of California, Davis — Understanding the methods by which cells move is a fundamental problem in modern biology. Recent evidence has shown that the fluid dynamics of cytoplasm can play a vital role in cellular motility. The slime mold Physarum polycephalum provides an excellent model organism for the study of amoeboid motion. In this research, we use a simply analytic model in conjuction with computational experiments to investigate intracellular fluid flow in a simple model of Physarum. Of particlar interest are stresses generated by cytoplasmic flow which may be used to aid in cellular motility. In our numerical model, the Immersed Boundary Method is used to account for such stresses. We investigate the relationship between contraction waves, flow waves, adhesion, and locomotive forces in an attempt to characterize conditions necessary to generate directed motion.

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