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Investigations of biomechanical activity of macrophages during phagocytosis DANIEL KOVARI, JENNIFER CURTIS, Georgia Institute of Technology — Phagocytosis has traditionally been investigated in terms of the relevant biochemical signaling pathways that trigger the process and lead to the deformation of the cell as it engulfs a target. Physical changes in the cell include rearrangement and polymerization of actin in the phagocytic cup, large membrane deformations, increased membrane area via exocytosis, and closure of the phagocytic cup through membrane fusion. Hence, phagocytosis is a fine-tuned balance between biophysical cellular events and chemical signaling, which are responsible for driving these materials and mechanical changes. We present a series of assays designed to probe the physical/mechanical parameters that govern a cell during phagocytosis. Custom built micropipette manipulators are used to manipulate individual cells, facilitating high-resolution microscopy of individual phagocytic events. This work has been supported by NSF PoLS #0848797.

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