

Abstract Submitted
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Mechanics of Nascent Cell Adhesions CECILE O. MEJEAN, ANDREW W. SCHAEFER, PAUL FORSCHER, ERIC R. DUFRESNE, Yale University — Cells have the ability to sense and respond to mechanical and biochemical cues from their environment. In neurons, the binding and restraint of transmembrane cell adhesion molecules (CAMs) can trigger acute periods of axon growth. Preceding growth, the cell must create a stiff mechanical linkage between the CAM and the cytoskeleton. Using holographic optical tweezers, we manipulate CAM-coated beads on the membrane of the cell. We investigate the dynamics of the mechanical properties of this linkage as a function of time, applied force, and CAM density. We find that CAM-coated beads exhibit stochastic intermittent binding to the cytoskeleton. In time, we observed that the adhesions stiffen and their mechanical properties depend on the applied force. Treatment of cells with small molecules that alter cytoskeletal dynamics are used to probe the roles of actin filament assembly and myosin motor activity in adhesion formation.

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