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Tracking Cytoskeletal Dynamics in Living Neurons via Combined Atomic Force and Fluorescence Microscopy ELISE SPEDDEN, DAVID KAPLAN, CRISTIAN STAII, Tufts University — Living cells are active mechanical structures which evolve within and in response to their local microenvironments. Various cell types possess different mechanical properties and respond uniquely to growth, environmental changes, and the application of chemical stimuli. Here we present a powerful approach which combines high resolution Atomic Force Microscopy with Fluorescence Microscopy to systematically obtain real-time micrometer and sub-micrometer resolution elasticity maps for live neuronal cells cultured on glass substrates. Through this approach we measure the topography, the elastic properties, and the dynamics of neuronal cells, and identify changes in cytoskeletal components during axonal growth, chemical modification, and changes in ambient temperature. We will also show high resolution elasticity measurements of the cell body and of axons/dendrites during growth, as well as identification of cytoskeletal components during cell growth and environmental changes.

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