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Microrheology of Microtubules "Networks" NAAMA GAL, CRAIG MANDATO, MARIA KILFOIL — Microtubules are the largest of the three protein biopolymers comprising the cytoskeleton, the other two being intermediate filaments and filamentous actin. While the mechanical properties of actin networks have been studied extensively, less is known about the mechanical properties of microtubules at high concentrations in the cytosol. Microtubules are involved in many of the cell functions, such as cell division and cargo transport within the cell. We use passive microrheology, extracting a viscoelastic modulus of the network based on the thermal motion of micron sized beads, to measure the elasticity of microtubules under various conditions in vitro. Our results show that the bead motion varies from highly confined to free, indicating the heterogeneous, structure of the network. We study the mechanical properties and the spatial heterogeneity and structure of these microtubule "networks" as a function of tubulin monomer concentration, ratio of microtubule associated protein to tubulin monomer concentration, and DMSO or nucleating factor concentration.

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