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Actin-Filamin Networks and Cell Mechanics KAREN KASZA, Harvard University, FUMIHIKO NAKAMURA, THOMAS STOSSEL, Brigham and Women's Hospital, NING WANG, University of Illinois at Urbana-Champaign, DAVID WEITZ, Harvard University — We seek to elucidate the mechanisms underlying stress dependent stiffening of the cellular cytoskeleton. Filamin A (FLNa) is a protein that cross-links and bundles actin filaments into soft gels that stiffen dramatically with applied mechanical stress. Living cells show similar stiffening behavior, but the underlying physical mechanism is poorly understood. While it is known that FLNa plays an important *biological* role in some very mechanical cellular processes, it is still unclear whether FLNa plays such a dominant *mechanical* role in the cell as it does in simple reconstituted actin networks. Here, we work with a human melanoma cell line deficient in FLNa and a transfected subline expressing FLNa. For both cell lines, we probe cell stiffness measured by magnetic twisting cytometry as we increase the stress supported by the actin cytoskeleton to determine the contribution of FLNa to both the linear and nonlinear material properties of the cell cytoskeleton.

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