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Elastic behavior of vimentin intermediate filament networks HUAYIN WU, ELIZA MORRIS, DAVID WEITZ, Harvard University — A cell's response to mechanical stress is closely linked to the structure and elasticity of its cytoskeleton, which is comprised primarily of actin, microtubule, and intermediate filament (IF) networks. Vimentin is an IF found in mesenchymal cells that plays a role in anchoring organelles and contributes to overall cellular elasticity. Previous research has shown that vimentin networks behave like softly crosslinked gels in the presence of divalent cations. The linear elastic modulus, a measure of stiffness and resistance to elastic deformation, of the network is related to the degree of crosslinking, which is itself controlled by the cation concentration. Increasing the concentration of the divalent cations further results in the formation of bundles within the network, but this bundling behavior is not well understood. Here we investigate the response of in vitro reconstituted vimentin networks to applied shear in the presence of various divalent species to better understand their individual contributions to the network's elastic behavior.

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