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The Elasticity Response to Substrate Stiffness in Cancer Cells NICOLAS NIKOLOUTSOS, IAN LIAN, Lamar University, CHING-HWA KIANG, RAYMOND FANG, Rice University, GABRIEL GRAHAM, Lamar University, KEVIN JIANG, JINGQIANG LI, SITHARA WIJERATNE, Rice University — We measured the effects of extracellular matrix (ECM) stiffness on cancer cell behavior with a silicone-based substrate platform that mimics relevant physiological tissue stiffness ranges. Cell lines grown on this platform exhibit drastically different morphologies depending upon the microenvironment stiffness. In order to study the effect of substrate stiffness on cellular membrane tension, the forces from extracted membrane tethers were quantified using atomic force microscopy (AFM). Based on the results obtained from HeLa, EKVX, and MDA-MB-453 cell lines, an increase in the membrane tether forces was observed as the substrate stiffness increased, suggesting the differences in morphological outcomes are a result of changes in membrane elasticity.

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