

Abstract Submitted
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The Role of Vimentin in Regulating Cellular Response to Substrate Properties¹ WILL LINTHICUM, QI WEN², Worcester Polytechnic Institute — Mechanical stiffness and nanotopography of extracellular matrix can regulate cellular behavior. Studying the mechanisms that allow cells to sense these physical properties of the microenvironment aids in the understanding of critical medical questions such as cancer cell metastasis and immunological responses to tissue engineered constructs. We aim to unveil the role of vimentin, a cytoskeletal protein, in mediating the cellular sensitivity to changes in substrate stiffness and nanotopography, as vimentin has been established as a biomarker for cancer and a regulator of cell morphology. Using Atomic Force Microscopy, we measured the cell stiffness of fibroblasts as a function of substrate nanotopography and stiffness. We found that decreasing the level of vimentin expression in 3T3 fibroblasts led to decreased ability to sense variations in substrate stiffness. In the future, we will characterize the effects of vimentin knockdown on cellular sensitivity to substrate nanotopography. Moreover, to test the hypothesis that vimentin modulate ability of cells to sense their microenvironment through its regulative effects on integrin-based adhesions, we will study the vimentin regulated cell-substrate adhesions on the single molecule level using single cell force spectroscopy.

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