

Abstract Submitted
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How Deep Cells Feel AMNON BUXBOIM, EDWARD C. ECKELS, DENNIS E. DISCHER, University of Pennsylvania — Lacking eyes to see and ears to hear, cells can still sense their microenvironment by physically touching and deforming, thus sensing not only their immediate surroundings but also feeling beyond the cell-matrix interface. To elucidate how deeply cells feel we cultured mesenchymal stem cells on gels-made microfilms with controlled elasticity (E) and thickness (h). After 36hrs in culture cells spread area was smaller on thick and on soft than on thin and on stiff films, respectively, and correlated with nuclei morphology. Transition in spread area was obtained at <5 microns gel thickness. Transcription levels of Lamin-A predominantly decreased with E and in a similar fashion to Lamin-A expression levels increased with h . RNA levels of histones and of chromatin-remodeling enzymes were similar for stiff gels and for soft but thin films but suppression of cell contractility resulted in transcriptional profiles that were uncorrelated with matrix-emerging cues. We conclude that cells actively sense up to 20 microns into soft, adipose-like matrix. Cellular response to E and h includes cytoskeletal reorganization, NE remodeling with evidence of coupling between matrix-emerging signals and regulation of gene expression

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