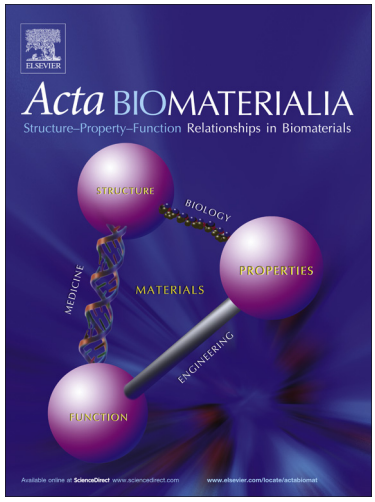

Peptide microarray patterning for controlling and monitoring cell growth

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Peptide microarray patterning for controlling and monitoring cell growth.

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Abstract

The fate of cells is influenced by their microenvironment and many cell types undergo differentiation when stimulated by extracellular cues, such as soluble growth factors and the insoluble extracellular matrix (ECM). Stimulating differentiation by insoluble or "immobilized" cues is particularly attractive because it allows for the induction of differentiation in a spatially-defined cohort of cells within a larger subpopulation. To improve the design of *de novo* screening of such insoluble factors, we describe a methodology for producing high-density peptide microarrays suitable for extended cell culture and fluorescence microscopy. As a model, we used normal murine mammary gland (NMuMG) cells, which undergo epithelial-to-mesenchymal transition (EMT) in response to soluble transforming factor beta (TGF-β) and surface-immobilized peptides that target TGF-β receptors (TGFβRI/II). We repurposed a well-established DNA microarray printing technique to produce arrays of micro patterned surfaces that displayed TGFβRI/II-binding peptides and integrin binding peptides. Upon long-term culture on these arrays, only NMuMG cells residing on EMT-stimulating areas exhibit growth arrest and a decrease in E-cadherin expression. We believe that the methodology developed in this report will aid the development of peptide-decorated surfaces that can locally stimulate defined cells surface receptors in cells and control EMT and other well-characterized differentiation events.