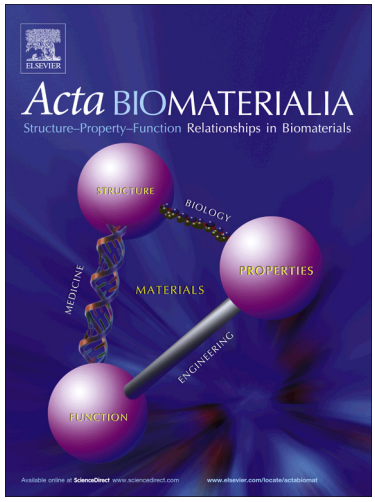

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Hydrogel arrays formed via differential wettability patterning enable combinatorial screening of stem cell behavior

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Abstract

Here, we have developed a novel method for forming hydrogel arrays using surfaces patterned with differential wettability. Our method for benchtop array formation is suitable for enhanced-throughput, combinatorial screening of biochemical and biophysical cues from chemically defined cell culture substrates. We demonstrated the ability to generate these arrays without the need for liquid handling systems and screened the combinatorial effects of substrate stiffness and immobilized cell adhesion peptide concentration on human mesenchymal stem cell (hMSC) behavior during short-term 2-dimensional cell culture. Regardless of substrate stiffness, hMSC initial cell attachment, spreading, and proliferation were linearly correlated with immobilized CRGDS peptide concentration. Increasing substrate stiffness also resulted in increased hMSC initial cell attachment, spreading, and proliferation; however, examination of the combinatorial effects of CRGDS peptide concentration and substrate stiffness revealed potential interplay between these distinct substrate signals. Maximal hMSC