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Control cell adhesion with dynamic bilayer films ANDREAS KOUROUKLIS, Department of Chemical Engineering, Umass Amherst, RONALD LERUM, Department of Polymer Science & Engineering, Umass Amherst, HARRY BERMUDEZ, Department of Polymer Science & Engineering and Department of Chemical Engineering, Umass Amherst — Interfacially-directed assembly of amphiphilic block copolymers was employed to create ultrathin films having the potential to correlate the dynamics of ECM cues with cell adhesion and cytoskeletally-generated forces. The mobility of the polymeric bilayer films were tuned by the incorporation of hydrophobic homopolymer chains, which are thought to reduce interlayer friction. Labeling of the block copolymer chains with an adhesive peptide ligand (RGD) provided a specific means to study integrin-mediated cellular processes and the corresponding mechanotransduction. By seeding anchorage-dependent cells on "dynamic" (laterally mobile) and "static" films that display the same amount of RGD, we have found that cells recognize the difference in RGD diffusivity and develop distinct responses over time. We intend to examine changes in cell response by controlling the extent of cytoskeletally-generated forces and the assembly dynamics of focal adhesion complexes. Such films provide a unique platform to unveil the biomechanical signals related with ECM dynamics, and may ultimately facilitate a deeper understanding of cellular processes.

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