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Contractile recovery of microtissues after giant shear events CAMERON MORLEY, TAPOMOY BHATTACHARJEE, SARAH ELLISON, W. SAWYER, THOMAS ANGELINI, University of Florida — Cells are often dispersed in extracellular matrix (ECM) gels like collagen and Matrigel as minimal tissue models. Generally, large-scale contraction of these constructs is observed, in which the degree of contraction of the entire system correlates with cell density and ECM concentration. The freedom to perform diverse mechanical experiments on these contracting constructs is limited by the challenges of handling and supporting these delicate samples. Here, we present a method to create simple cell-ECM constructs that can be manipulated with significantly reduced experimental limitations. We 3D print mixtures of MCF10A cells and ECM (collagen-I and Matrigel) into a 3D growth medium made from jammed microgels. With this approach, we are able to apply shear stresses to the cell constructs times after printing and observe the collective response. Preliminary results reveal that, following shear deformations that exceed 300% and dramatically smear cells and matrix in space, the cells actively re-contract the construct toward the un-sheared construct. These results suggest that new principles of collective recovery can be employed for tissue engineering applications using jammed microgels as a re-configurable support medium.

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