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Self-assembling, bioactive protein hydrogels via engineered coiled-coil aggregation. JAMES HARDEN, University of Ottawa, STEPHEN FISCHER, Johns Hopkins University, LIXIN MI, Georgetown University — We describe associating triblock proteins with that self-assemble into reversible, nanostructured hydrogels with a regular network structure and specific biofunctional attributes. These fibrilar, telechelic designs consist of a hydrophilic random coil (denoted R) flanked by associating coiled-coil end domains (denoted A, B, C). The central R domain also encodes specific cell binding and signaling functions of extracellular matrix (ECM) constituents. We will discuss a series of proteins with complimentary associating end blocks that preferentially form heterotrimer aggregates of A, B, and C domains. Mixtures of symmetric triblocks ARA, BRB, and CRC in aqueous solution self assemble into reversible viscoelastic network structures, which we characterize using microscopy, light scattering techniques and computer simulations. Supporting circular dichroism and analytical ultracentrifugation studies of the secondary structure and association behavior of the A, B, C domains will also be presented. Through the use of microscopic and cell proliferation assays, we also show that these hydrogels are capable of inducing biomimetic responses of ECM constituents in cell culture experiments.

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