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Diffusion and Controlled Localized Drug Release from an Injectable Solid Self-Assembling Peptide Hydrogel JESSIE E.P. SUN, BRANDON STEWART, University of Delaware, SIGRID LANGHANS, Nemours Alfred I duPont Hospital for Children, JOEL P. STEWART, National Cancer Institute, DARRIN J. POCHAN, University of Delaware — We use an injectable solid peptide hydrogel (first assembled into a solid hydrogel, can shear-thin flow and immediately reheal on cessation of shear) as a drug delivery vehicle for sustained and active drug release. The triggered intramolecular peptide folding into a beta-hairpin leads to intermolecular assmebly of the peptides into the entangled and branched nanofibrillar hydrogel network responsible for its advantageous rheological properties. The hydrogel is used to encapsulate a highly effective chemotherapeutic, vincristine, with hydrophobic behavior. We show that we are able to constantly maintain drug release in low but still potent concentrations after the shear-thinning injection process. Similarly, the mechanical and morphoogical properties of the gels remains identical after injection. Characterization of the hydrogel construct is through tritiated vincristine release, TEM, confocal microscopy, and in vitro methods.

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