

Supporting Information for:

Electroconductive Gelatin Methacryloyl-
PEDOT:PSS Composite Hydrogels: Design,
Synthesis, and Properties

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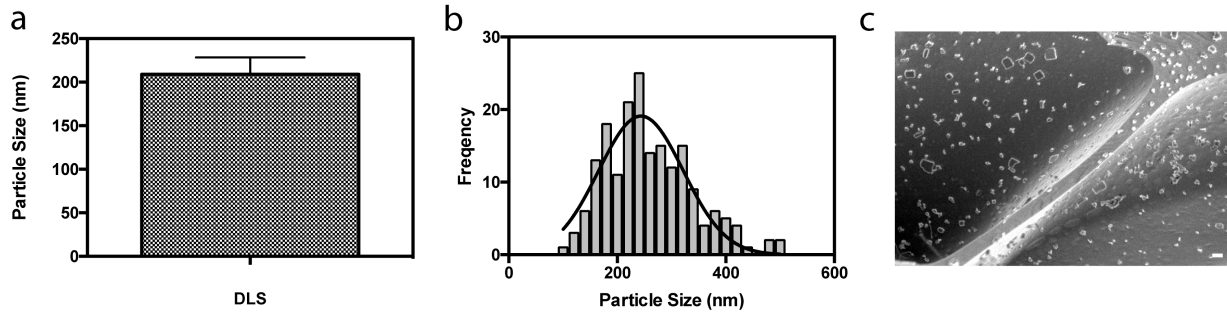


Figure S1. Characterization of particle size in GelMA/PEDOT:PSS composites. Average particle size \pm SD from the main peaks of DLS measurements, representing \sim 82% of the spectrum intensity (a). Histogram of particle size distribution along the particles' short axis fitted to a Gaussian distribution. Approximately 94% of the particles measured fall within the range of 100-500 nm (b). Representative high-resolution SEM image of a pore wall of a hydrogel containing PEDOT:PSS (c) (scale bar = 1 μ m).

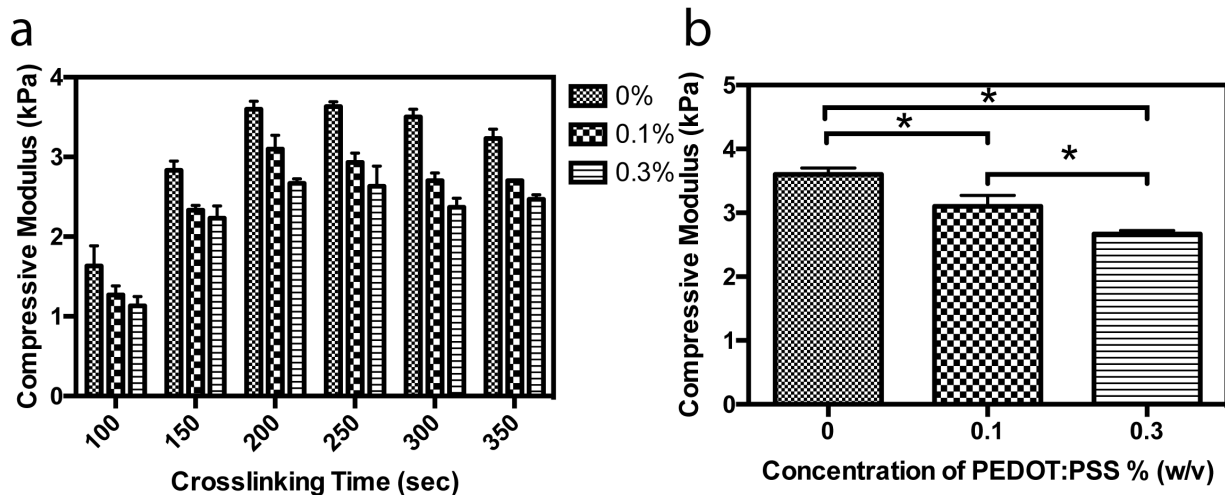


Figure S2. Compression testing of cylindrical hydrogels. Compressive modulus of GelMA/PEDOT:PSS hydrogels with varying concentrations of PEDOT:PSS with increasing exposure times to UV light (a). Compressive modulus of GelMA/PEDOT:PSS hydrogels exposed to UV light for 200 s (b).

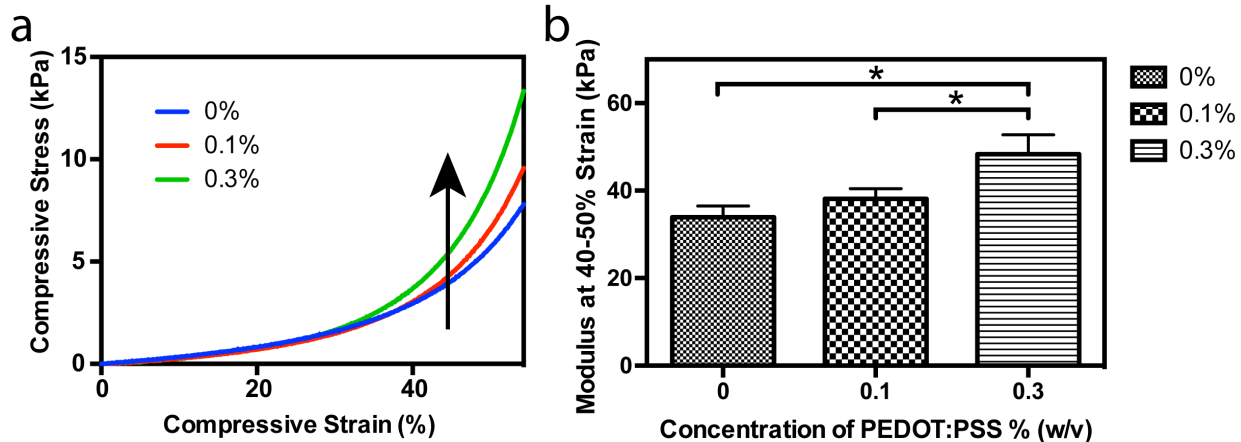


Figure S3. Modulus of GelMA/PEDOT:PSS hydrogels at high compressive strain. Representative compression curves for GelMA/PEDOT:PSS hydrogels (a). Black arrow in (a) indicates increased stiffness at high strain. The slope of the compression curves in the portion of the stress-strain curve from 40-50% strain (b).

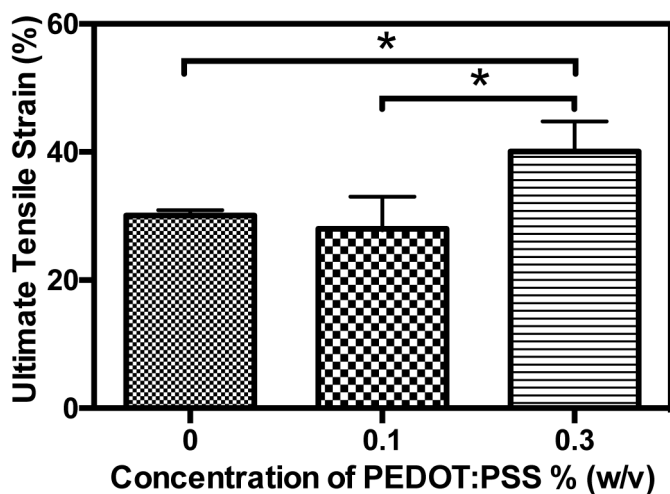


Figure S4. Ultimate tensile strain of hydrogels with varying PEDOT:PSS loading. Ultimate tensile strain at which hydrogel samples under tension broke during tensile testing of rectangular hydrogel samples.

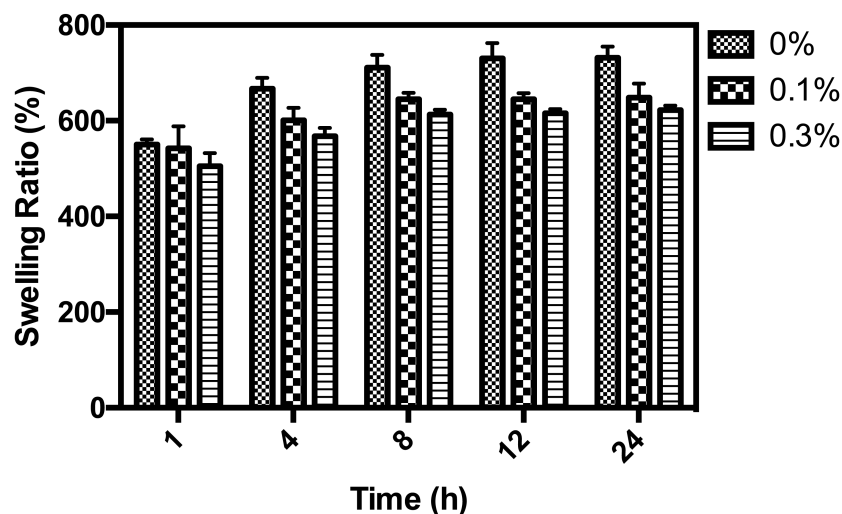


Figure S5. Swelling ratio of GelMA/PEDOT:PSS hydrogels at various time points. Swelling ratio of hydrogels at varying concentration of PEDOT:PSS at all time points. Gels all reached over 95% of maximum swelling ratio after 8 h of swelling.

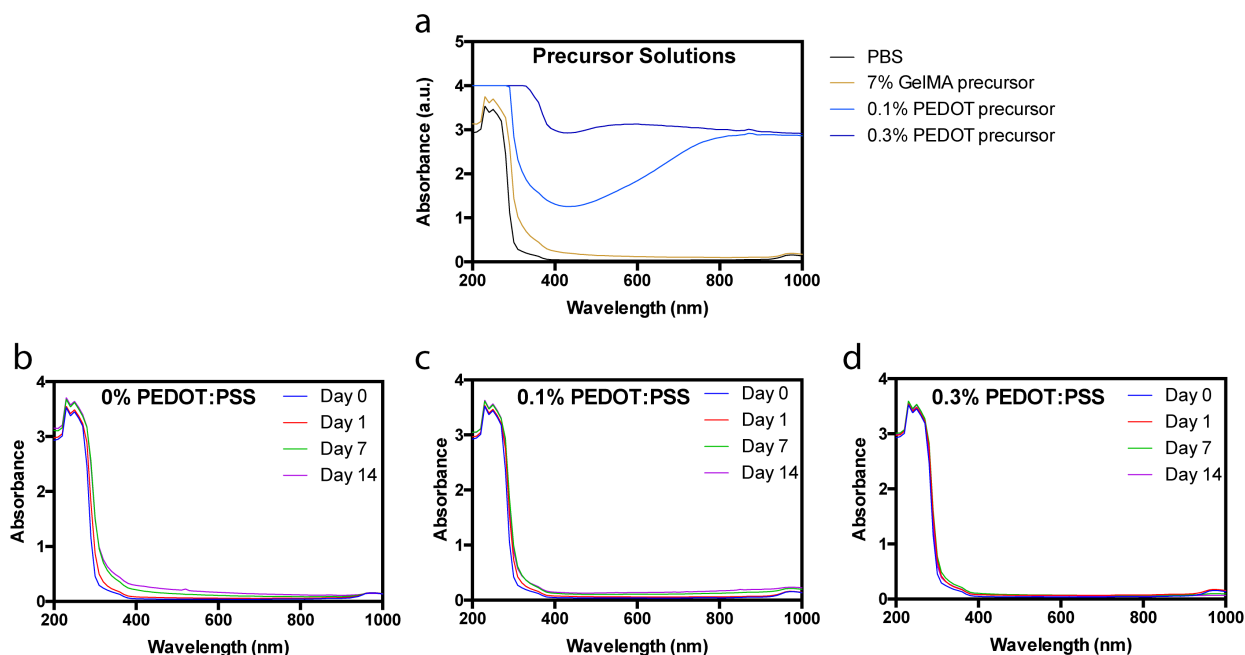


Figure S6. UV-vis spectra of degradation solutions. UV-vis absorbance of DPBS and solutions of unpolymerized precursors, containing 7% GelMA and 0-0.3% PEDOT:PSS (a). UV-vis spectra of PBS solutions in which hydrogels containing various concentration of PEDOT:PSS were incubated demonstrates minimal loss of b) pure GelMA, c) 0.1% PEDOT:PSS, and d) 0.3% PEDOT:PSS into the PBS storage solution for up to 14 days of incubation. Hydrogels were removed from the storage solution prior to measurements, and the lack of absorbance in the visible range indicates the stability of PEDOT:PSS.

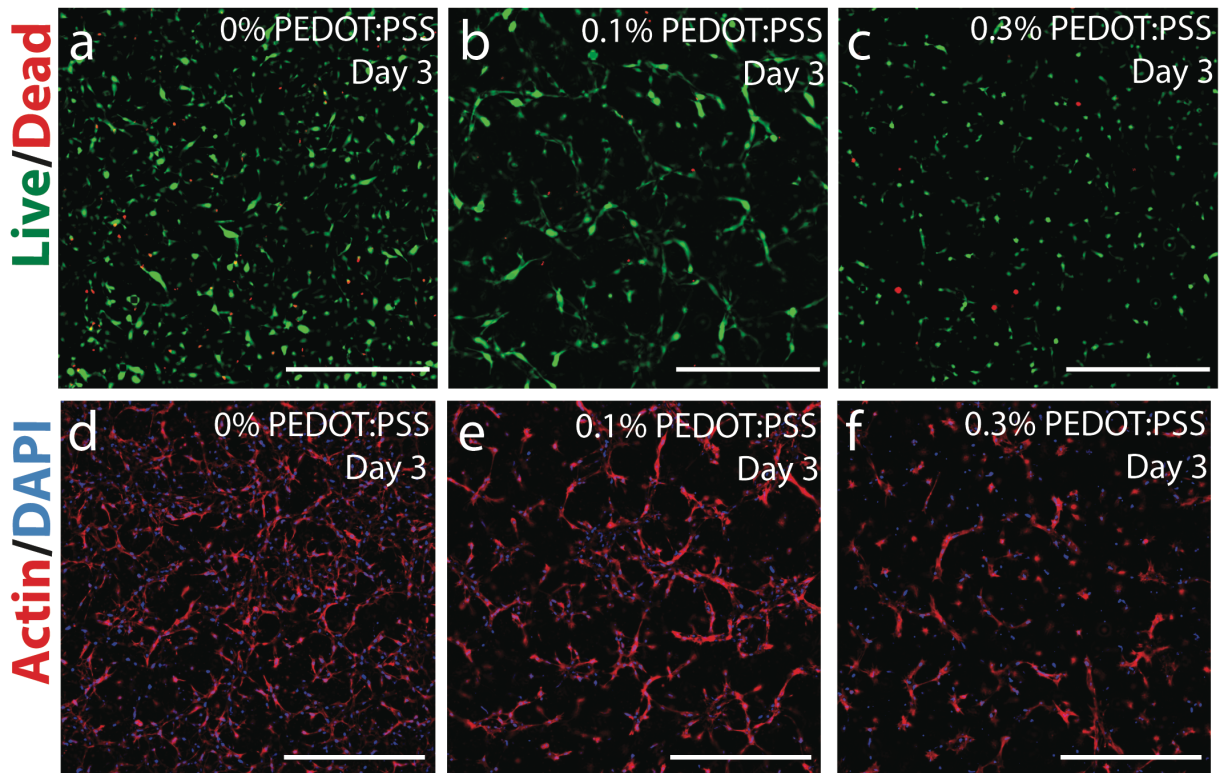


Figure S7. Representative fluorescence microscopy images from 3D cell encapsulation. Representative Live/Dead images from C2C12 cells encapsulated in 0% (a), 0.1% (b) and 0.3% (c) PEDOT:PSS at day 3 of culture (scale bars = 500 μm). Representative Actin/DAPI images from C2C12 cells encapsulated in 0% (d), 0.1% (e) and 0.3% (f) PEDOT:PSS at day 3 of culture (scale bars = 500 μm).

Movie S1. *Ex Vivo* stimulation of abdominal tissue. Tissue slices extracted from the *rectus abdominus* of adult rats were connected with a hydrogel containing 7% GelMA and 0.3% PEDOT:PSS and stimulated with platinum wires connected to a pulse generator. Voltage was raised until both pieces of tissue were visually observed to contract.