Supplementary Information

An Injectable, Calcium Responsive Composite Hydrogel for the Treatment of Acute Spinal Cord Injury

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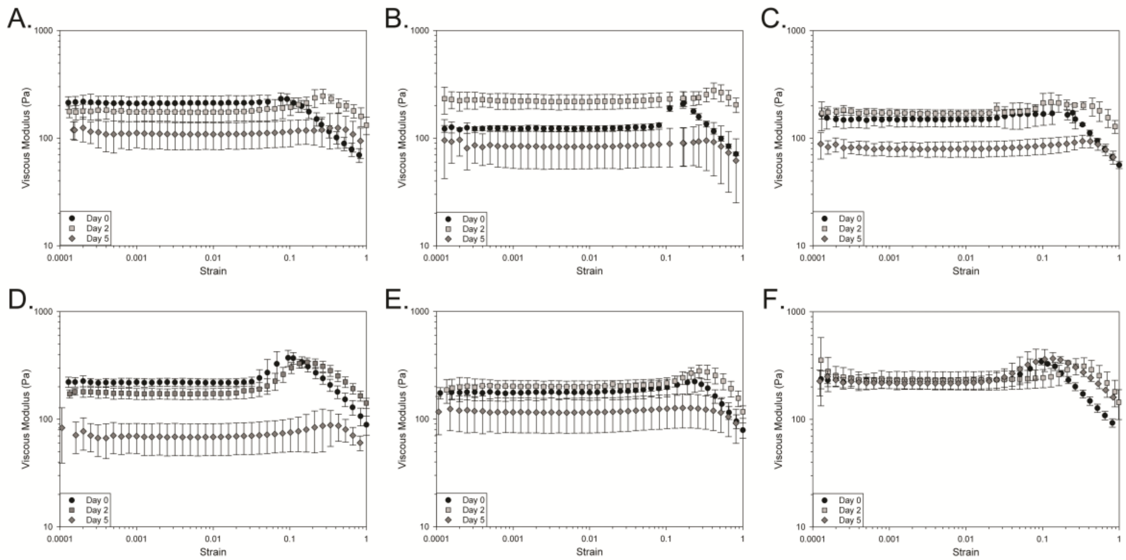
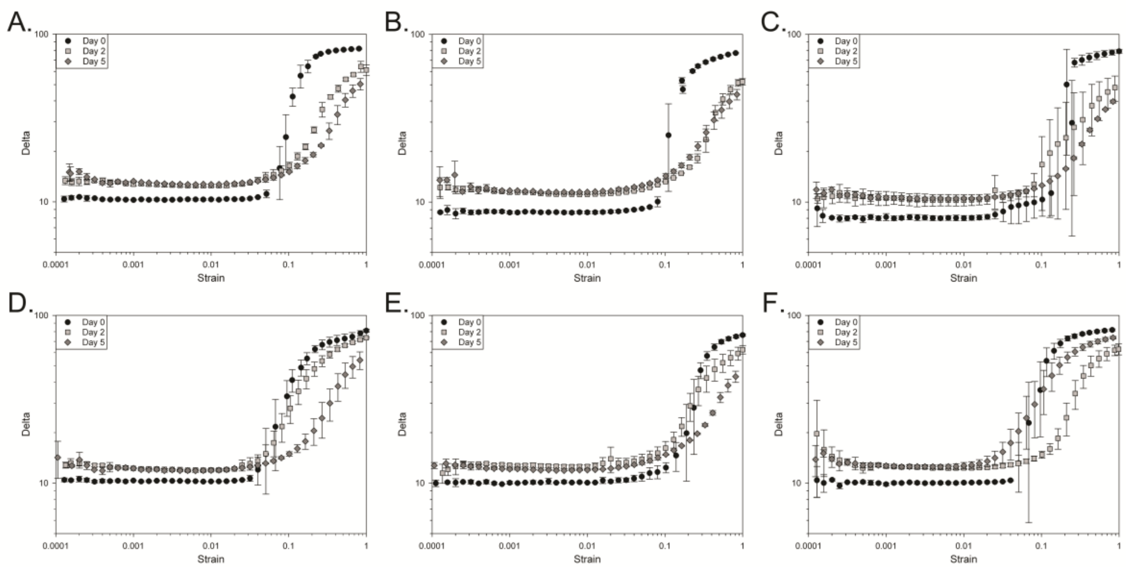


Supplementary Figure 1. A-F) Viscous modulus obtained from strain sweeps **after *in situ* gelation modeling with normal Ca^{2+} concentration (1.8 mM)**, demonstrating the effect of long term incubation in Ca^{2+} containing media. **The delayed increase in viscous modulus following incubation complements the increased LVE limit observed in Figure 2. This provides further evidence that incubating hydrogels in Ca^{2+} containing media promotes increased hydrogel stability and a change in internal crosslinking structure in response to C^{2+} exposure.** (A) A5/C0/G0/Ca22, (B) A5/C0/G0/Ca22, (C) A5/C125/G1/Ca24, (D) A25/C125/C1/Ca23, (E) A5/C25/C01/Ca20, (F) and A25/C25/C05/Ca18. n = 3, mean ± standard deviation.



Supplementary Figure 2. Phase angle (delta) obtained from strain sweeps **after *in* situ gelation modeling with normal Ca^{2+} concentration (1.8 mM)**, demonstrating the effect of long term incubation in Ca^{2+} containing media. Delta is the ratio of the viscous modulus to the elastic modulus (delta = $\tan^{-1}$(viscous/elastic) and provides information about the relative viscoelastic nature of the hydrogel. In this case, a lower value of delta indicates a more **elastic, solid-like material** material. **The delayed increase in phase angle (delta) following incubation complements the increased LVE limit observed in Figure 2 and delayed increase in viscous modulus observed in Supplementary Figure 1.** Hydrogels that have been incubated in Ca^{2+} exhibit a more elastic nature at higher strains than non-incubated samples, indicating a**n increase in hydrogel stability and a change in the internal crosslinking structure in response to Ca^{2+} exposure.** (A) A5/C0/G0/Ca22, (B) A5/C0/G0/Ca22, (C) A5/C125/G1/Ca24, (D) A25/C125/C1/Ca23, (E) A5/C25/C01/Ca20, (F) and A25/C25/C05/Ca18. n = 3, mean ± standard deviation.

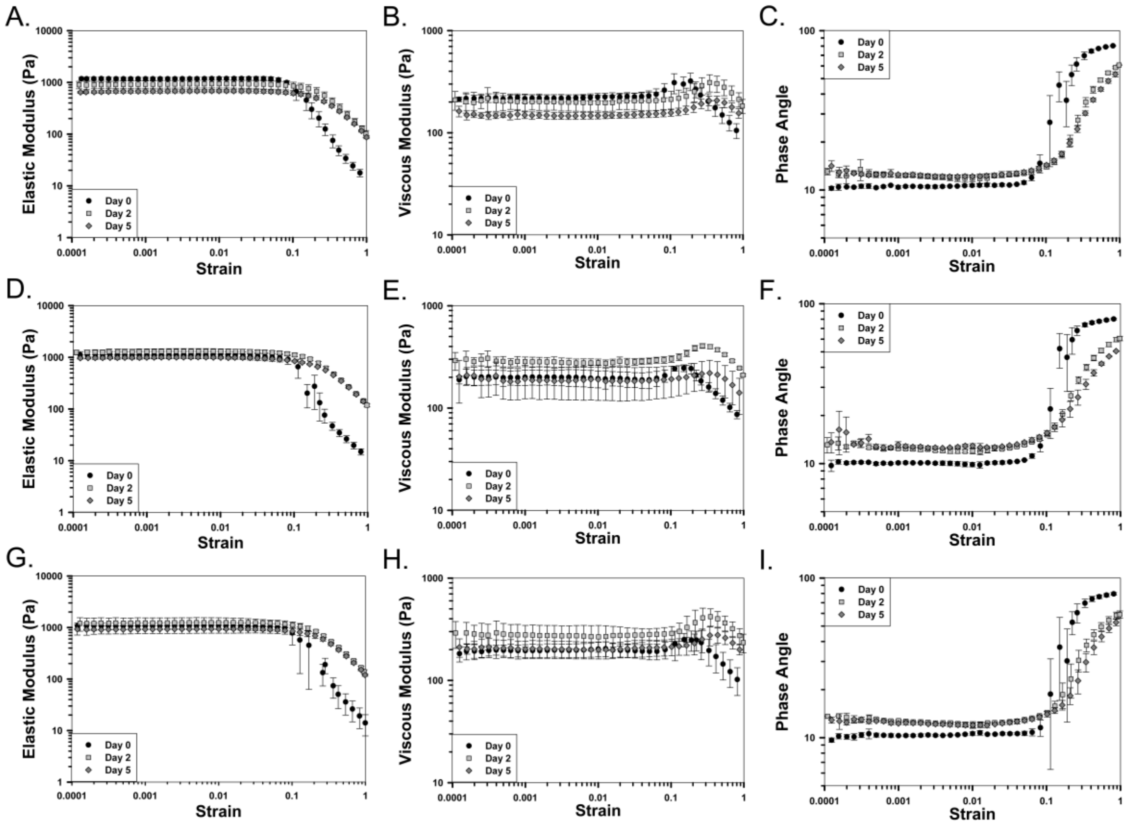
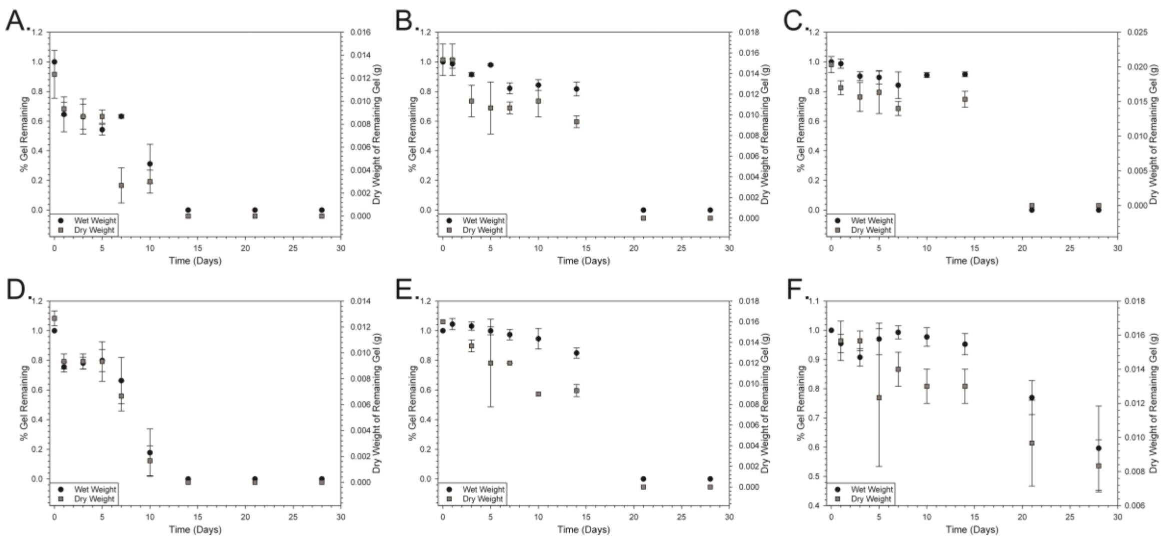


Figure 3. A-I) Rheological behavior of hydrogels following *in situ* gelation modeling with elevated Ca^{2+} concentration (6 mM) demonstrating the effect of long term incubation in Ca^{2+} containing media. Rheological behavior after *in situ* modeling with elevated Ca^{2+} is very similar to that observed following incubation with normal Ca^{2+} concentration (1.8 mM). Strain sweeps indicate an increase in the LVE limit (A,D,G) as well as a delay in the increase of the viscous modulus (B,E,H) and phase angle (C,F,I) of hydrogels in a composition manner following incubation in a Ca^{2+} containing media. (A-C) A5/C0/G0/Ca22, (D-F) A5/C125/G1/Ca24 and (G-I) A5/C25/G01/Ca20. n = 3, mean ± standard deviation.



Supplementary Figure 4. Degradation profile of alginate/chitosan hydrogels. Wet weight at each time point is normalized to the original weight of the gel at day 0 and is given as the percent of gel remaining. Dry weight at each time point is provided in grams of hydrogel remaining following lyophilization. A-F) Degradation profiles for (A) A5/C0/G0/Ca22, (B) A25/C0/G0/Ca22, (C) A5/C125/G1/Ca24, (D) A25/C125/G1/Ca23, (E) A5/C25/G01/Ca20, (F) A25/C25/G05/Ca18 **hydrogels**. n = 3, mean ± standard deviation