Electronic supplementary information (ESI)

Ultra-Tough Injectable Cytocompatible Hydrogel for 3D Cell Culture and Cartilage Repair

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Supplementary Figures

Figure S1. FTIR spectra of PVA, CPBA (sodium salt), blend of PVA and CPBA at 7/3 weight ratio, and freeze-dried PVA7/CPBA3 hydrogel.
Figure S2. Digital images of PVA7/CPBA3/Ca4 hydrogel after being dialysized in 5% glucose solution for various duration.

Figure S3. Photographs for demonstrating the tensile test and the stress-strain curves of the PVA/CPBA/Ca hydrogel samples with various chemical composition (wt% in hydrogel).
**Figure S4.** Compressive stress-strain curves of the PVA/CPBA/Ca hydrogel samples with various chemical composition (wt% in hydrogel).

**Figure S5.** Compressive stress-strain curves of the PVA7/CPBA3 hydrogels containing different types of cations (1 wt%).
**Figure S6.** Photographs for demonstrating the pull-out test and the pull-out force of the screw from the PVA/CPBA/Ca hydrogels.

**Figure S7.** Comparison of the ionic strength in the aqueous phase of the PVA/CPBA/Ca hydrogel on its compressive behavior.
**Figure S8** Cytotoxicity of leach liquor from the PVA/CPBA/Ca hydrogels on L929 cell line.

**Figure S9.** In vitro degradation of the PVA/CPBA/Ca hydrogels in water.
Figure S10. Comparison of processing methodology on the cell viability inside the PVA7/CPBA3/Ca1 hydrogel. The cell line is ATDC5. The statistics analysis show no significant difference between the two groups at each time point ($p > 0.05$).

Figure S11. Cumulative release of chondroitin sulfate (CS) from the PVA/CPBA/Ca hydrogels. The loading ratio was 5 mg of CS in 1 mL of hydrogel.