

Supplementary Information

Bio-Ionic Liquid Conjugation as Universal Approach to Engineer Hemostatic Bio-adhesives

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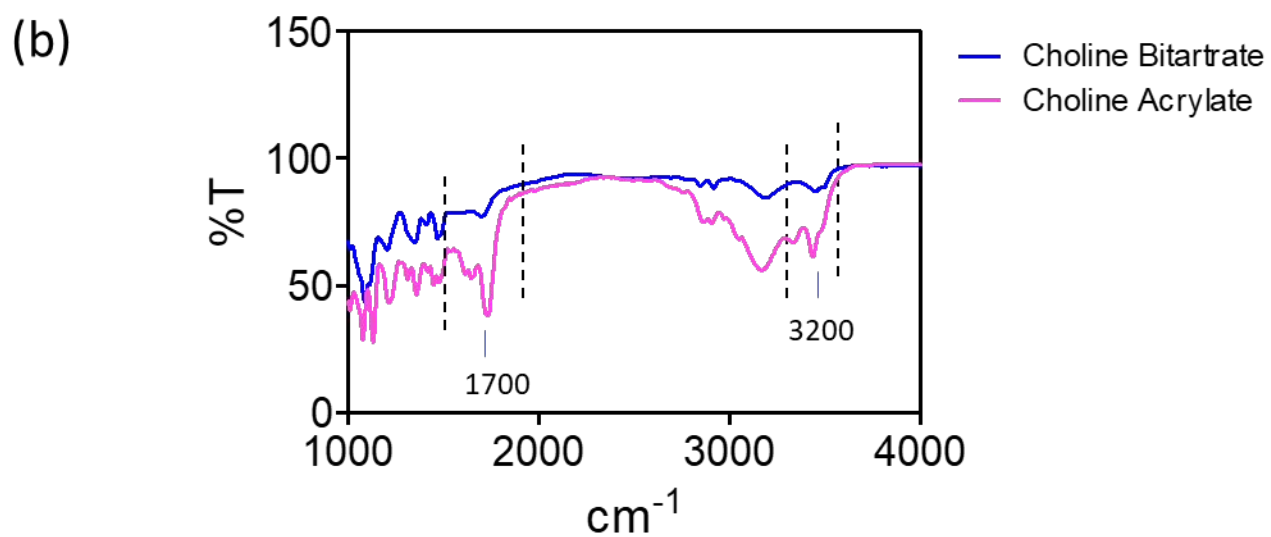
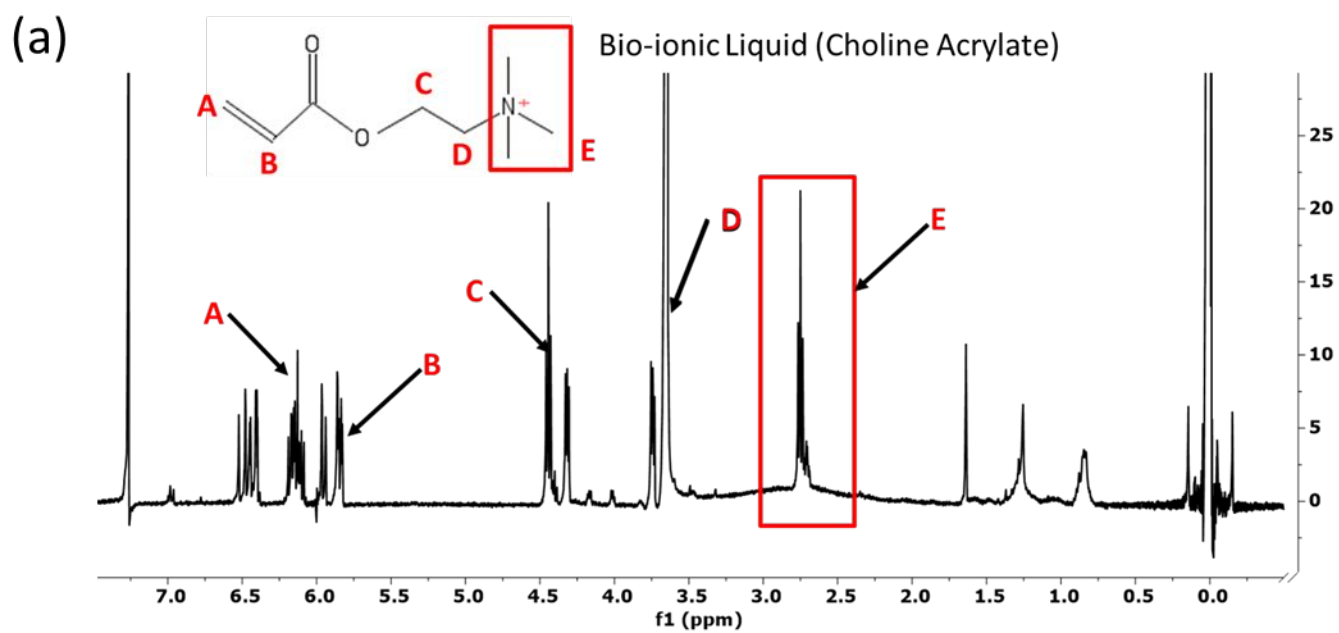


Figure S1: Synthesis and characterization of Choline acrylate (Bio Ionic liquid)The panels show (a) $^1\text{H-NMR}$ analysis of acrylate (b) FTIR - acrylation of the choline bitartrate indicated at the peak 1700 and 3200 cm^{-1}

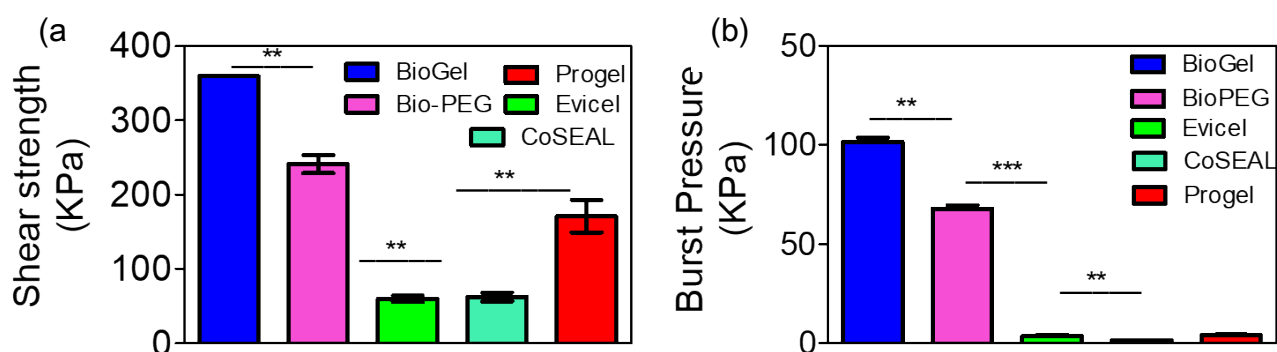
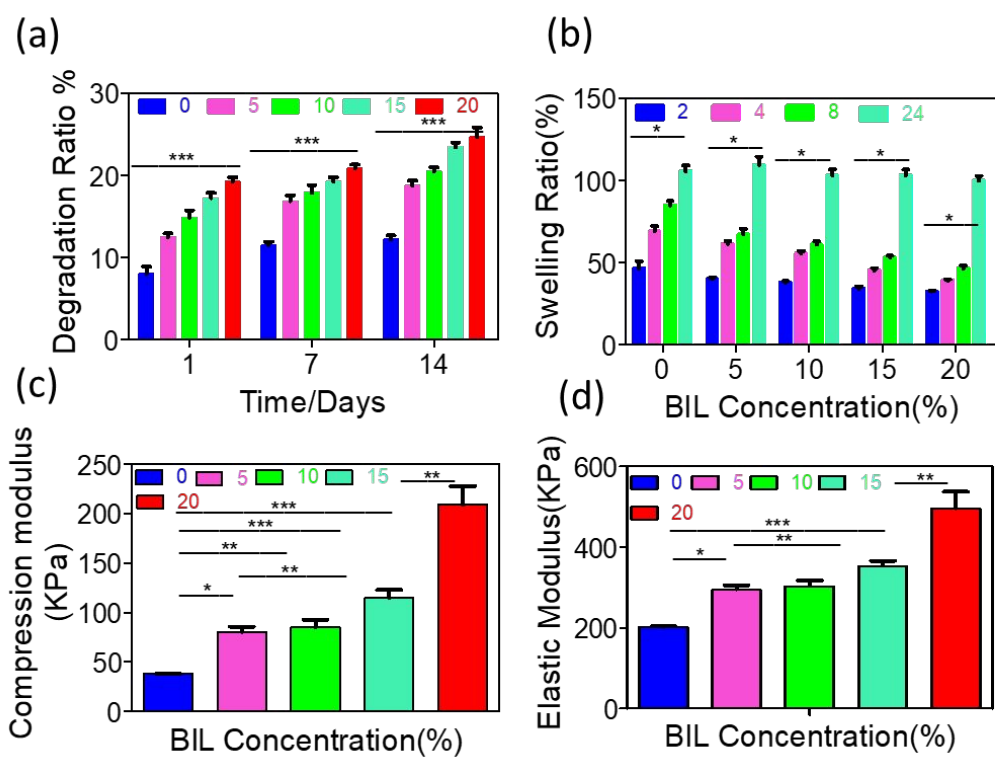


Figure S2. In vitro sealing properties of the Bio-Gel and Bio-PEG sealant compared to commercially available sealants: Evicel, Coseal , and Progel. (a) Standard lap shear test (b) Standard burst pressure test. The data for the commercially available sealant are reproduced from references. Data are mean \pm SD. P values were determined by one-way ANOVA followed by Tukey's multiple comparisons test (*P < 0.05, **P < 0.01, ***P < 0.0001).



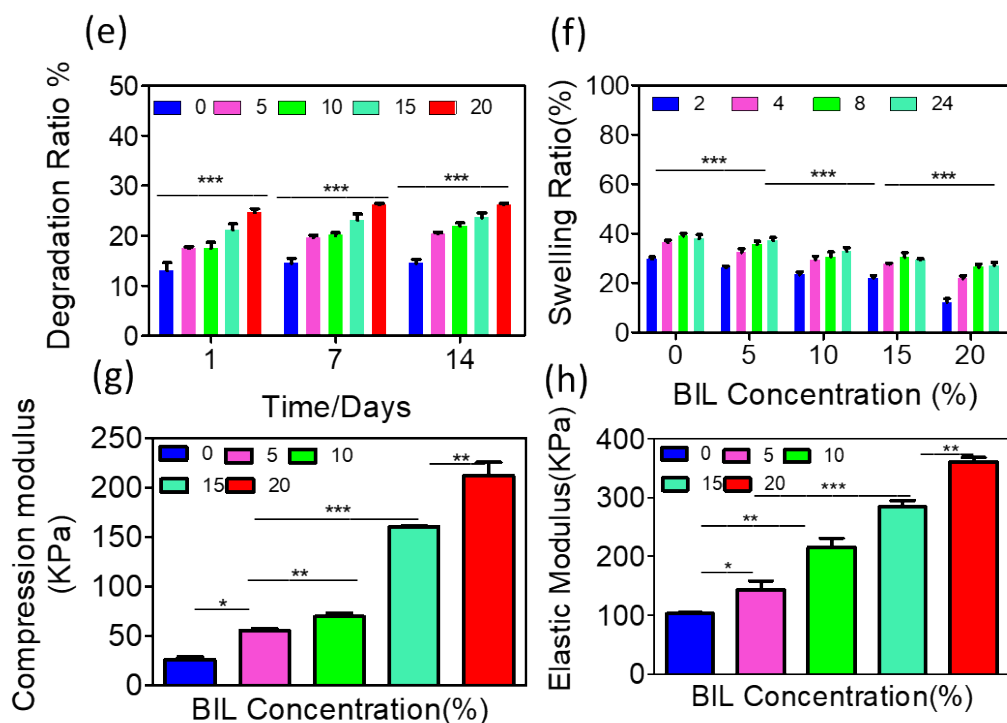


Figure S3: *In vitro* swelling and degradation and Mechanical characterization of the BioGel (25% (w/v) GelMA with varying concentration of BIL) and BioPEG (25% (w/v) PEGDA with varying concentration of BIL) synthesis by photopolymerization under visible light using 0.5% LAP as photoinitiator. BioGel (a,b) Degradation profile and swelling ratio in DPBS over a two-week period and swelling ratio in DPBS after 1,2, 4,6, 8 and 24 h. Mechanical characterization of BioGel (c,d) Compression an elastic modulus. BioPEG (e,f) Degradation profile in DPBS over a two-week period and swelling

ratio in DPBS after 1,2, 4,6, 8 and 24 h. Mechanical characterization of. **(c,d)** BioGel - Compression and elastic modulus and **(g,h)** BioPEG - Compression and elastic modulus. Data are means \pm SD. P values were determined by one-way ANOVA followed by Tukey's multiple comparisons test (*P < 0.05, **P < 0.01, ***P < 0.001).

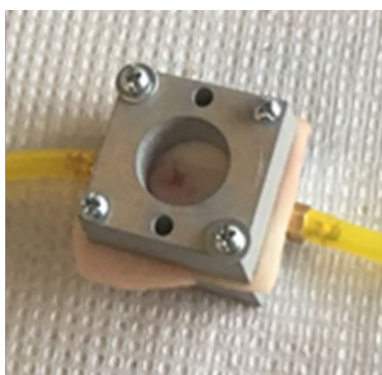


Figure S4: Setup for measuring *In vitro* Adhesive property of BioGel and BioPEG.

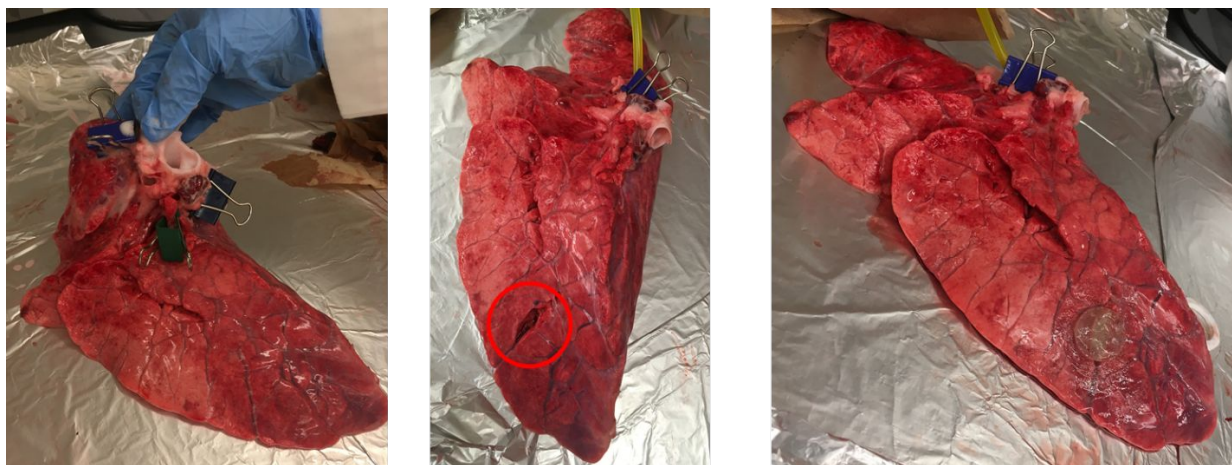


Figure S5: *Ex vivo* performance characterization of the polymer-IL composites.

Puncture, sealing and patching of the wound in porcine lung.

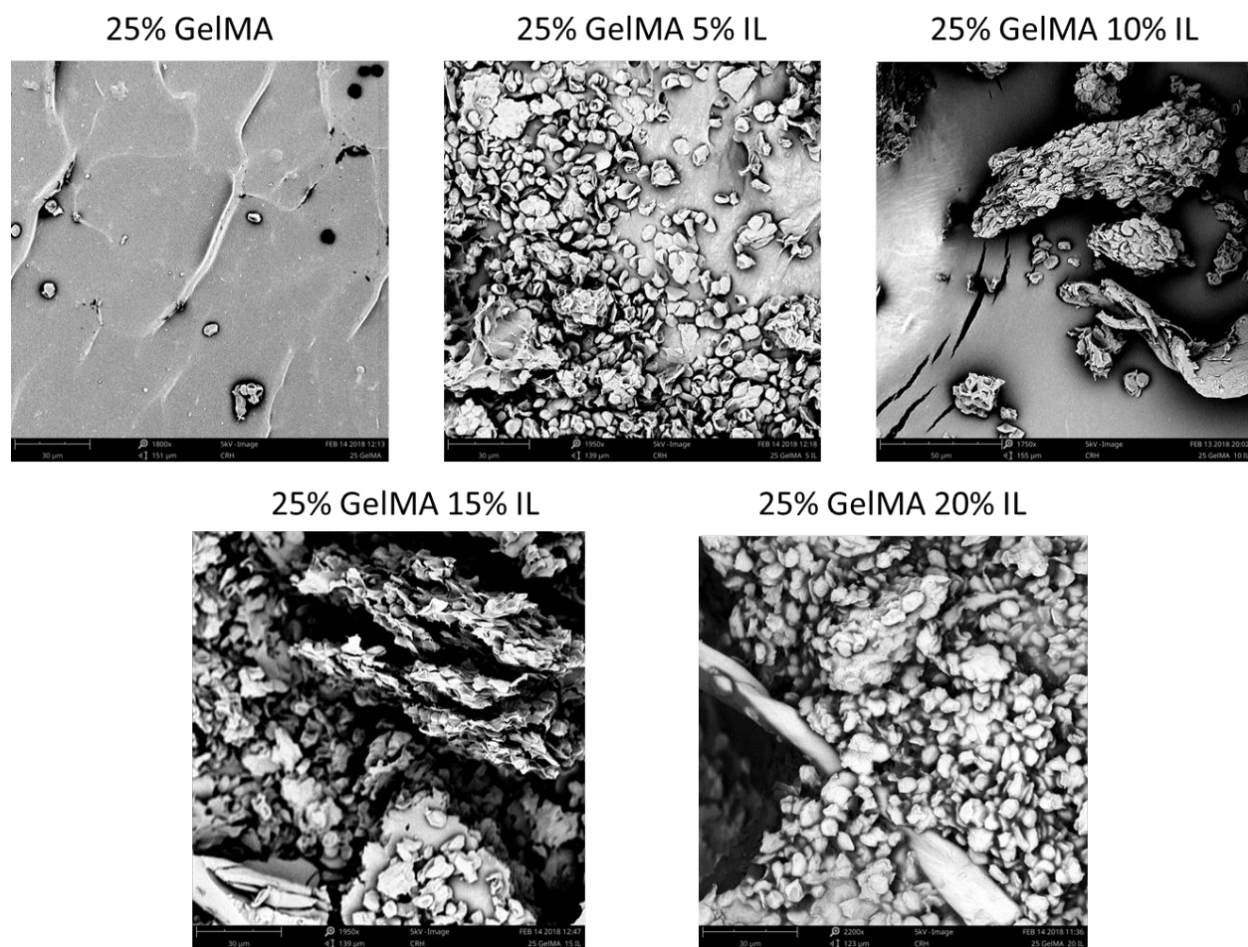


Figure S6: *In vitro* clotting assay, SEM of the coagulation of RBC with control (25(w/v) % GelMA) and BioGel with increasing concentration of the BIL (0 -20 (w/v) %).

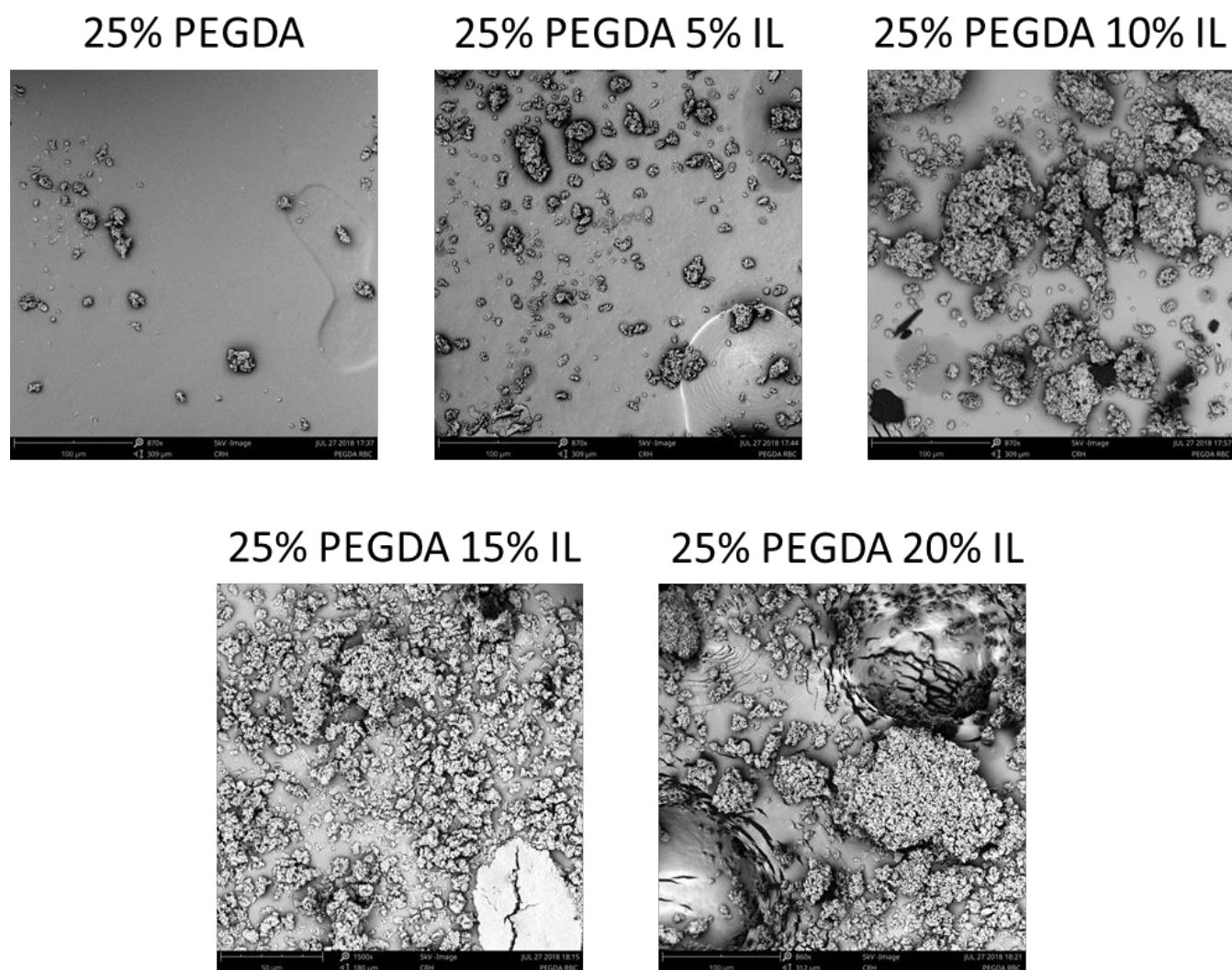


Figure S7: *In vitro* clotting assay, SEM of the coagulation of RBC with control (25(w/v) % PEGDA) and BioPEG with increasing concentration of the BIL (0 -20 (w/v) %).

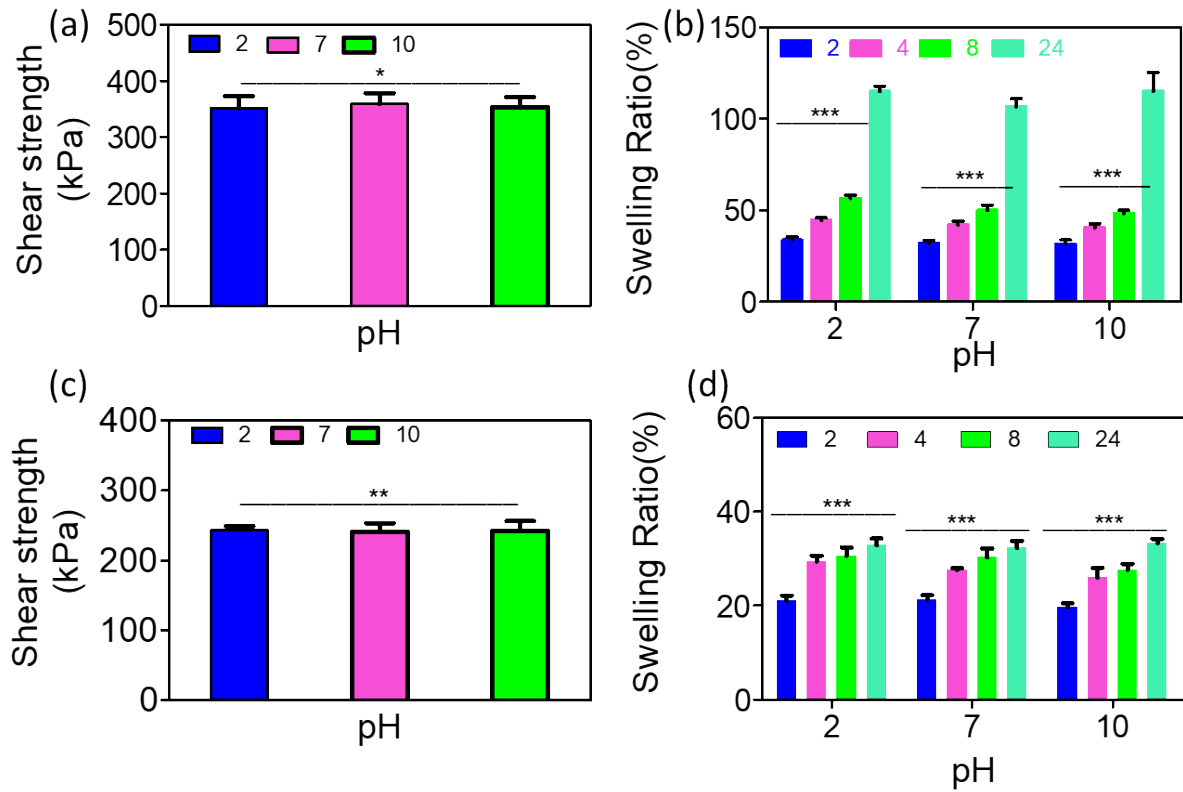


Figure S8: Effect of pH on *In vitro* adhesive and swelling performance. BioGel (25% (w/v) GelMA 20% (w/v) BIL) and BioPEG (25% (w/v) PEGDA 20% (w/v) BIL) synthesis by photopolymerization under visible light using 0.5% LAP as photoinitiator. BioGel (a,b) Shear strength and Swelling ratio in DPBS after 1,2, 4,6, 8 and 24 h with varying pH(2, 7, 10). Bio-PEG(c,d) Shear strength and Swelling ratio in DPBS after 1,2, 4,6, 8 and 24 h with varying pH(2, 7, 10) Data are means \pm SD. P values were determined by one-

way ANOVA followed by Tukey's multiple comparisons test (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$).