

One-pot Fabrication of High-strength Janus Hydrogel for Wet Tissue Hemostasis and Intestinal/Intrauterine Anti-adhesion

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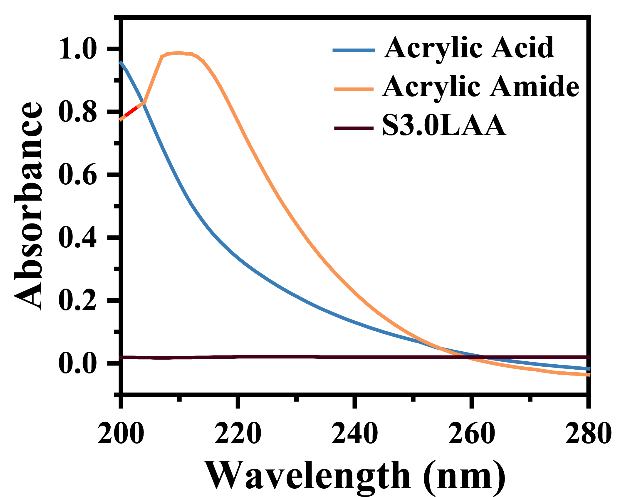
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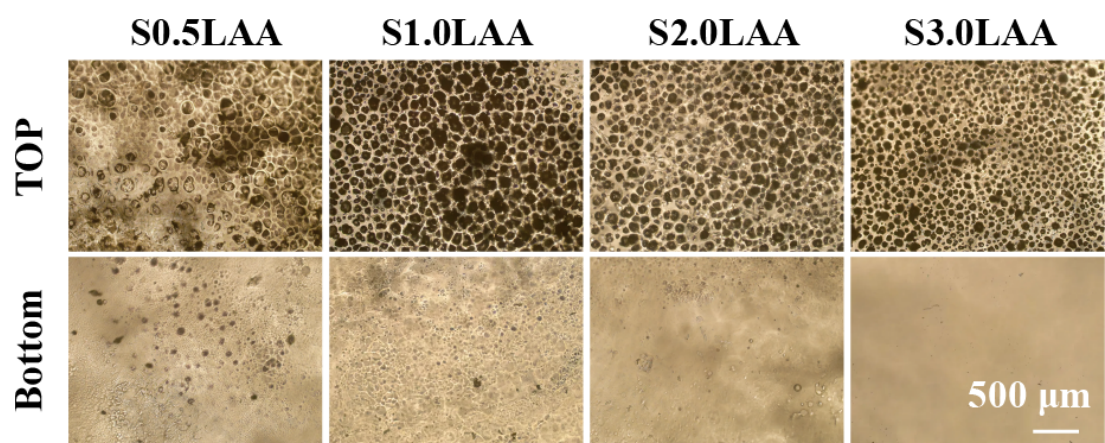
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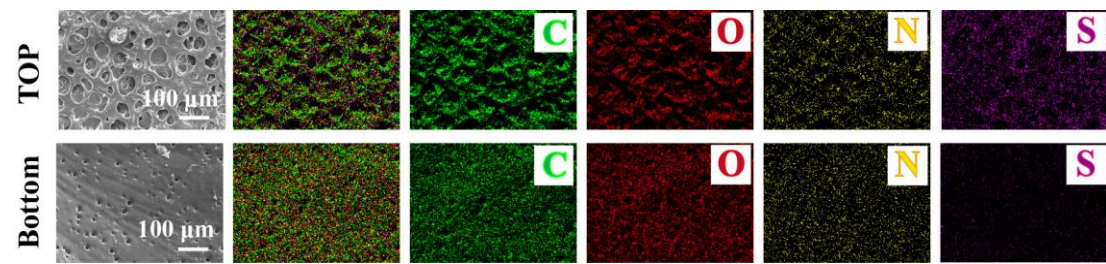
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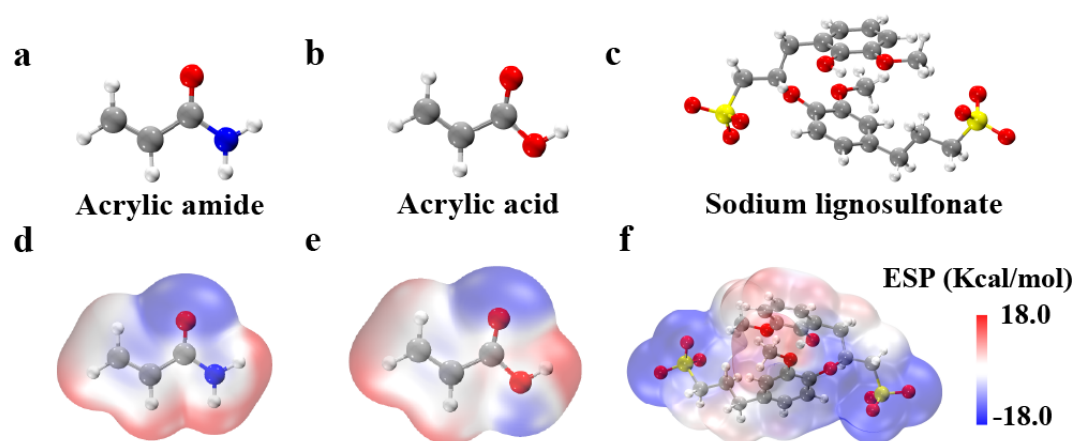
Supplementary Fig. 1. UV-vis spectra of acrylic acid, acrylic amide and S3.0LAA. Source data are provided as a Source Data file.



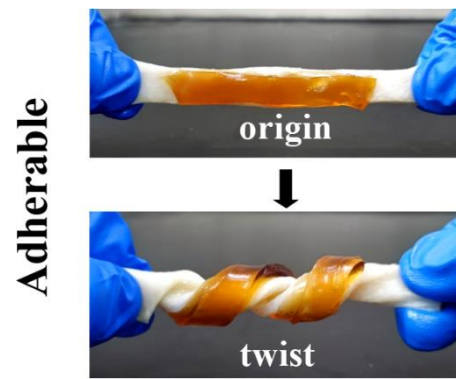
Supplementary Fig. 2. Bright-field images of the surface and bottom for SLAA Janus hydrogel. (all experiments were performed in triplicate with similar results, scale bar: 500 μm).



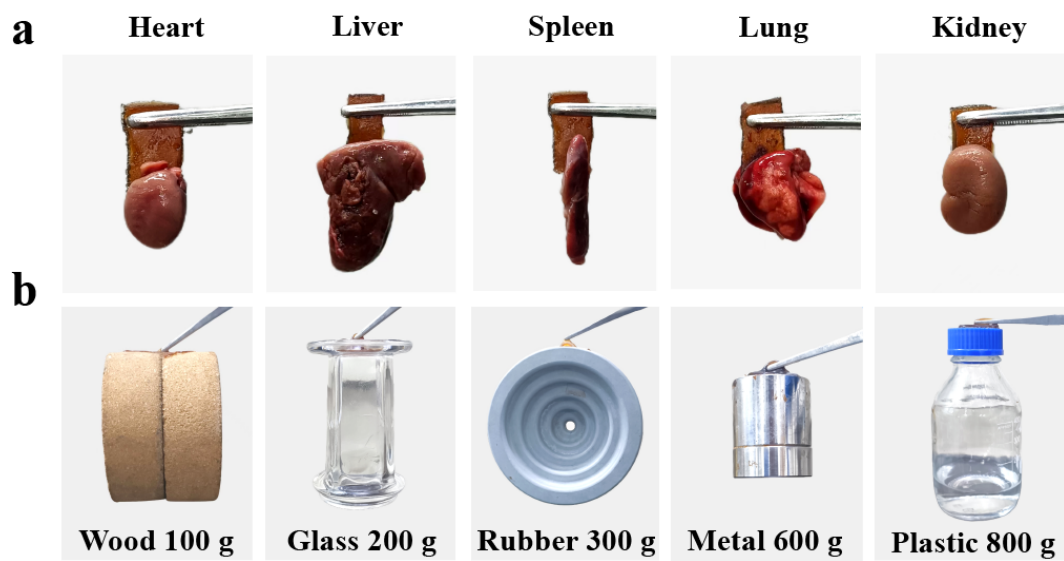
Supplementary Fig. 3. Mapping images of C, O, N, S for the top and bottom surface of S3.0LAA hydrogels. (all experiments were performed in triplicate with similar results, scale bar: 100 μm).



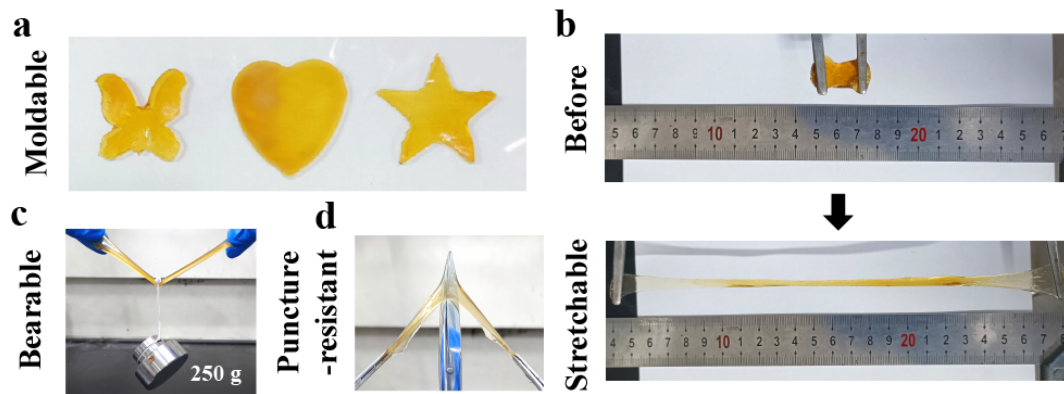
Supplementary Fig. 4. **a-c** The molecular monomer structures and **(d-f)** electrostatic potential energies of acrylic amide, acrylic acid and sodium lignosulfonate.



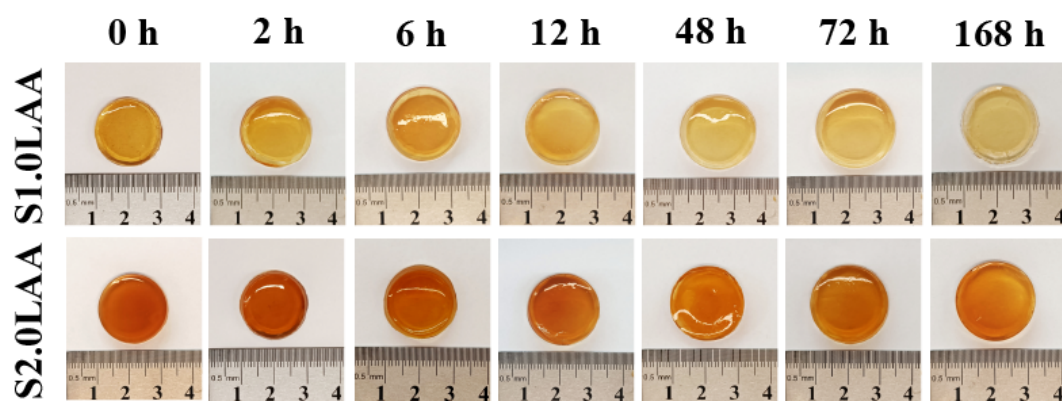
Supplementary Fig. 5. Demonstration of the adherable properties of the SLAA Janus hydrogel.



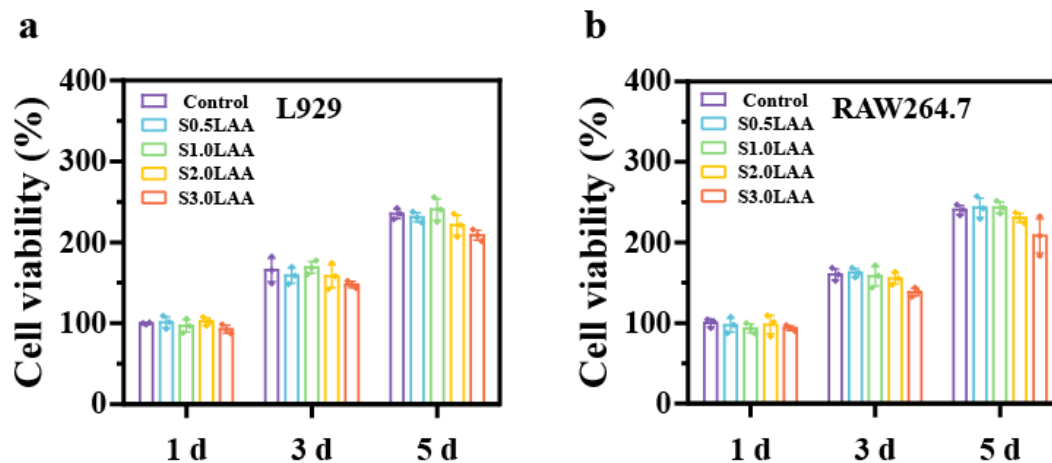
Supplementary Fig. 6. Photographs of SLAA Janus hydrogel adhesion to (a) different organs and (b) materials.



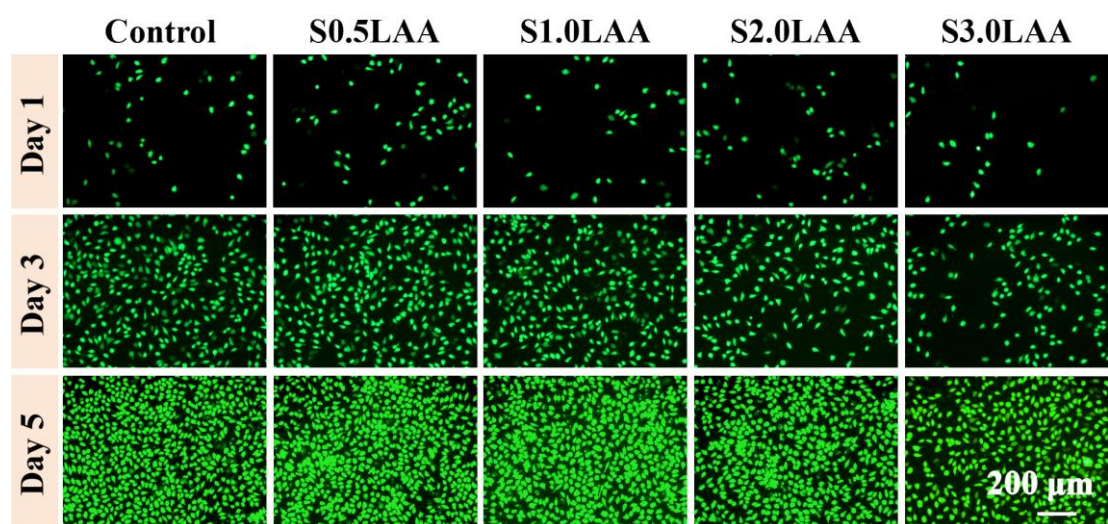
Supplementary Fig. 7. Demonstration of the (a) moldable, (b) stretchable, (c) bearable and (d) puncture-resistant properties of the SLAA Janus hydrogel.



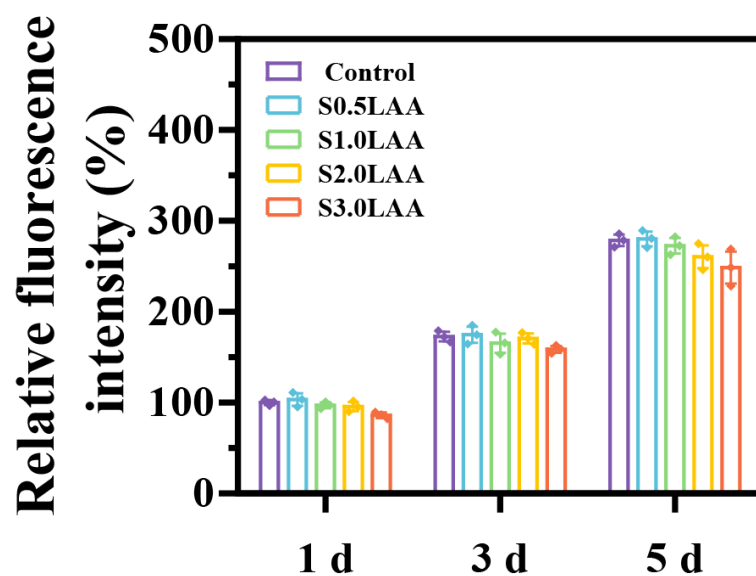
Supplementary Fig. 8. The swelling behavior images of the S1.0LAA and S2.0LAA hydrogels after immersing in water for determined time.



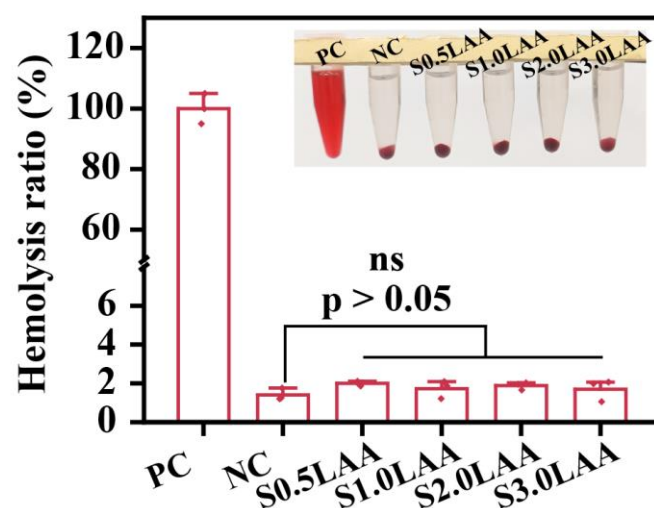
Supplementary Fig. 9. Cell viability (CCK-8 assay) of (a) L929 and (b) RAW264.7 cells after incubating with the extracts of hydrogels and PBS for 1, 3 and 5 days. Data was presented as mean $\pm$ SD ($n = 3$ independent samples). Source data for (a and b) are provided as a Source Data file.



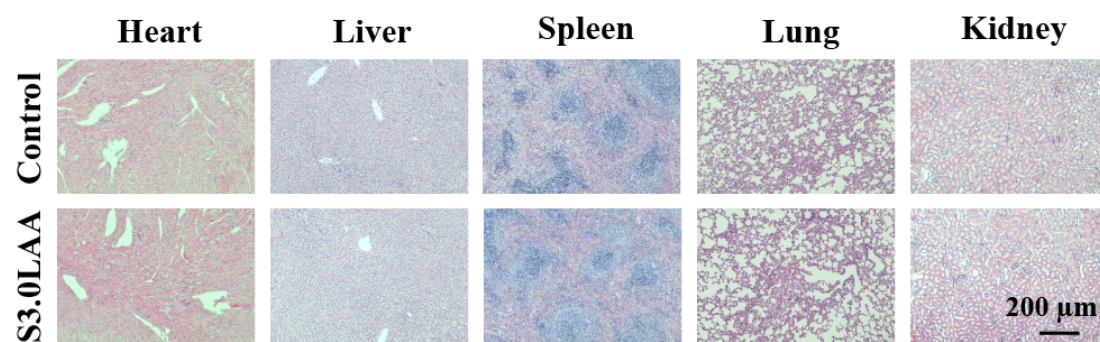
Supplementary Fig. 10. Representative images of L929 with live/dead staining after incubation with Janus bio-adhesives extract for 5 d. (Scale bar: 200 μm).



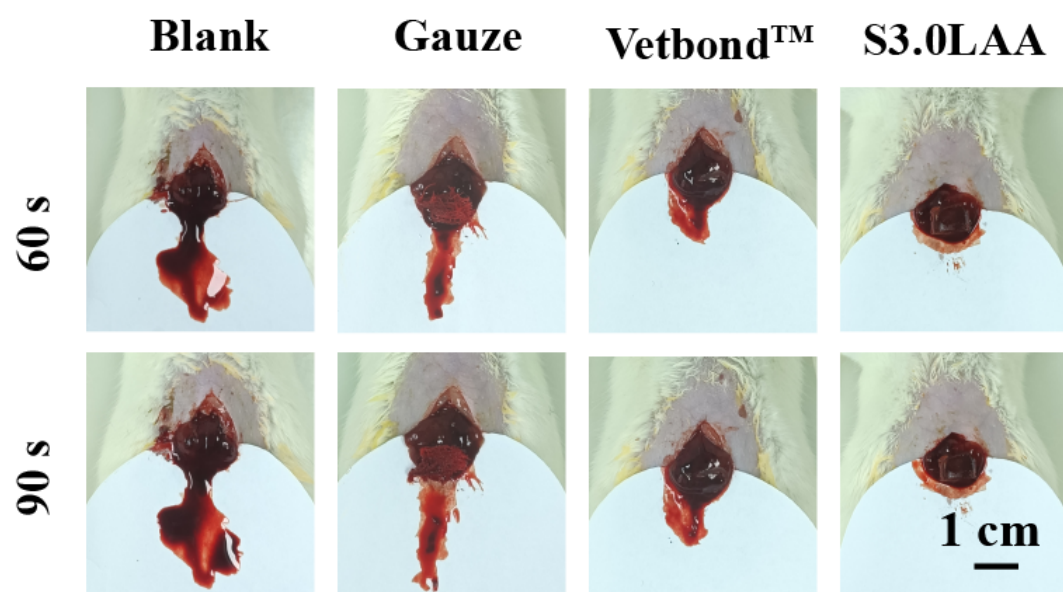
Supplementary Fig. 11. The quantitative cell amounts of L929 after incubating with hydrogel extract for 1, 3, and 5 d. Data was presented as mean $\pm$ SD ($n = 3$ independent samples). Source data are provided as a Source Data file.



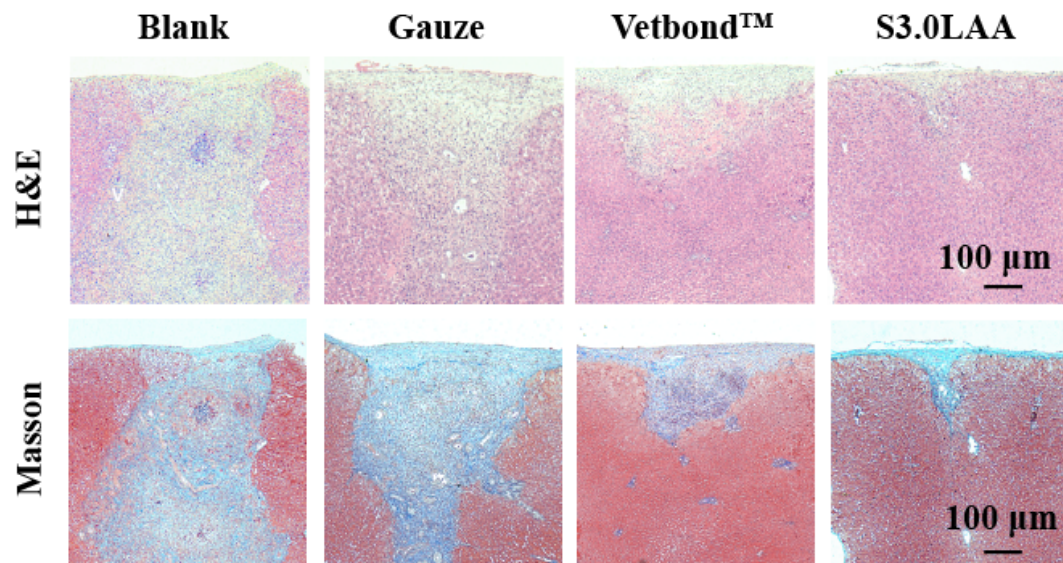
Supplementary Fig. 12. Hemolysis ratio of the S0.5LAA, S1.0LAA, S2.0LAA, S3.0LAA hydrogels (PC: 0.1% Triton X-100, NC: PBS). Data was presented as mean $\pm$ SD (n = 3 independent samples). Statistical analyses were performed by using ordinary one-way analysis of variance (ANOVA) with Tukey's post hoc test. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$. Source data are provided as a Source Data file.



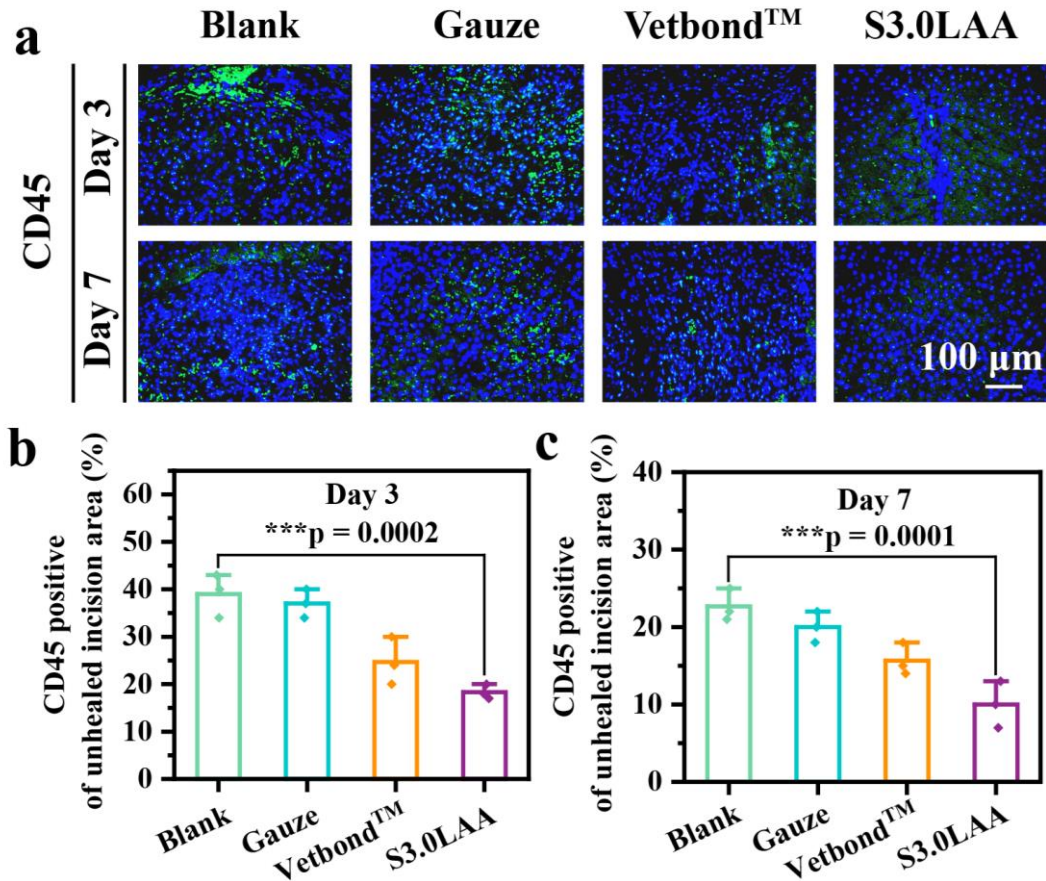
Supplementary Fig. 13. Key rat organ toxicities in the heart, liver, spleen, lung, and kidney on day 21. (Scale bar: 200 μm).



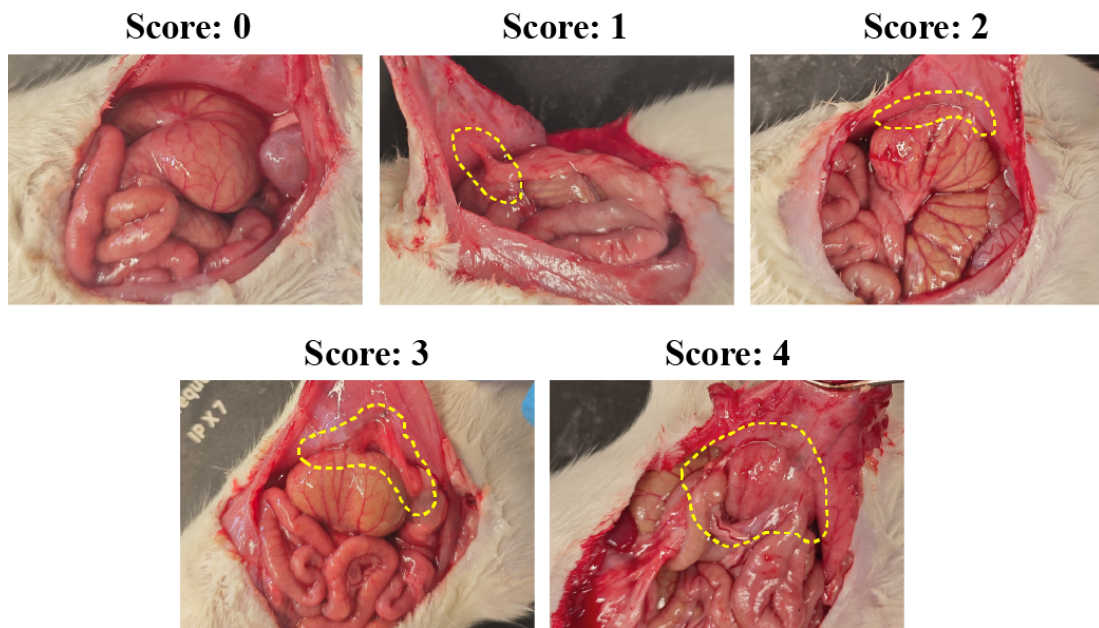
Supplementary Fig. 14. Photographs of the liver hemostasis using gauze, Vetbond™, and SLAA Janus hydrogel. (Scale bar: 1 cm).



Supplementary Fig. 15. H&E and Masson staining of the liver tissues after 7 days of healing using gauze, Vetbond, and SLAA Janus hydrogel, respectively. (Scale bar: 100 μm).

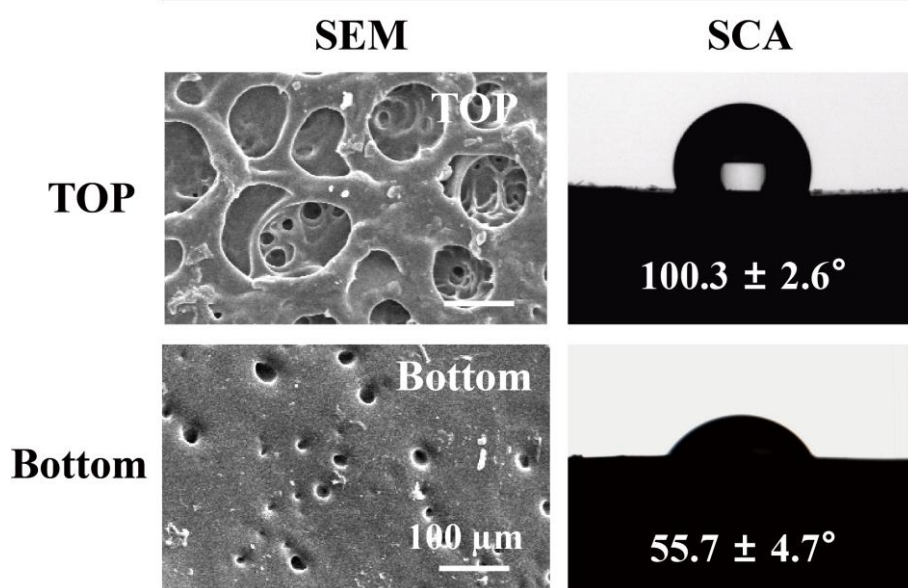


Supplementary Fig. 16. **a** Immunofluorescence staining and **(b, c)** corresponding quantitation of CD45 (green) in the liver tissues after 3 and 7 days of healing using SLAA Janus hydrogel. Data for **(b and c)** were presented as mean $\pm$ SD ($n = 3$ independent samples). Statistical analyses for **(b and c)** were performed by using ordinary one-way analysis of variance (ANOVA) with Tukey's post hoc test. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$. Source data for **(b and c)** are provided as a Source Data file.



Supplementary Fig. 17. The standard scoring system was used to evaluate the degree of adhesion (Dashed yellow line).

S3.0LAA



Supplementary Fig. 18. SEM images and SCA test of S3.0LAA Janus hydrogel (all experiments were performed in triplicate with similar results, scale bar: 100 μm). Data in SCA test was presented as mean $\pm$ SD ($n = 3$ independent samples). Source data are provided as a Source Data file.