Supplementary Information

Stable Antibacterial Polysaccharides-based Hydrogels as Tissue Adhesives for Wound Healing

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Materials and Methods

Rheological studies. Dynamic rheology experiments were performed using a Haake RS6000 rotational rheometer (Thermo Fisher Scientific) with parallel-plate (P20 TiL; 20-mm diameter) geometry at 25°C. Time-sweep oscillatory tests of hydrogel (n = 3) were performed at a 10% strain, 1-Hz frequency, and a 0.5-mm gap.

Evaluation of hydrogel porosity. The different composite hydrogels were lyophilized, and immersed in anhydrous ethanol with a known volume (V1). Then, the mixture were evacuated at 0.08 kPa and the volume of ethanol-perfused hydrogels and ethanol was recorded as V2, and after removal of the hydrogels, the final volume was recorded as V3. Porosity was calculated, as follows: $P = (V1 - V3) / (V2 - V3) \times 100\%$.

Swelling ratio (SR) of the hydrogels. The hydrogels were freeze dried to determine the dry weight (W_d) and then incubated in phosphate-buffered saline (PBS; Hyclone, Logan, UT, USA) at 37°C for 24 h, followed by removal of PBS, and weighing (W_s). The SR of the hydrogels was calculated according to the following equation: Swelling ratio = $W_s - W_d / W_d$.

Contact-angle measurement. Contact angle measured using a JY-PHA instrument (Chengde Jinhe Instrument Manufacturing Co. Ltd., Chengde, China). Hydrogels were placed on a flat table. Then single-distilled water was added onto the surface of the hydrogel. The angle within each sample was determined as the average value of five independent experiments.

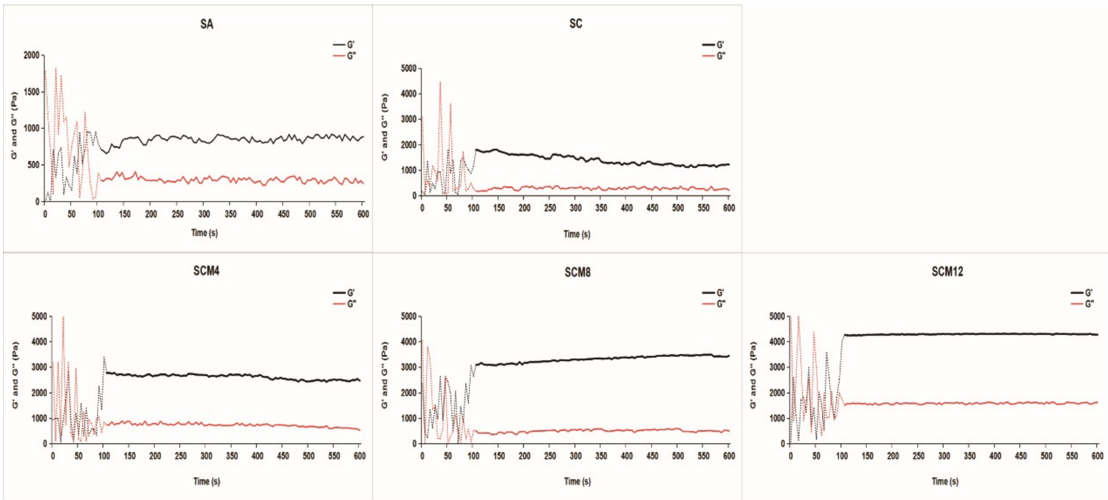

Fig. S1. Rheological analysis of hydrogels.

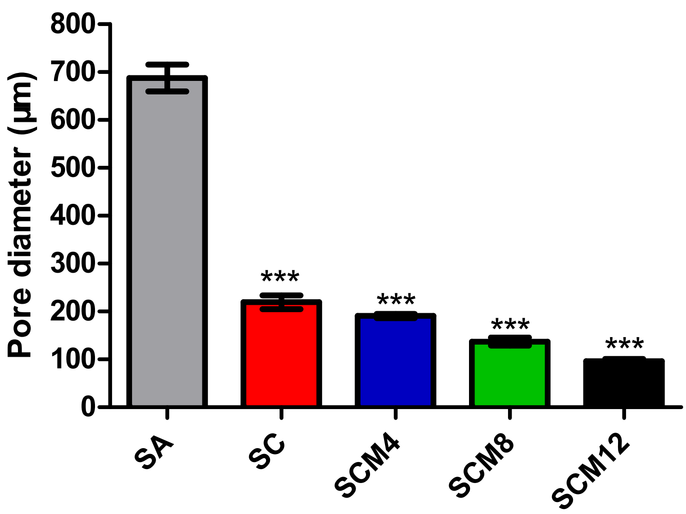

Fig. S2. Pore size of hydrogels. Data represent the mean ± SD of five independent experiments. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ vs. the SA hydrogels.

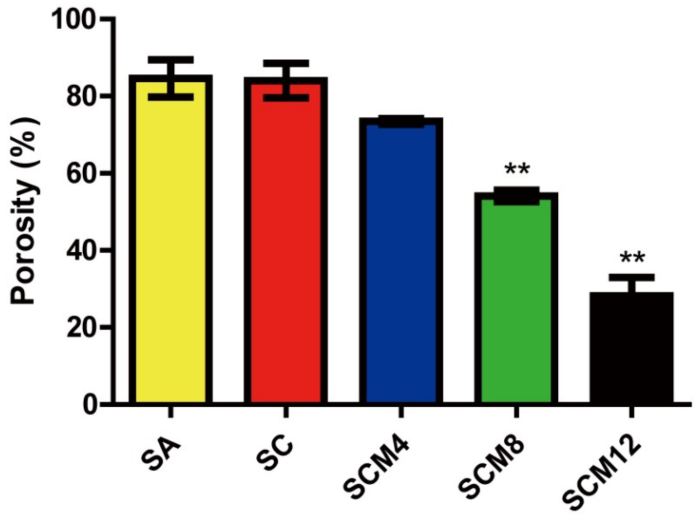

Fig. S3. Porosity of hydrogels. Data represent the mean ± SD of five independent experiments. *p < 0.05; **p < 0.01; ***p < 0.001 vs. the SA hydrogels.

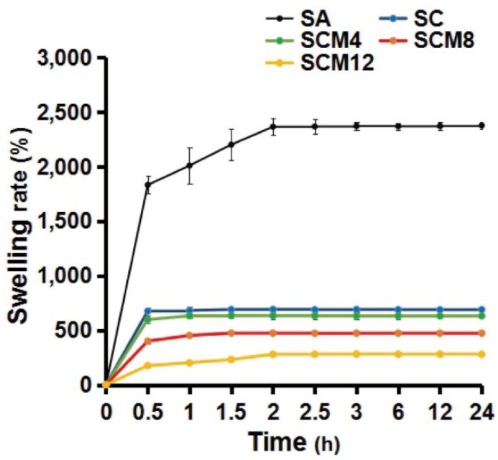

Fig. S4. Hydrogel swelling ratio. Data represent the mean ± SD of five independent experiments. *p < 0.05; **p < 0.01; ***p < 0.001 vs. the SA hydrogels.

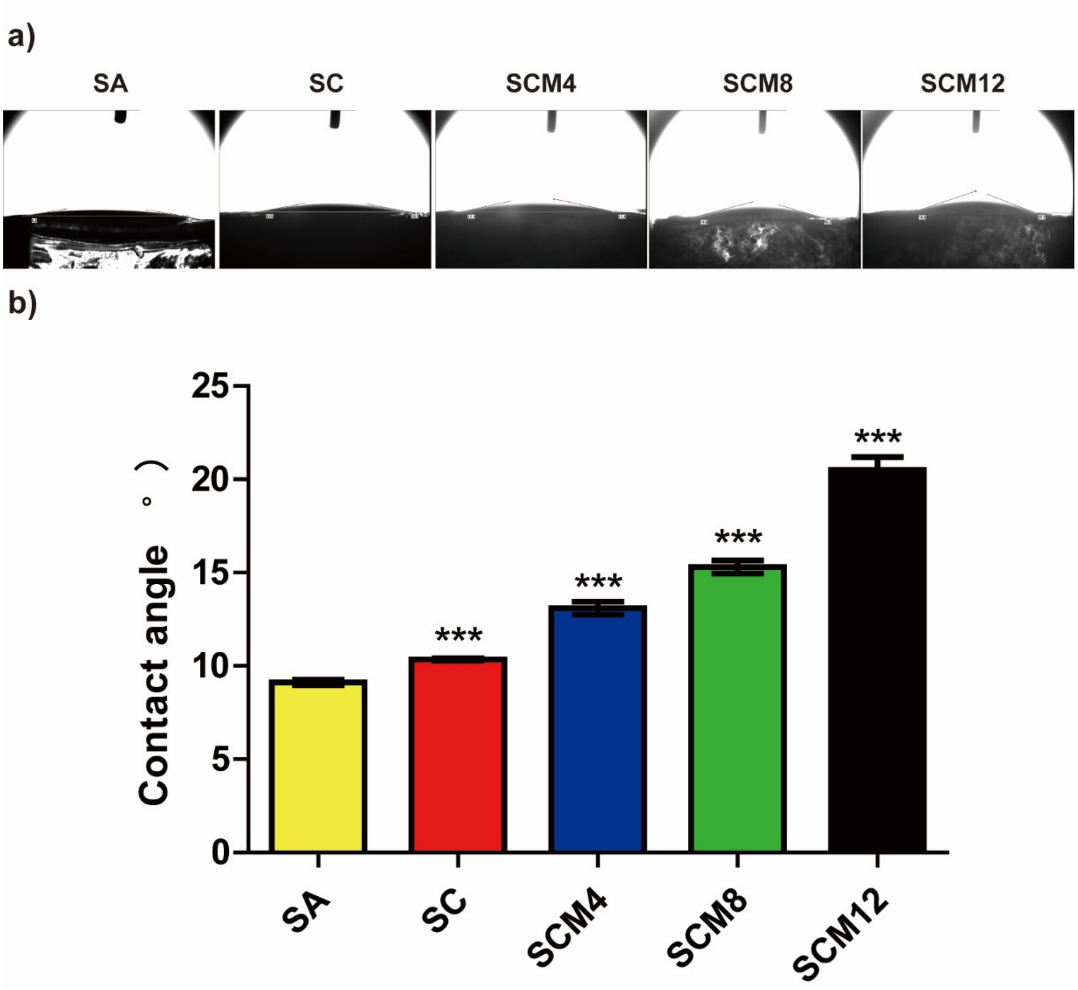

Fig. S5. Contact angles of hydrogels. Data represent the mean ± SD of three independent experiments. *p < 0.05; **p < 0.01; ***p < 0.001 vs. the SA hydrogels.

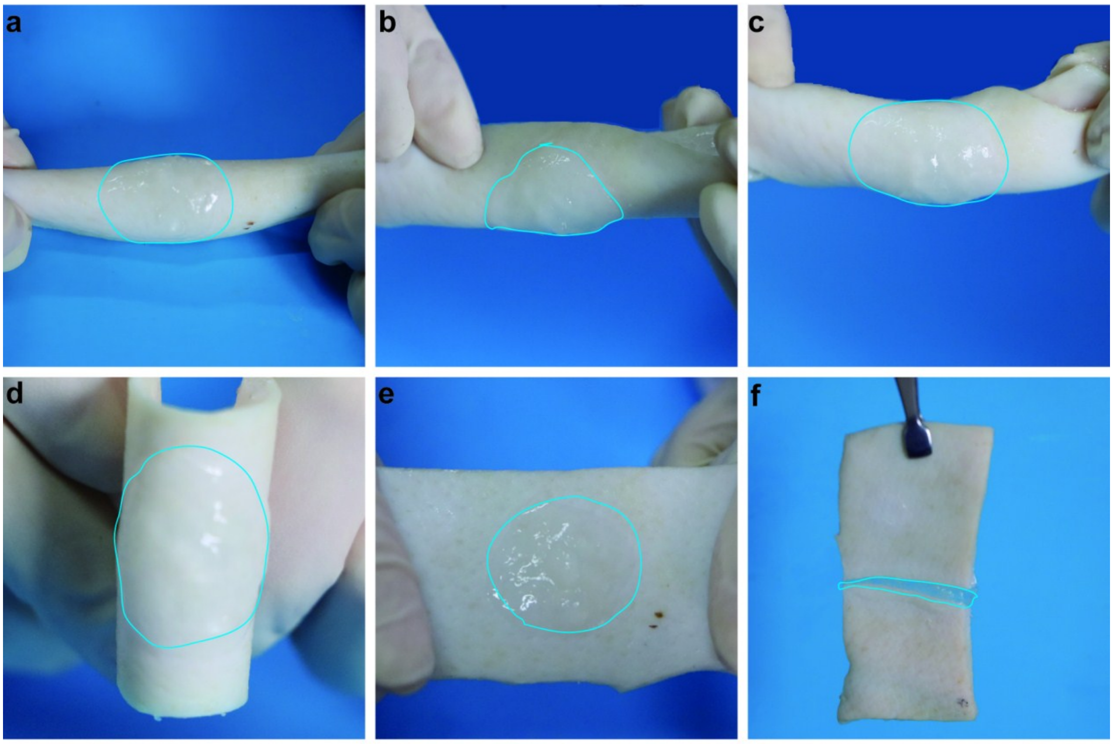

Fig. S6. Hydrogel adherence to porcine skin.

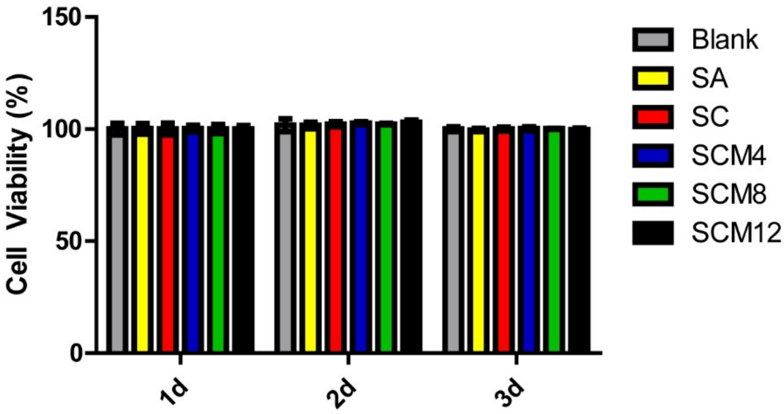

Fig. S7. Viability of L929 fibroblasts cultured on hydrogels for 3 days according to MTT assay.

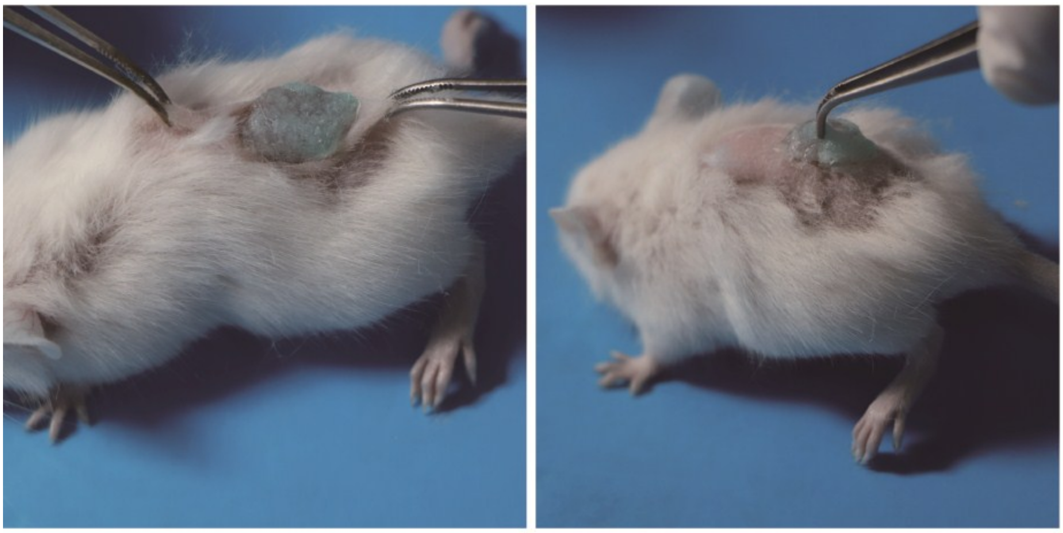

Fig. S8. Hydrogel adherence to skin-defect sites of the mouse wound closure model.