

## Supporting Information

### ***In Situ* Self-Assembly of Polydopamine inside Injectable Hydrogels: Antibacterial Activity and Photothermal Therapy for Superbug-Infected Wound Healing**

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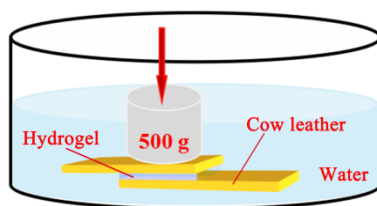
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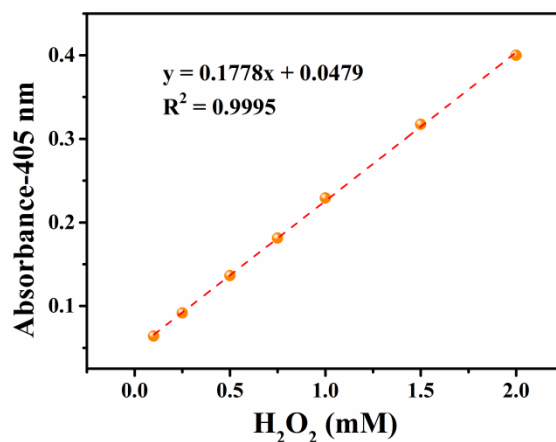
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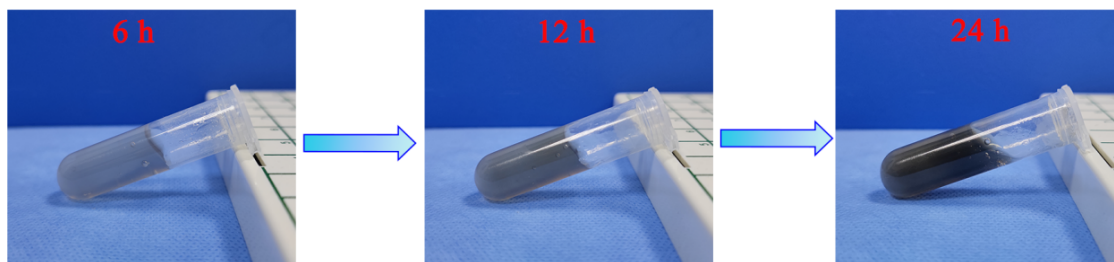
<sup>†</sup> Y.Z., L.L. and Y.X contributed equally to this work.



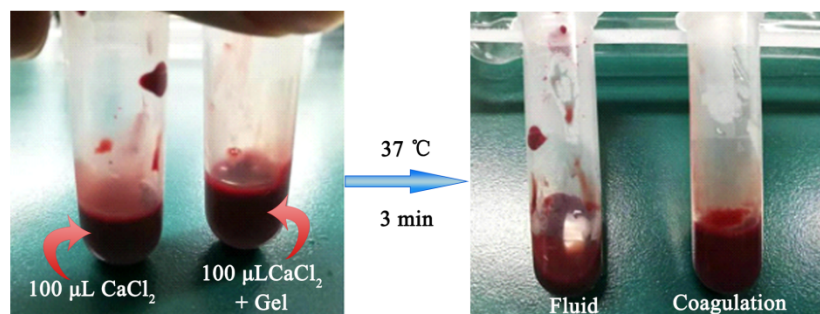
**Figure S1.** Schematic image of preparing specimens underwater.



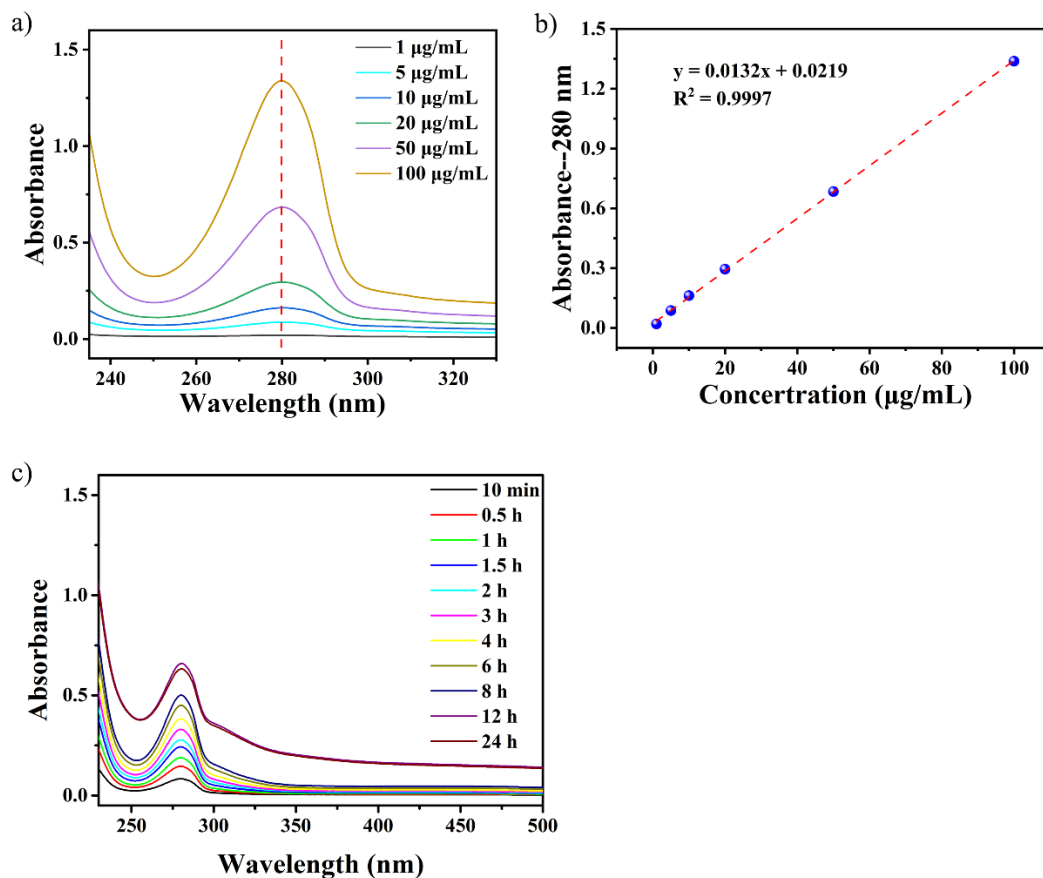
**Figure S2.** The standard curve of the production of ROS.



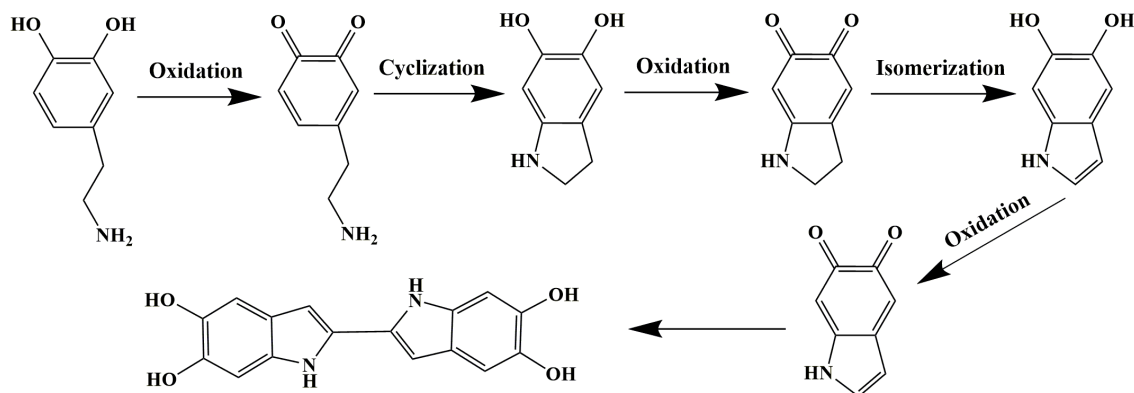
**Figure S3.** Photographs of colour changes of the GCPP-PDA gel along with the continuous self-assembly of dopamine.



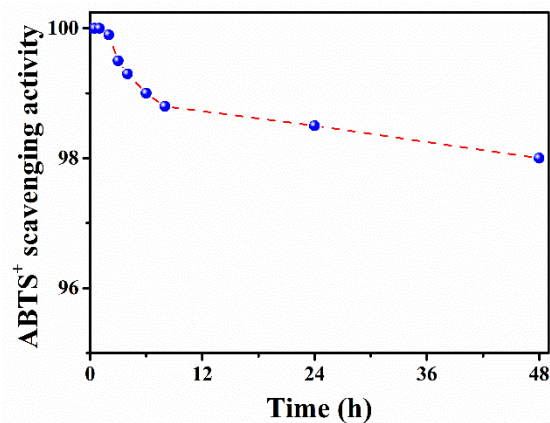
**Figure S4.** Photographs of the coagulation effect of control and GCPP-PDA gel in whole blood.



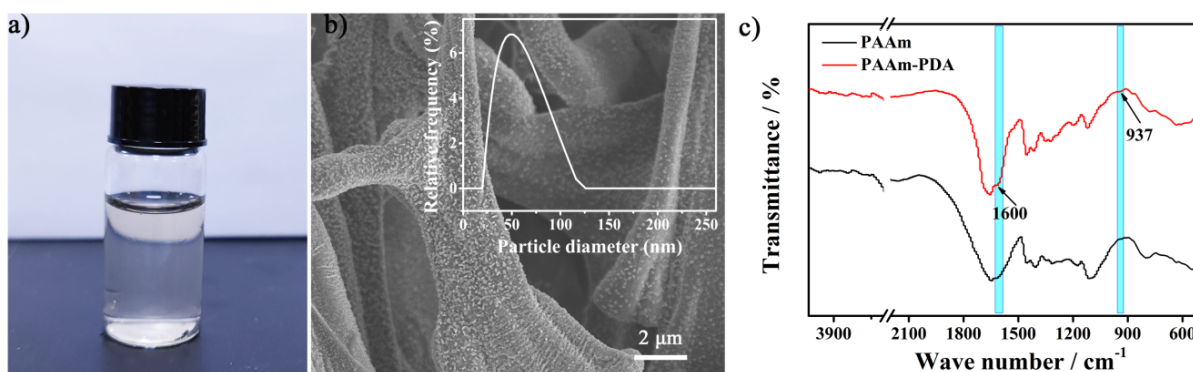
**Figure S5.** a) UV-vis spectra of PDA/PBS solution with different concentration (1  $\mu\text{g}$ ~100  $\mu\text{g}$ ). b) The standard curve of the PDA. c) UV-vis spectra of gel/PBS solution with different extraction times at 37  $^{\circ}\text{C}$ , the volume of PBS was three time of the gel.



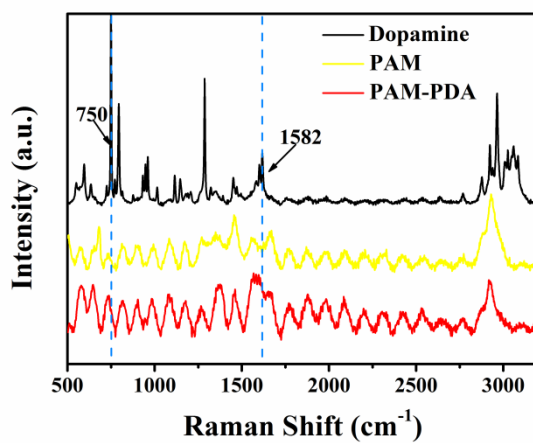
**Figure S6.** The self-assembly of PDA NPs. The steps are presented in the electropolymerization representing the starting reaction for PDA formation.



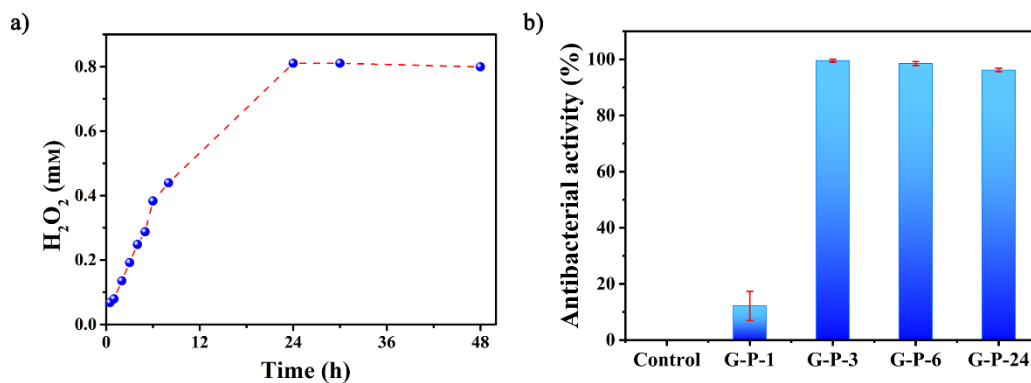
**Figure S7.** The ABTS<sup>+</sup> scavenging activity of the PDA NPs at different assembly time.



**Figure S8.** a) The stable PAM-PDA solution (positive charged) presents pink. b) The SEM image of the PAM-PDA solution (vacuum freeze drying), and the hydrodynamic diameter of the PDA nanoparticles in the PAM-PDA solution. c) FT-IR test results of PAM and PAM-PDA.

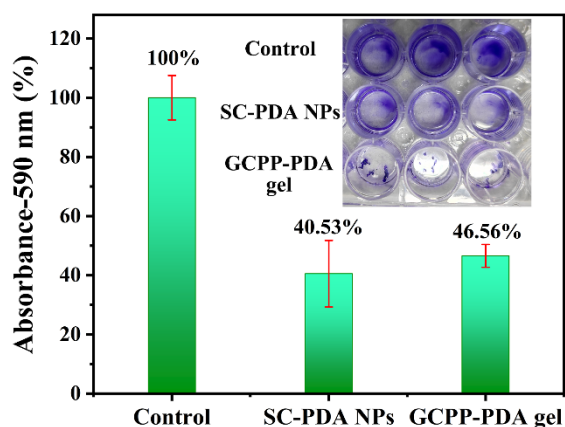


**Figure S9.** Raman spectra of Dopamine, PAM, PAM-PDA.

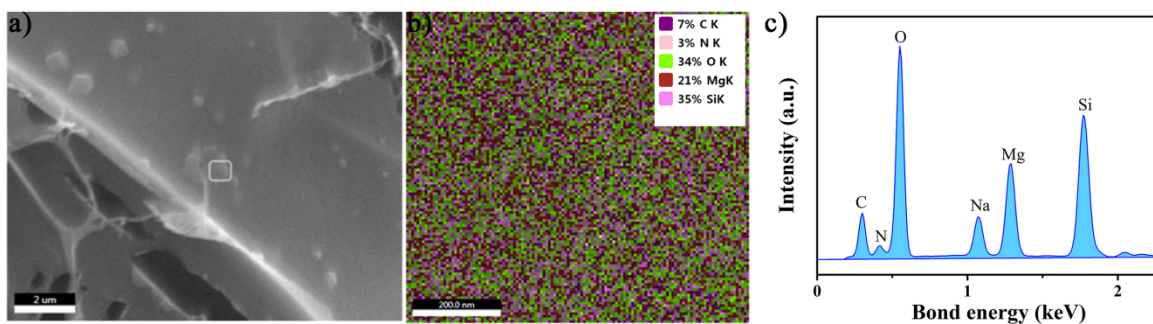


**Figure S10.** a)  $H_2O_2$  generated by GCPP-PDA gel after self-assembly for different time at 37 °C.

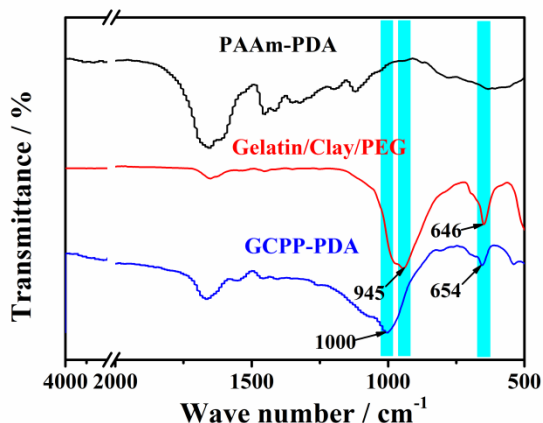
b) The antibacterial rates of the GCPP-PDA gel after immersing in PBS for different time.



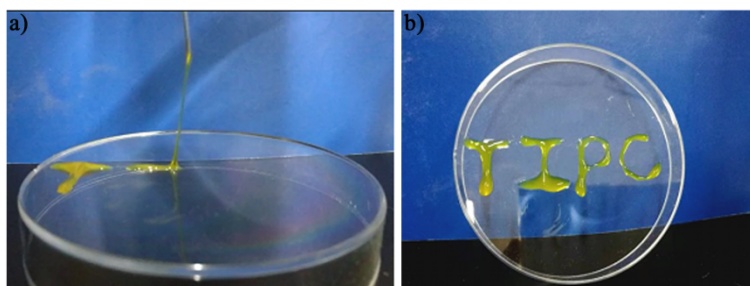
**Figure S11.** Crystal violet staining image and its corresponding absorbance for integrated MRSA biofilm incubated with the SC-PDA NPs and the GCPP-PDA gel. The biofilm without incubation with the sample was used as the control.



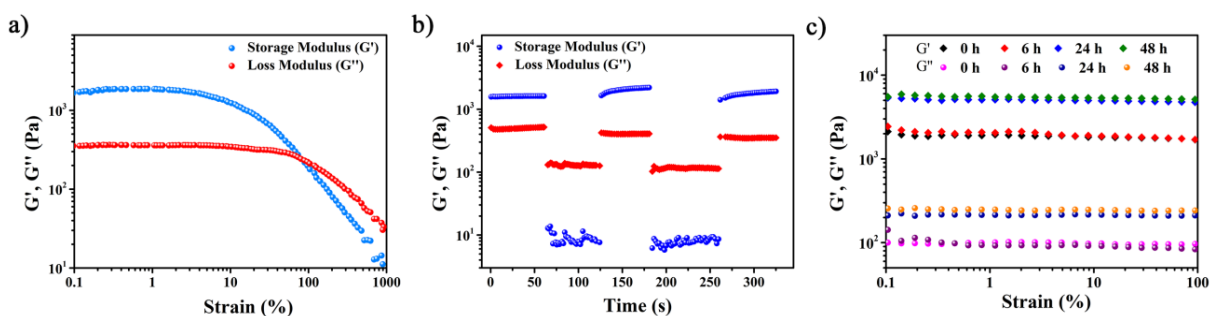
**Figure S11.** EDS of the GCPP-PDA gel.



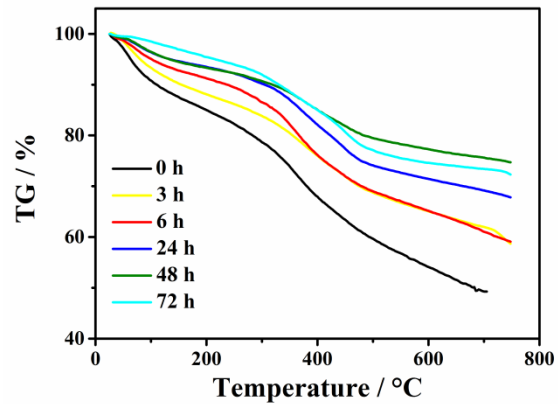
**Figure S12.** The FT-IR spectra of the samples.



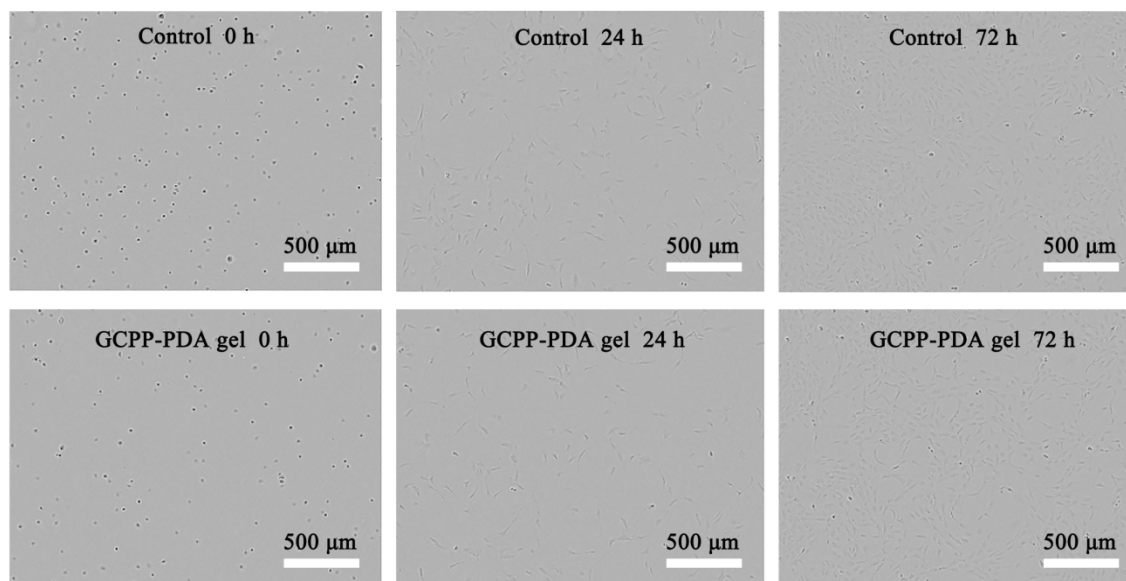
**Figure S13.** Photograph of the injectable GCPP-PDA hydrogel.



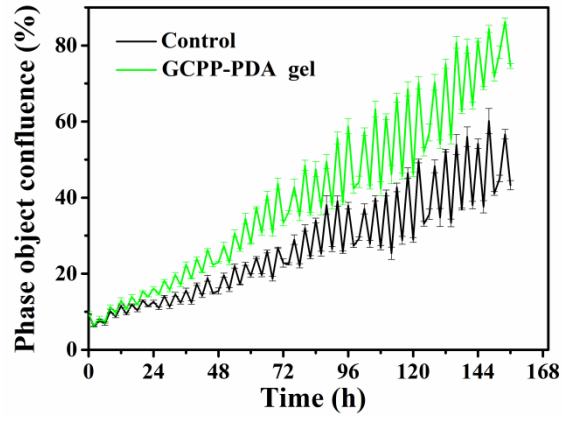
**Figure S14.** Rheological property of the GCPP-PDA gel. a) Strain sweep measurements of  $G'$  (storage modulus) and  $G''$  (loss modulus) of the GCPP-PDA gel. b) Dynamic step-strain measurements of  $G'$  (storage modulus) and  $G''$  (loss modulus) under repeated deformation of 1% strain and 100% strain. c)  $G'$  (storage modulus) and  $G''$  (loss modulus) of the GCPP-PDA gel with different self-assembly time of PDA.



**Figure S15.** TGA curves of a series of the GCPP-PDA gels with different self-assembly time of dopamine.

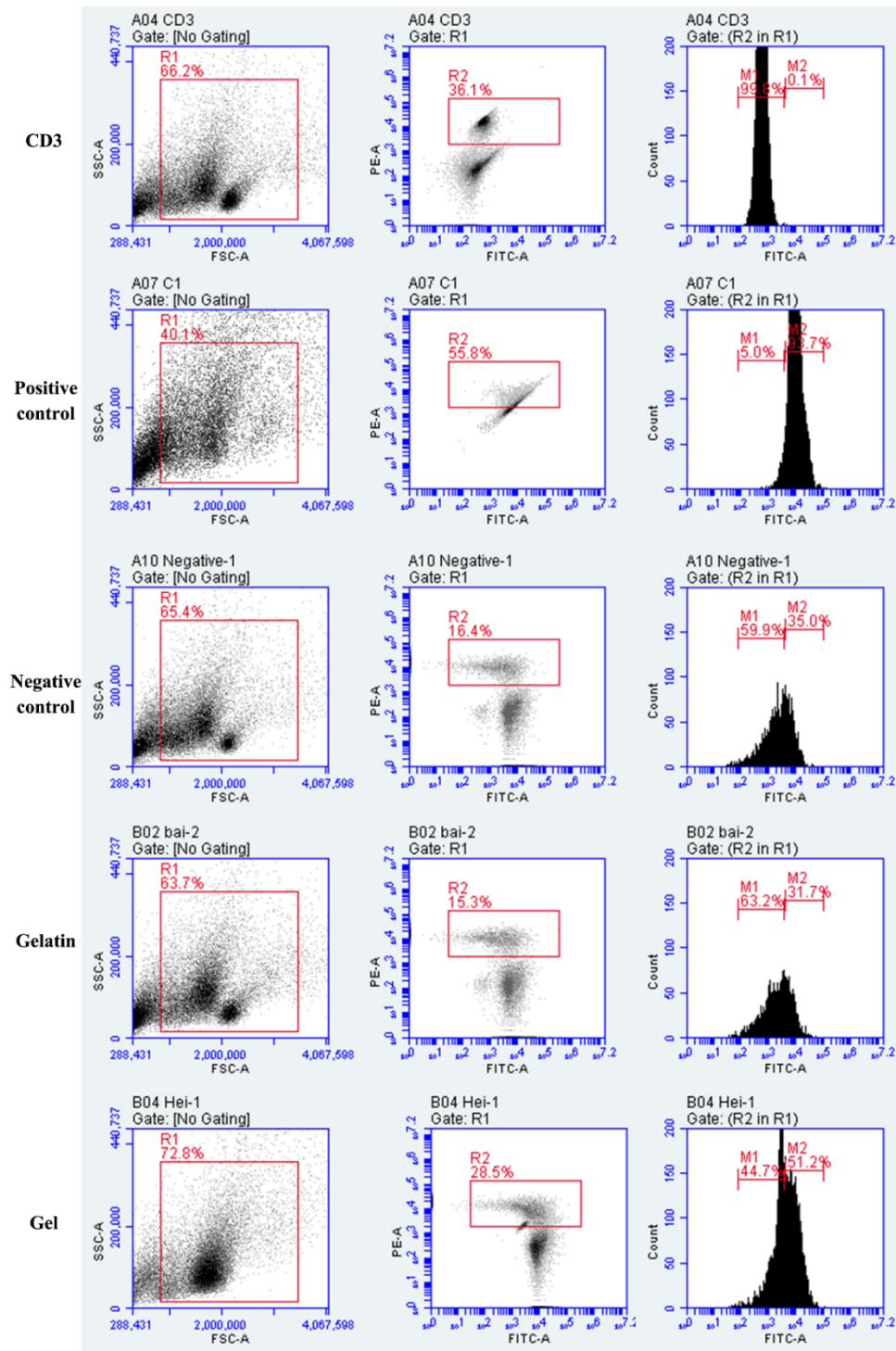


**Figure S16.** The microscopy images of the MC3T3-E1 cells cultured in the presence of unconditioned media and GCPP-PDA gel conditioned medium for 72 hours, respectively.

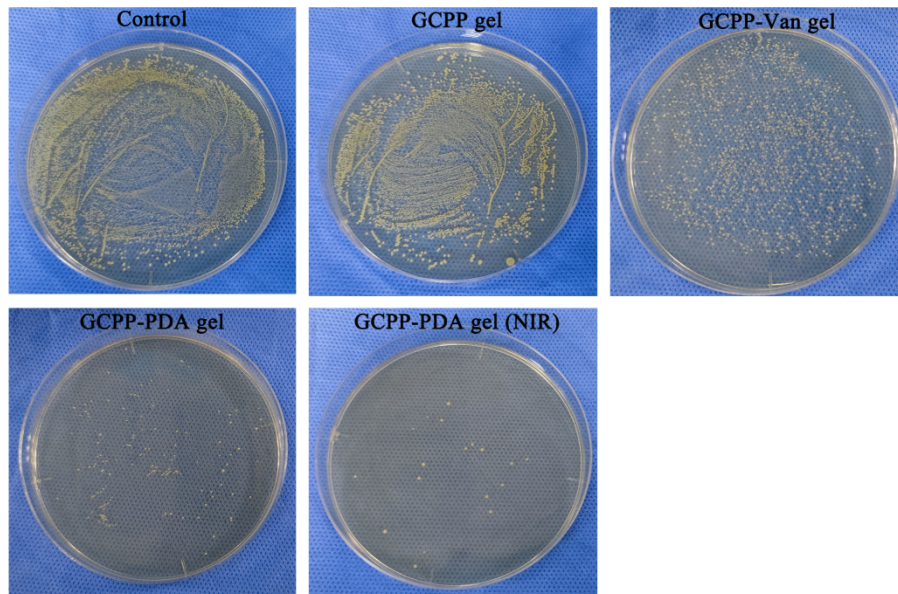


**Figure S17.** The growth curves of the MC3T3-E cells cultured in each group by the the Incucyte Live-Cell Analysis system.





**Figure S18.** The immunogenicity results of the GCPP-PDA gel using CFSE as maker and analysing by flow cytometry (IV ConA as positive group, culture medium as negative, PE anti-mouse CD 3 and PE Rat IgG2b Isotype as antibodies).



**Figure S19.** Photographs of MRSA colonies after treatments with PBS, GCPP gel, GCPP-Van gel, GCPP-PDA gel, GCPP-PDA gel (NIR) *in vivo*.

**Table S1.** Clotting time of the GCPP-PDA gel and  $\text{Ca}^{2+}$  to whole blood.

Group	Rabbit blood (natrium citricum)	GCPP-PDA gel	$\text{CaCl}_2$ (0.25 M)	Clotting time
1	1 mL	0 mg	0 $\mu\text{L}$	Non
2	1 mL	0 mg	100 $\mu\text{L}$	365 s
3	1 mL	50 mg	0 $\mu\text{L}$	780 s
4	1 mL	50 mg	100 $\mu\text{L}$	180 s