**Supporting Information**

**Photothermal-triggered release of alkyl radicals hydrogel via versatile carbon dots chelating Ag+ and its synergistic anti-bacterial and biofilm activities**

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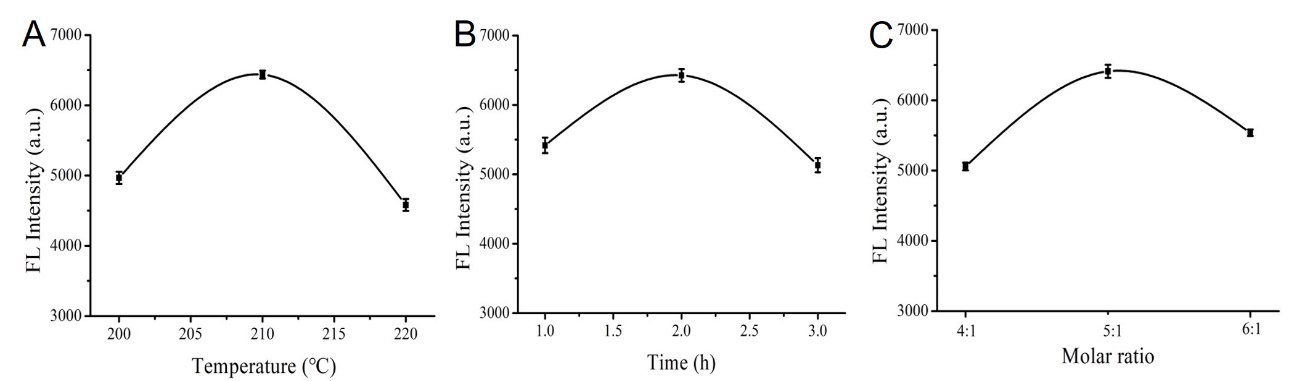
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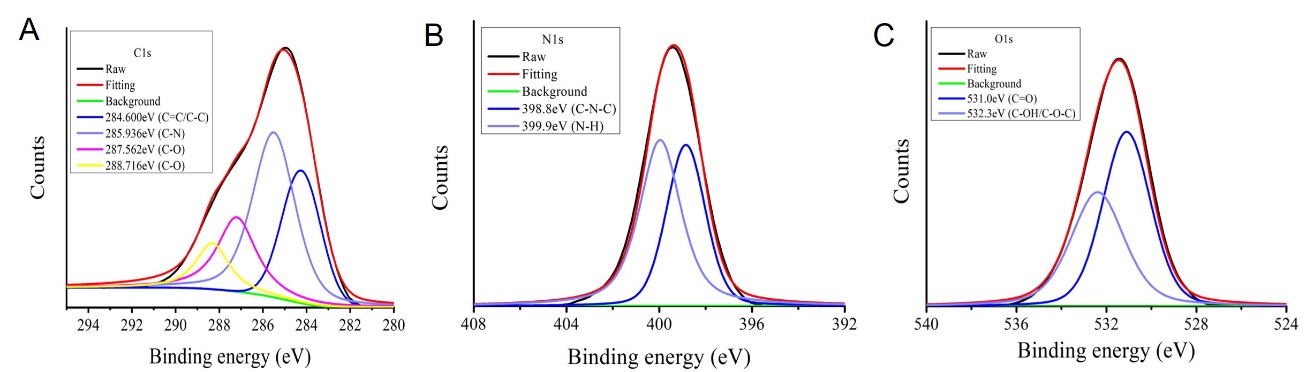
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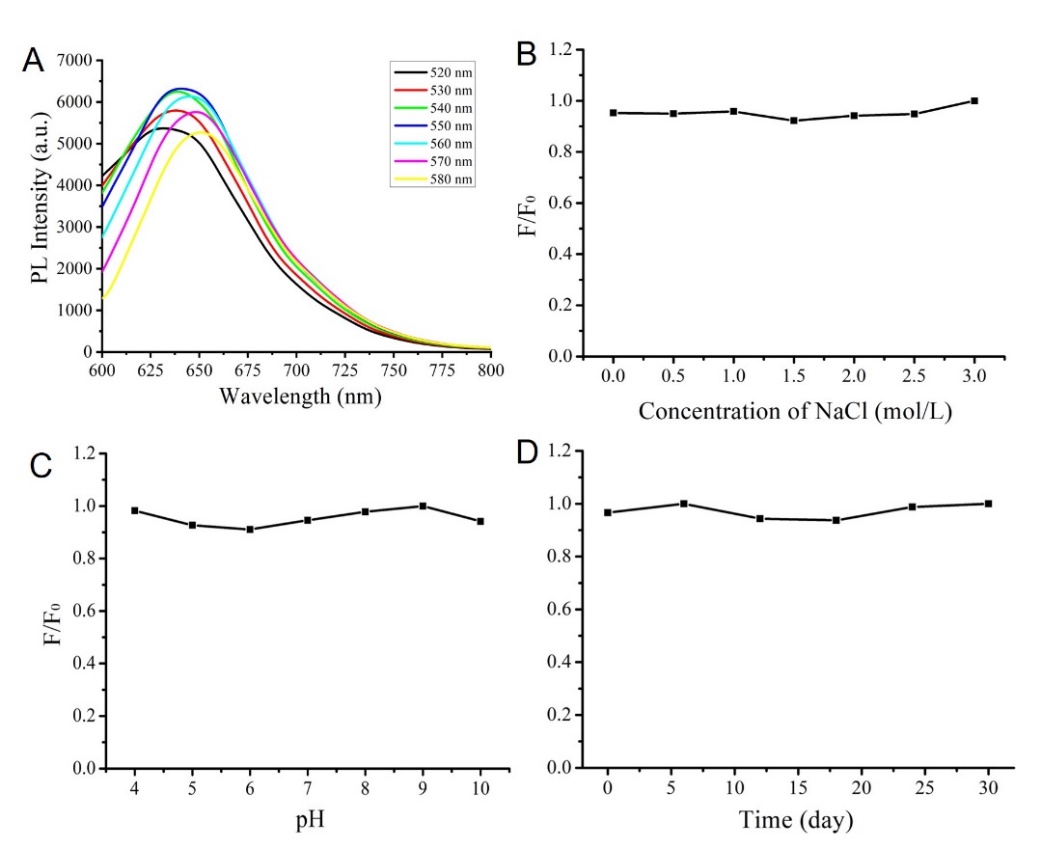
**Fig.S1-Fig.S10**



**Fig. S1.** Fluorescence intensity of PTCDs under different synthesis conditions. (A) different reaction temperatures; (B) different reaction times; (C) the molar ratio of different reactants.

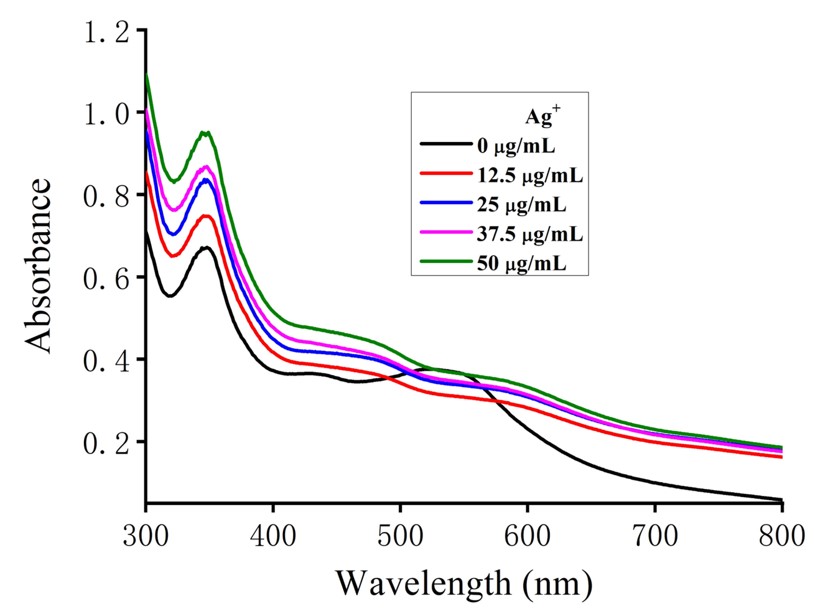


**Fig. S2.** The high resolution C1S XPS spectrum (A), N1S XPS spectrum (B) and O1S XPS spectrum (C).

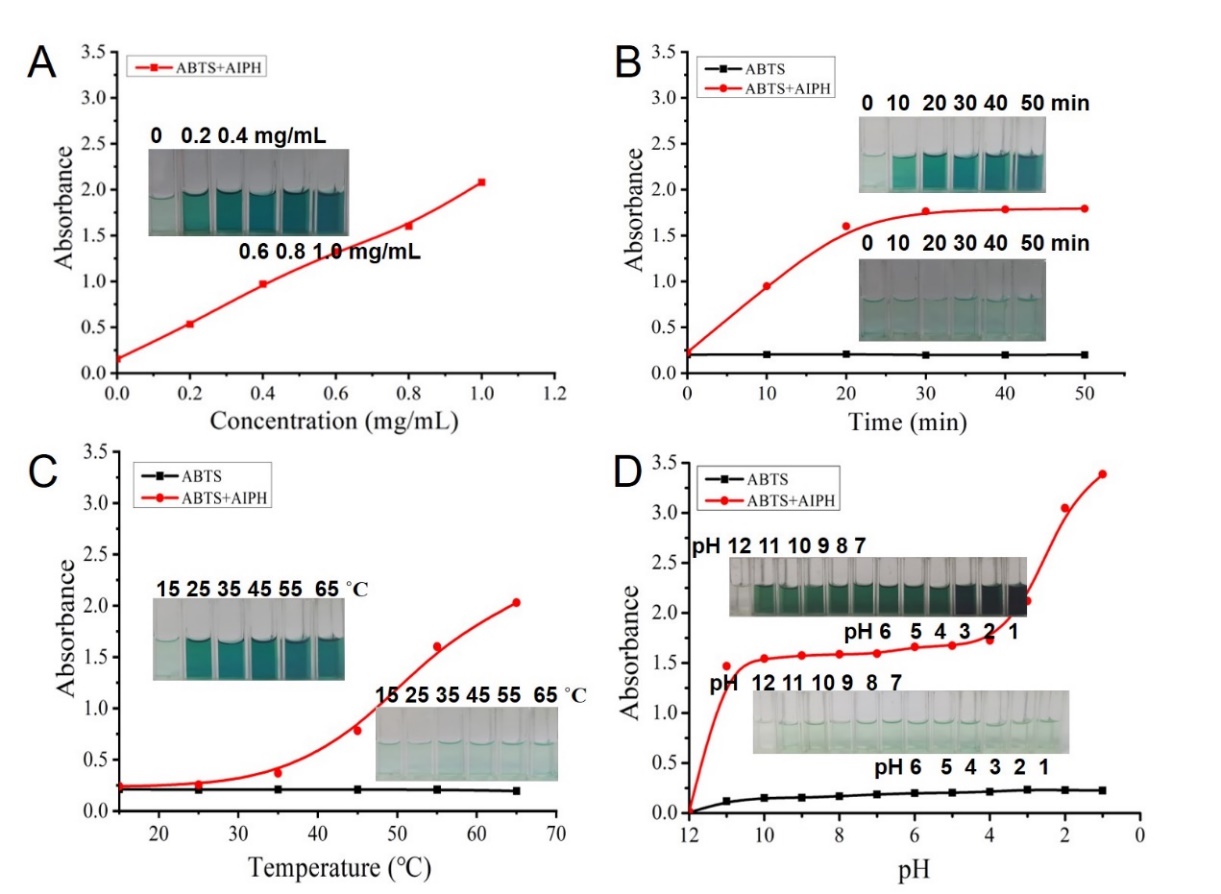


**Fig. S3.** (A) Fluorescence emission spectra of PTCDs at different excitation wavelengths; (B) Effect of ionic strength (NaCl) on fluorescence intensity of PTCDs; (C) Effect of different pH on fluorescence intensity of PTCDs; (D) The time-dependence of fluorescent intensity of PTCDs at the various time.

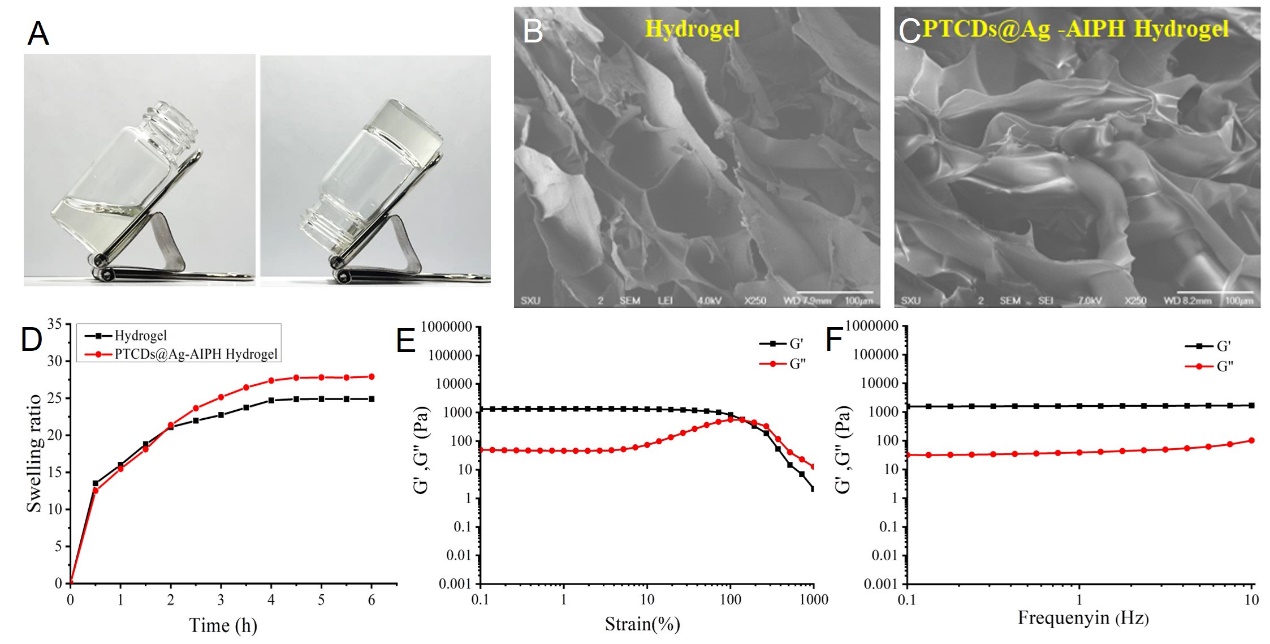
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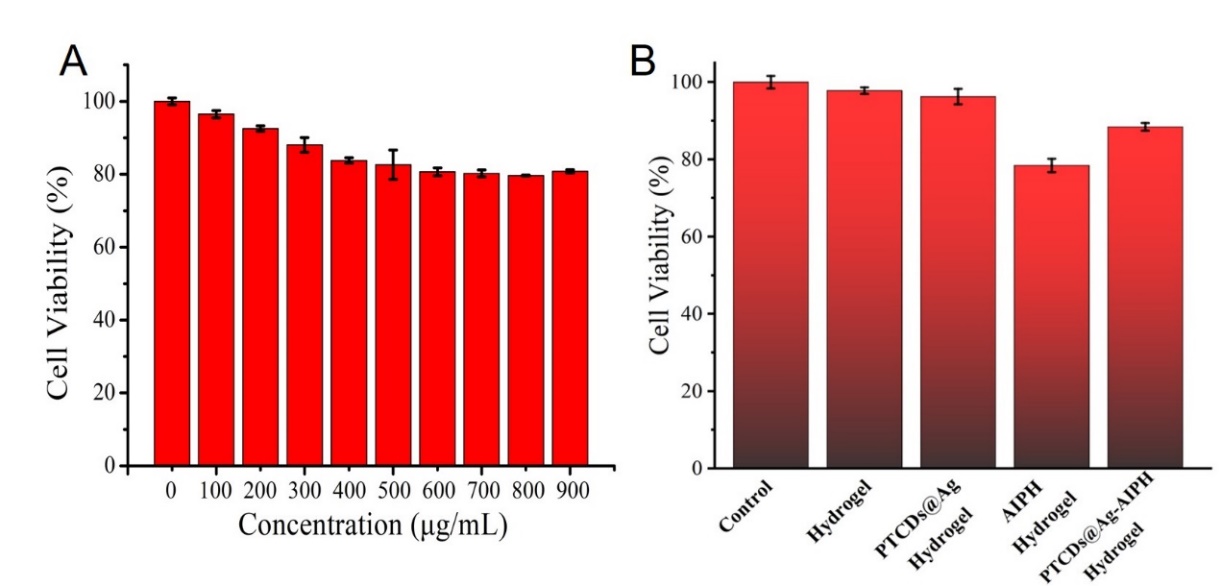
**Fig. S4**. The absorption spectra of PTCDs incubated with different concentrations of Ag+.



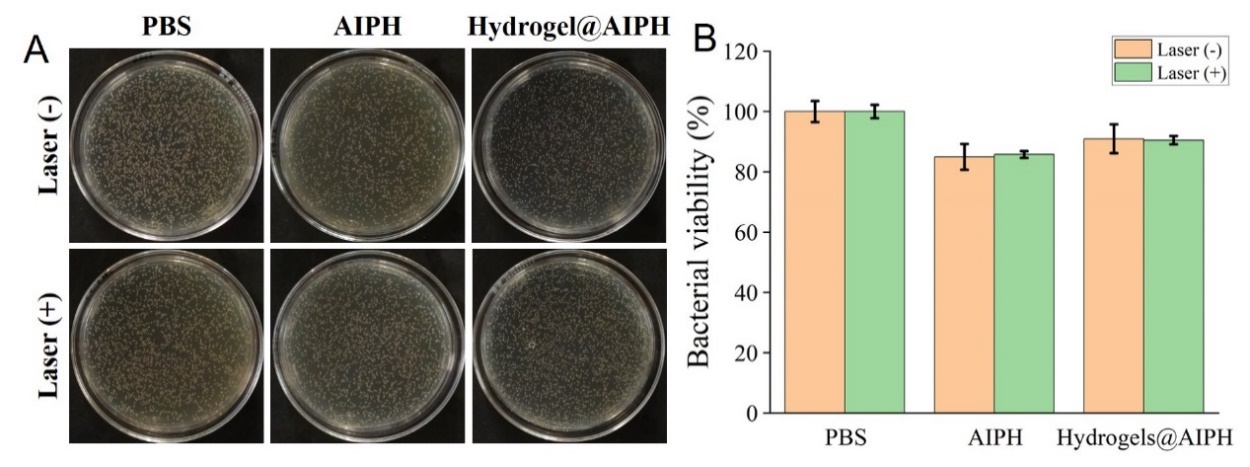
**Fig. S5.** Alkyl radicals produced by AIPH (A) at different concentrations in a water bath for 55 ℃ and (B) at different times in a water bath for 55 ℃ and (C) at different temperatures and (D) at different pH in a water bath for 55 ℃. The insets: the color change of the solution before and after ABTS interacted with the alkyl radical produced by AIPH.



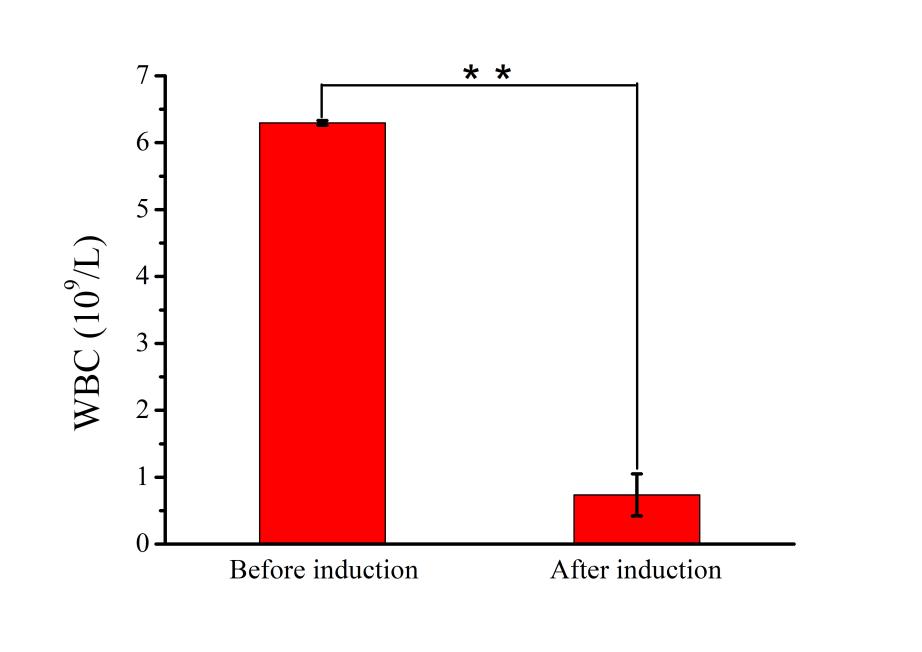
**Fig. S6**. (A) Photographs of hydrogels in the gel and sol states, (B, C) High-resolution SEM of Hydrogel and composite hydrogel (PTCDs@Ag-AIPH Hydrogel), (D) Swelling rates of Hydrogel and PTCDs@Ag-AIPH Hydrogel, (E, F) Rheological properties of PTCDs@Ag-AIPH Hydrogel: strain scan (E), frequency scan (F).



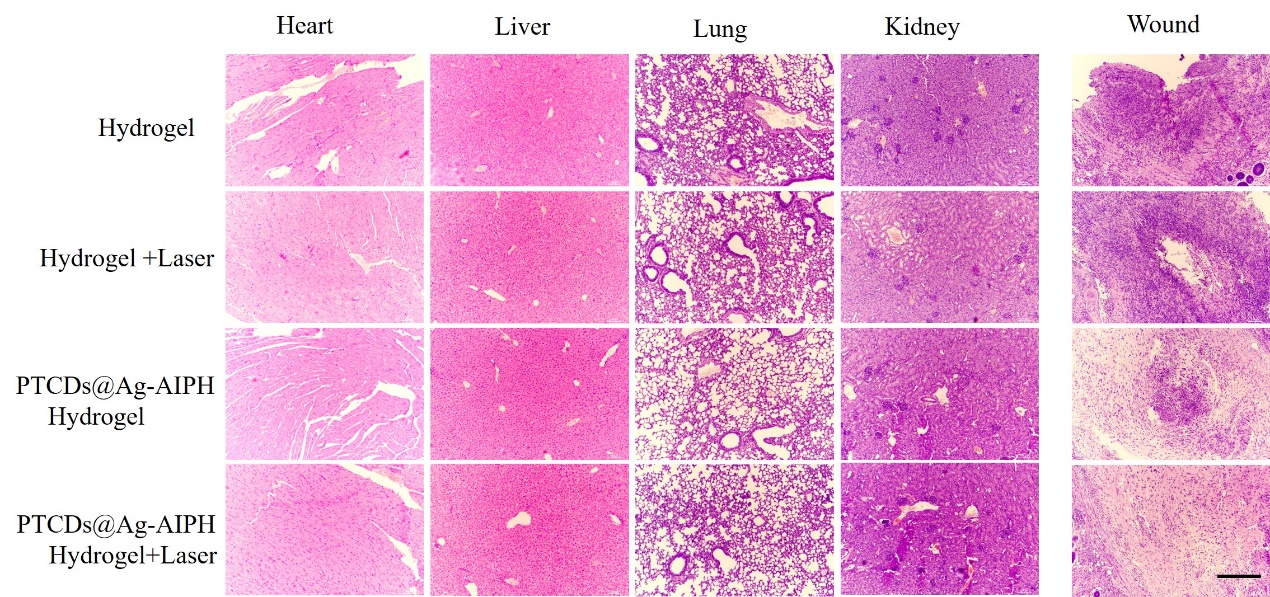
**Fig. S7.** Cytotoxicity tests of PTCDs at different concentrations and Hydrogels.



**Fig. S8.** (A) The plate photos of *S. aureus* cocultured with PBS, AIPH and Hydrogel@AIPH under 660 nm laser irradiation or not ([AIPH]=0.80 mg/mL). The final bacteria suspension concentrations were adjusted to 106 CFU·mL−1. (B) The viability rate of the different treatments against *S. aureus*.



**Fig. S9.** The difference of white blood cell value in mice before and after cyclophosphamide induction (\*\*p<0.01).



**Fig. S10.** H&E staining analyses of major organs and infected wound tissues in mice with various treatments. Scale bar = 200 μm.