Supporting information

Peptide-based pH-sensitive Antibacterial Hydrogel for Drug-resistant Biofilm-infected Diabetic Wounds Healing

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Table S1. Composition and nomenclature of hydrogels.

Sample	c_{TPI-PN}（mg/mL）
QCS-OD	0
QCS-OD-AMP（**COA-T0**）	0
QCS-OD-AMP/TPI-PN0.05（**COA-T1**）	0.05
QCS-OD-AMP/TPI-PN0.10（**COA-T2**）	0.10
QCS-OD-AMP/TPI-PN0.15（**COA-T3**）	0.15
QCS-OD-AMP/TPI-PN0.20（**COA-T4**）	0.20
QCS-OD-AMP/TPI-PN0.25（**COA-T5**）	0.25

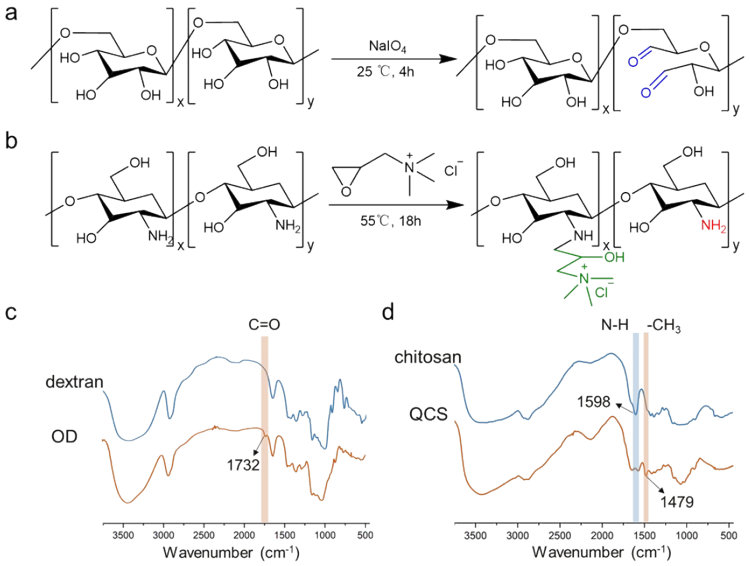

Figure S1. Synthesis and FT-IR characterization of ODex and QCS. (a) Synthesis of ODex; (b) synthesis of QCS; (c) FT-IR spectra of dextran and ODex; (D) FT-IR spectra of chitosan and QCS.

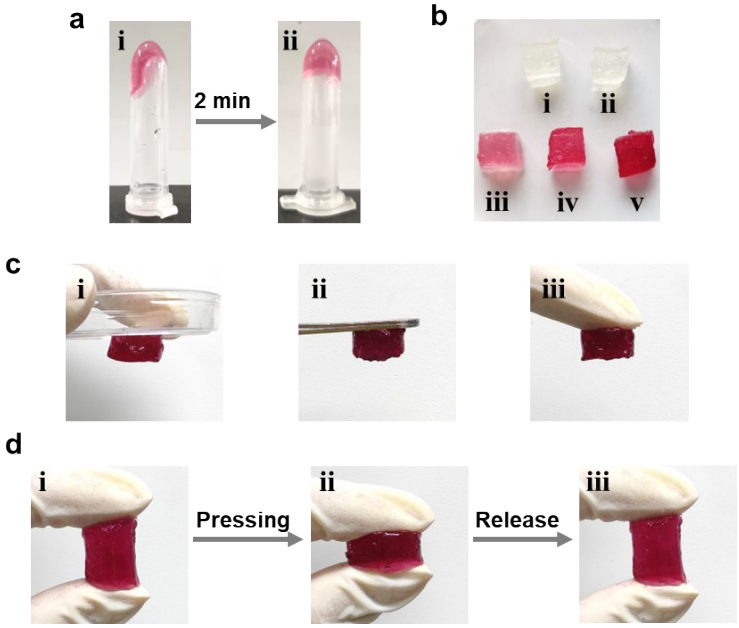

Figure S2. (a) **COA-T3** before and after gelation. (b) Photographs of the hydrogels: (i) **QCS-OD**, (ii) **COA-T0**, (iii) **COA-T1**, (iv) **COA-T2**, (v) **COA-T3**. (c) Photographs of the adhesiveness of **COA-T3** to different materials. (d) Original state (i), compressed state (ii), and the recovered state (iii) of the prepared hydrogel.

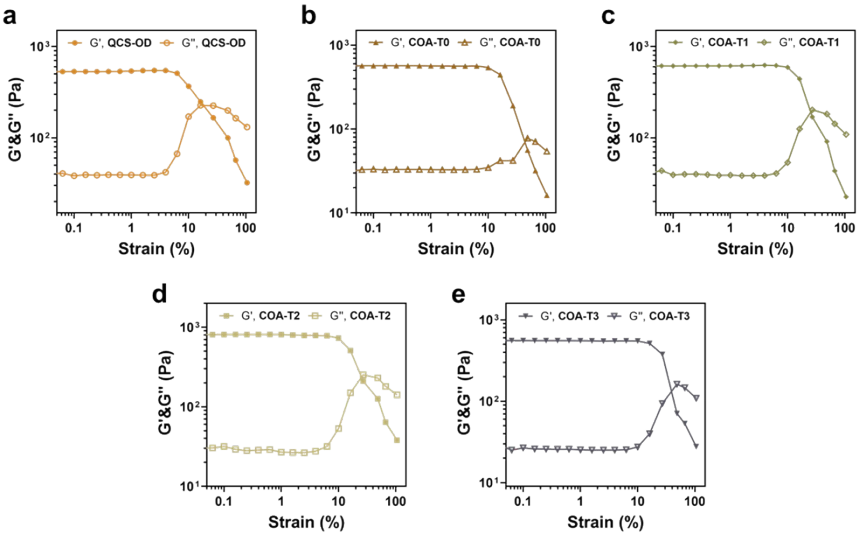

Figure S3. Amplitude scanning assay of **QCS-OD** (a), **COA-T0** (b), **COA-T1** (c), **COA-T2** (d), **COA-T3** (e).

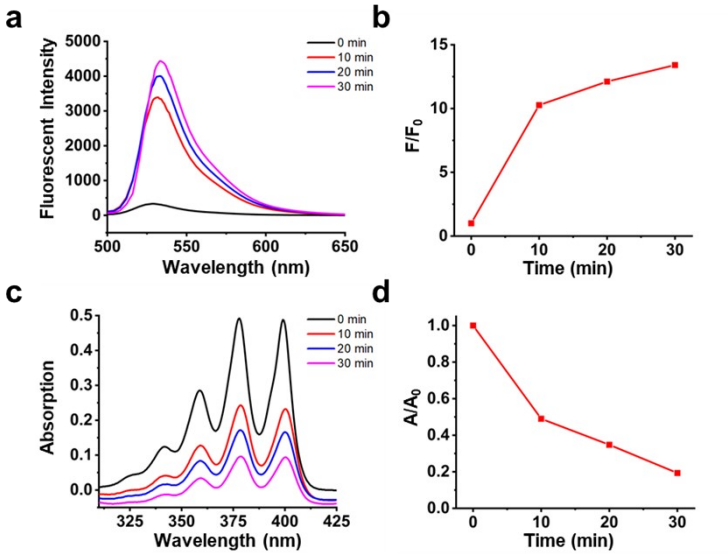

Figure S4. Investigation of ROS generation of **COA-T3**. (a) The fluorescence emission spectrum of DCFH with excitation wavelength of 488nm under different illumination time in the presence of **COA-T3**. (b) The fluorescence emission intensity of DCFH at 525nm increased gradually with the prolongation of illumination time. (c) The UV-vis absorption spectrum of ABDA under different illumination time in the presence of **COA-T3**. (d) The absorption value of ABDA at 378nm decreased with the prolongation of light time.

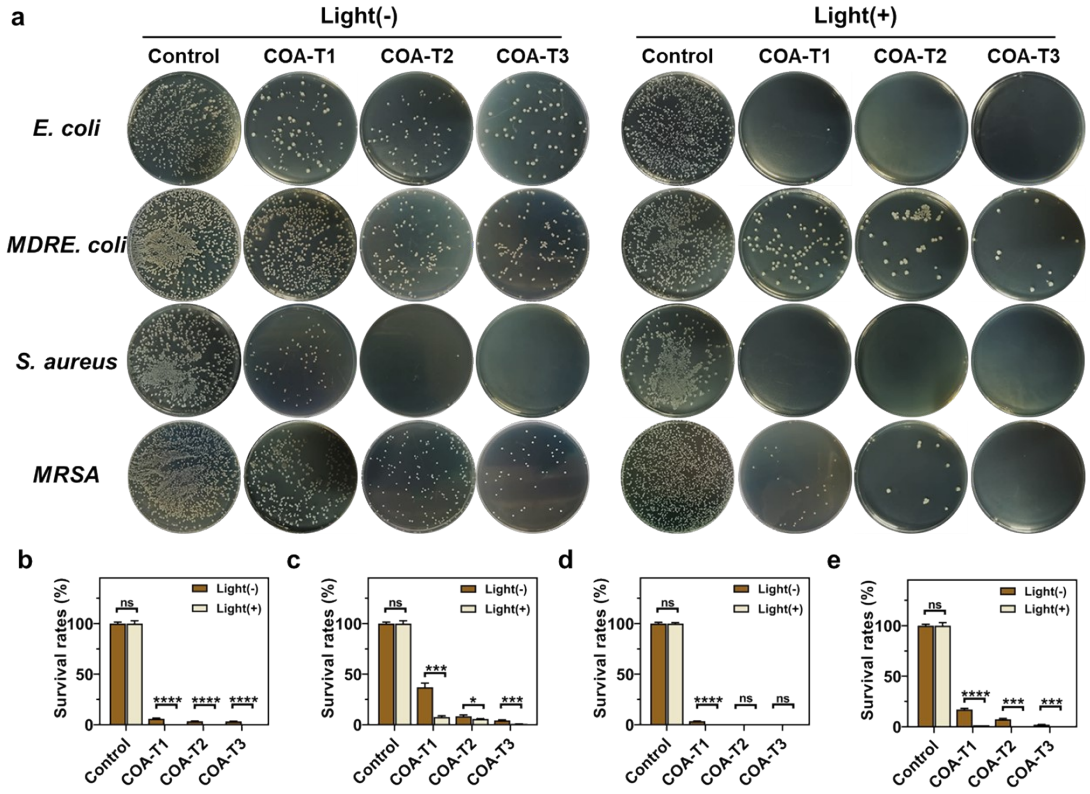

Figure S5. Effect of different concentration of photosensitizer in hydrogels on its antibacterial activity. (a) The colony growth of *E.coli*, *MDRE.coli*, *S.aureus* and *MRSA* on agar plates after hydrogels treatment with different concentrations of photosensitizer with or without light irradiation. The survival rates of *E.coli* (b), *MDRE.coli* (c), *S.aureus* (d) and *MRSA* (e) in hydrogels with different concentrations of photosensitizers were quantified by counting the colonies on agar plates. The data is displayed as the mean ±SD (n = 3). ****$P < 0.0001$; ***$P < 0.001$; **$P < 0.01$; "ns" represents no significant difference between the two groups.

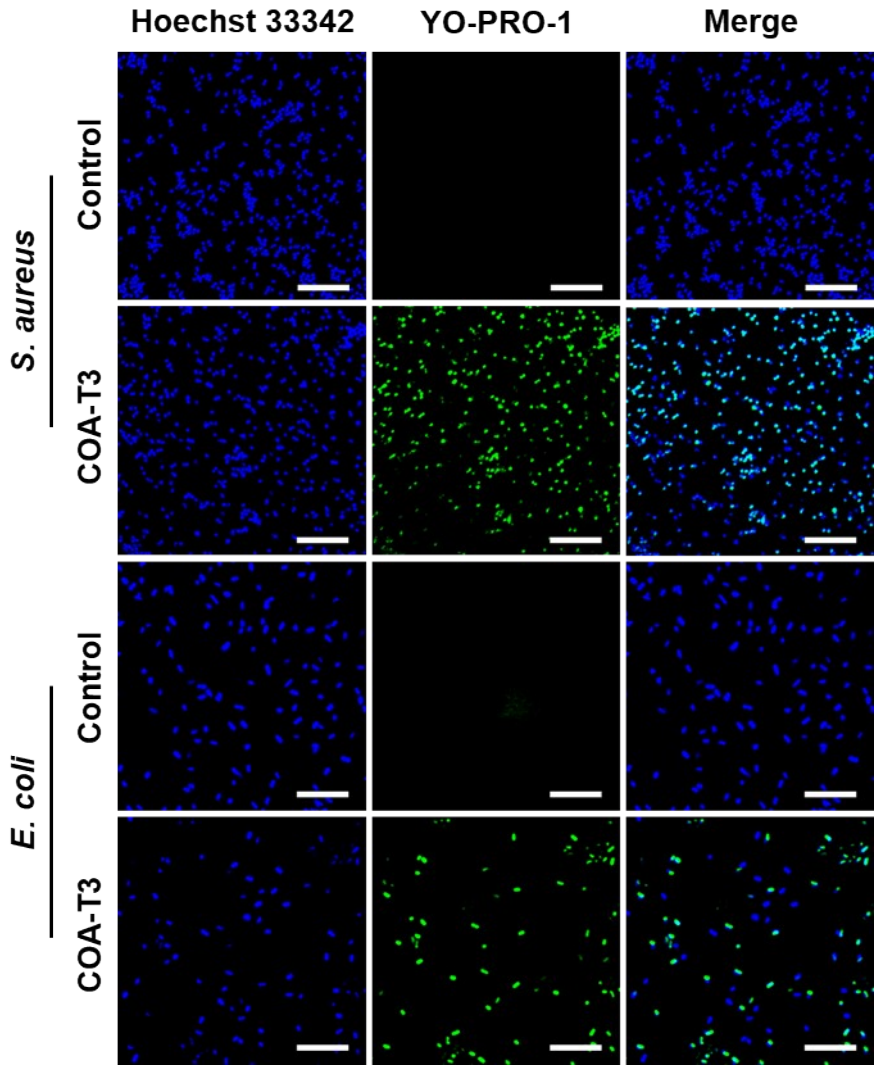

Figure S6. CLSM images of *S. aureus* and *E. coli* after incubation with PBS (Control) or **COA-T3** and then co-staining with Hoechst 33342 (blue fluorescence, a nucleic acid dye for all bacteria) and YO-PRO-1 (green fluorescence, a dye for dead bacteria). Scale bar: 10 μm.

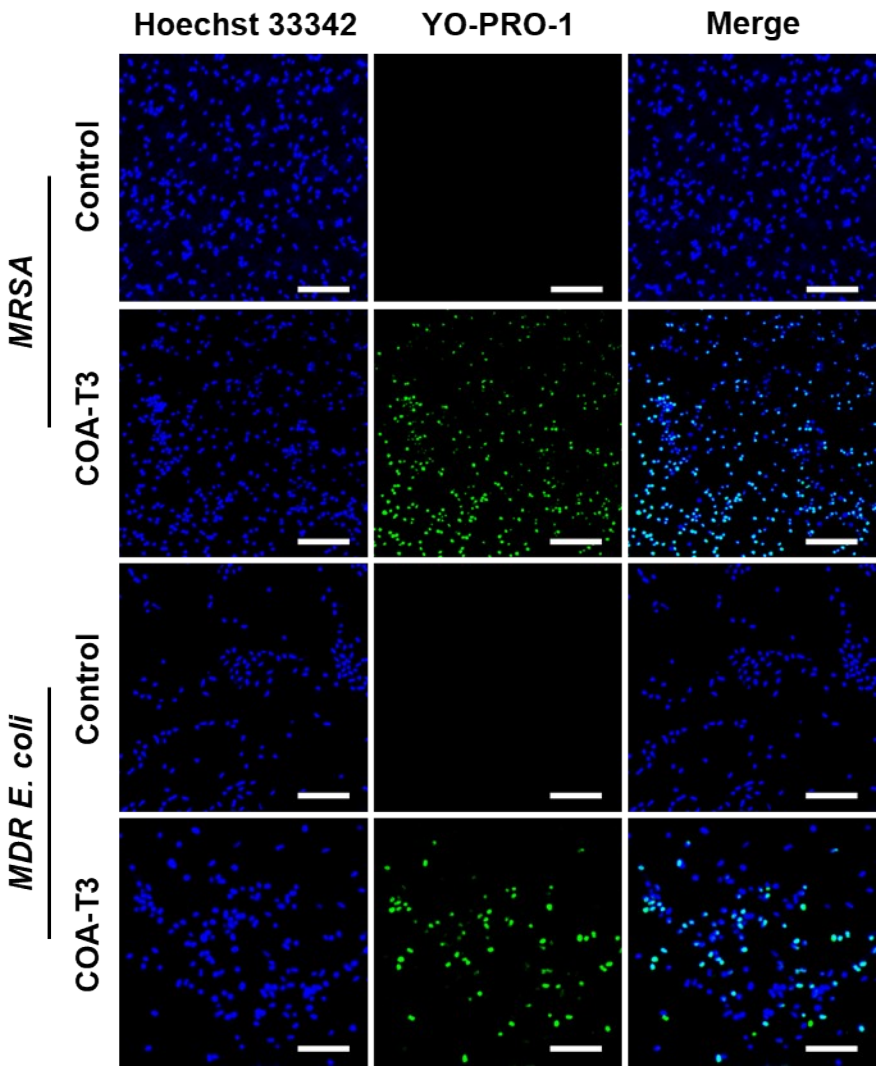

Figure S7. CLSM images of *MRSA* and *MDR E. coli* after incubation with PBS (Control) or **COA-T3** and then co-staining with Hoechst 33342 (blue fluorescence, a nucleic acid dye for all bacteria) and YO-PRO-1 (green fluorescence, a dye for dead bacteria). Scale bar: 10 μm.

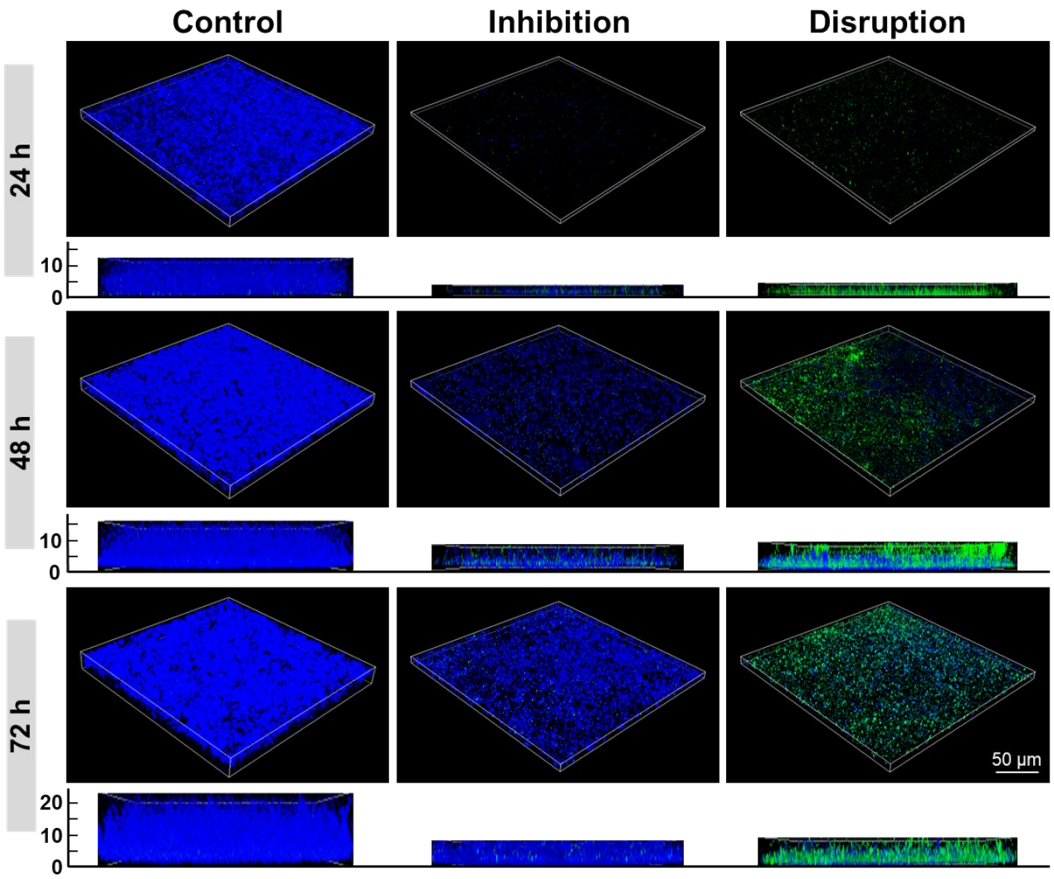

Figure S8. Anti-biofilm assays. CLSM 3D and side view imaging of *MRSA*-biofilms co-incubation with PBS or **COA-T3** before and after biofilm formation. The samples were co-staining with Hoechst 33342 (blue fluorescence) and YO-PRO-1 (green fluorescence) before CLSM imaging. Scale bars: 50 μm.

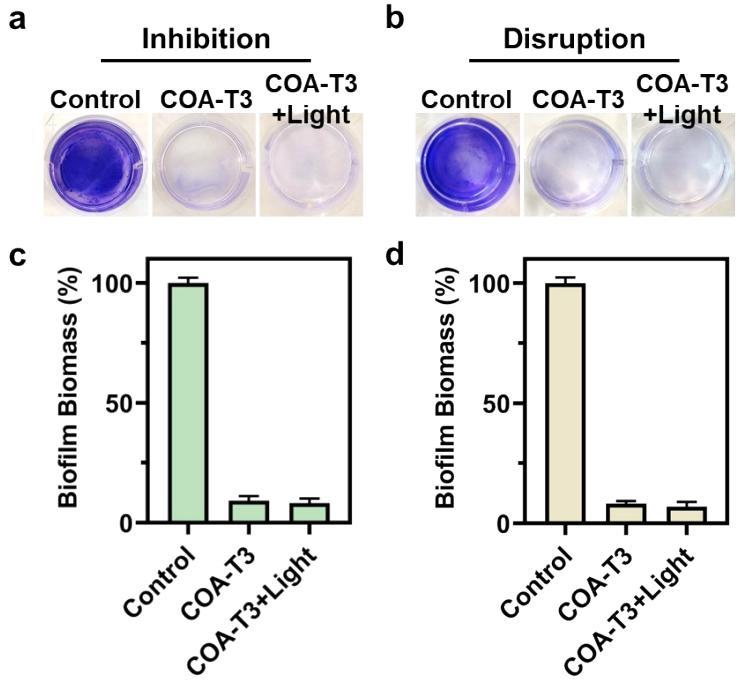

Figure S9. Investigation of biofilm (24 h) inhibition/disruption *via* crystal violet staining method. (a-b) Images of *MRSA* stained by crystal violet after different treatments. (c-d) Biofilm biomass of *MRSA* after different treatments.

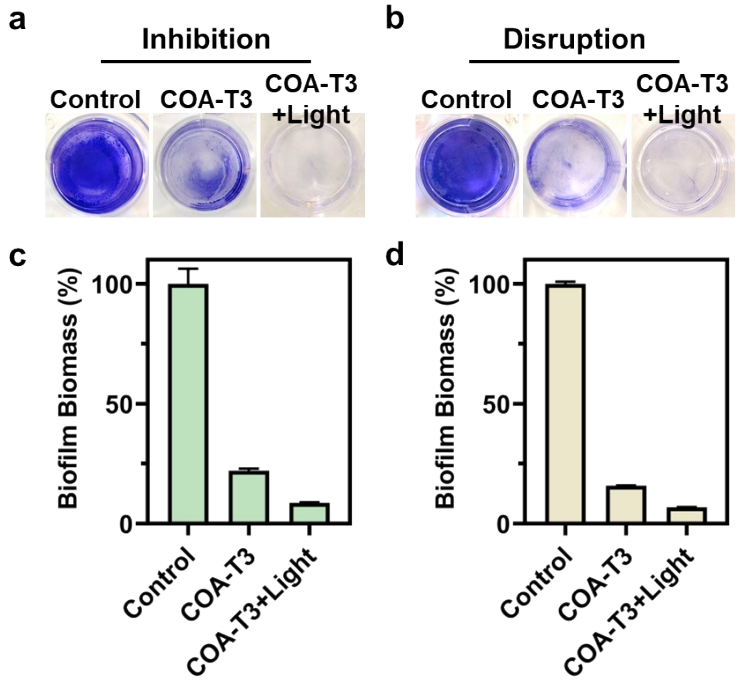

Figure S10. Investigation of biofilm (48 h) inhibition/disruption *via* crystal violet staining method. (a-b) Images of *MRSA* stained by crystal violet after different

treatments. (c-d) Biofilm biomass of *MRSA* after different treatments.

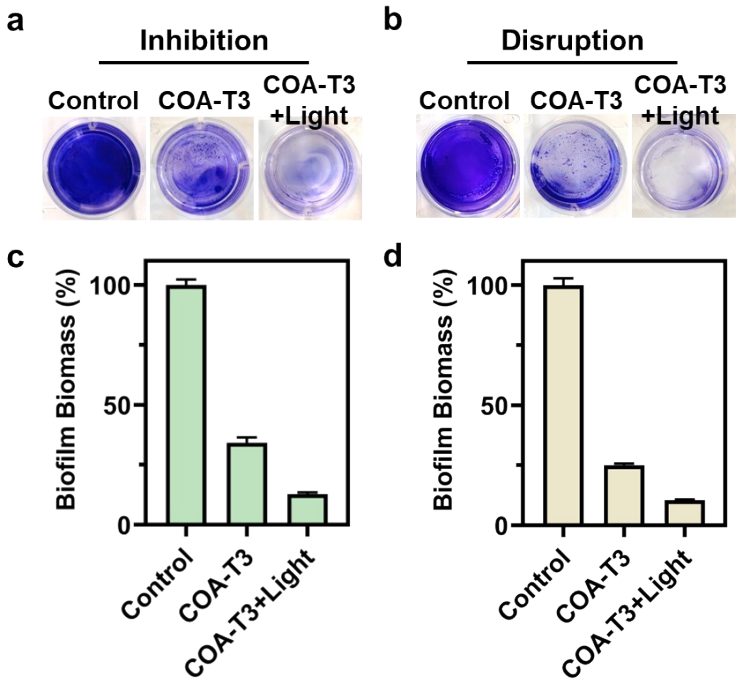

Figure S11. Investigation of biofilm (72 h) inhibition/disruption *via* crystal violet staining method. (a-b) Images of *MRSA* stained by crystal violet after different treatments. (c-d) Biofilm biomass of *MRSA* after different treatments.

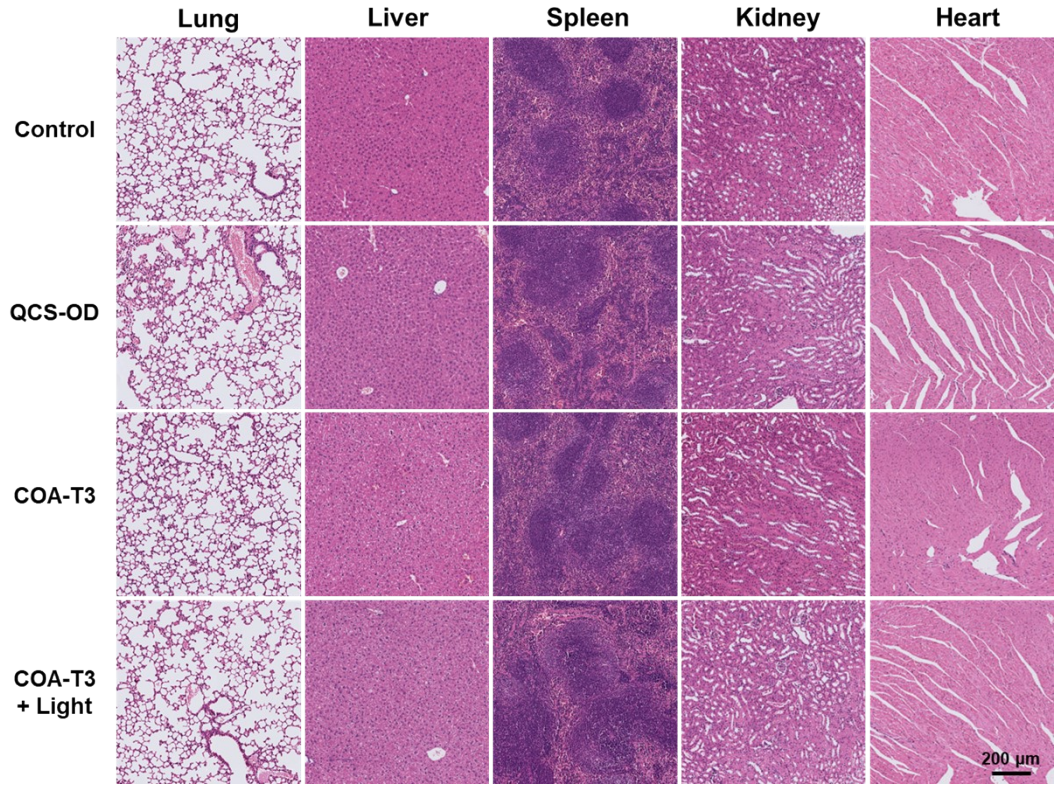

Figure S12. Representative images of H&E-stained heart, liver, spleen, lung and kidney slices from mice 8 days post treatment at each group. Scale bar: 200 μm.