Supporting Information

Accelerated Antibacterial Red-Carbon Dots with Photodynamic Therapy Against *Multidrug-resistant Acinetobacter baumannii*

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Content

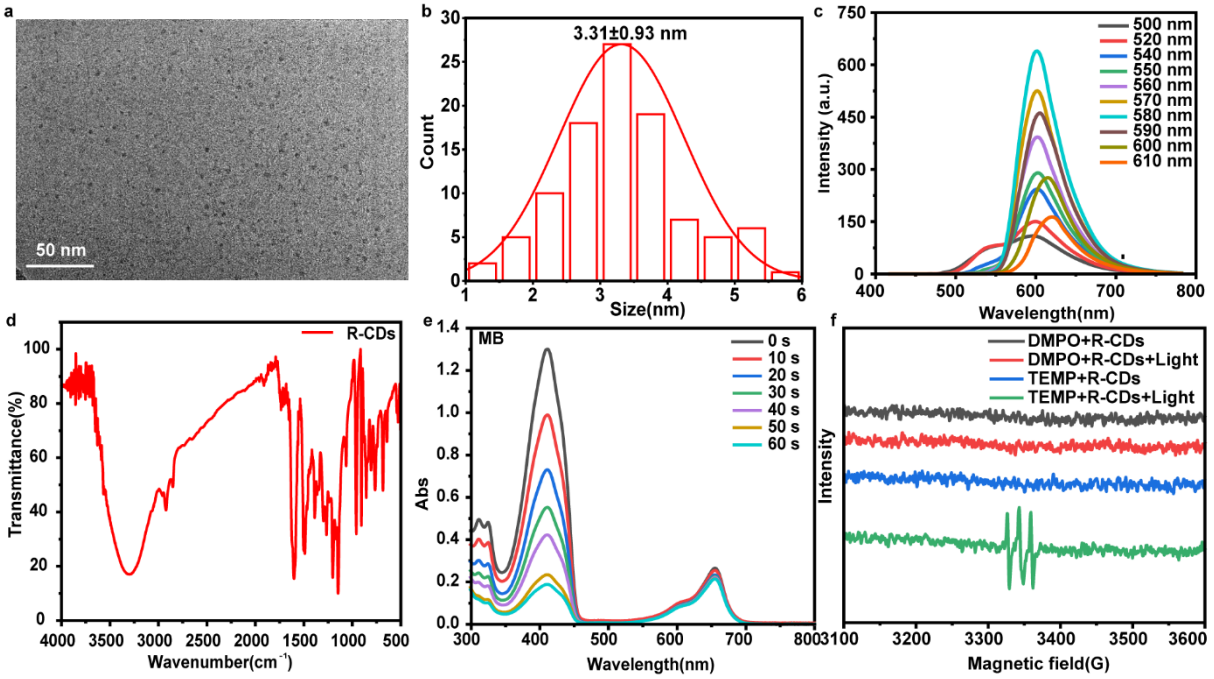

Figure S1. Characterization of R-CDs. (a) The TEM image of R-CDs, (b) The size distribution of R-CDs obtained by counting the diameter of the dots in the HRTEM image. (c) Fluorescence emission spectra of R-CDs in ethanol solution under different excitation wavelengths. (d) FTIR spectra of the R-CDs. (e) Decreasing absorbance of DPBF with MB with increasing irradiation time (powder density: 8 mW cm^{-2}). (f) EPR spectra of R-CDs and TEMP/DMPO with or without light irradiation (powder density: 8 mW cm^{-2}).

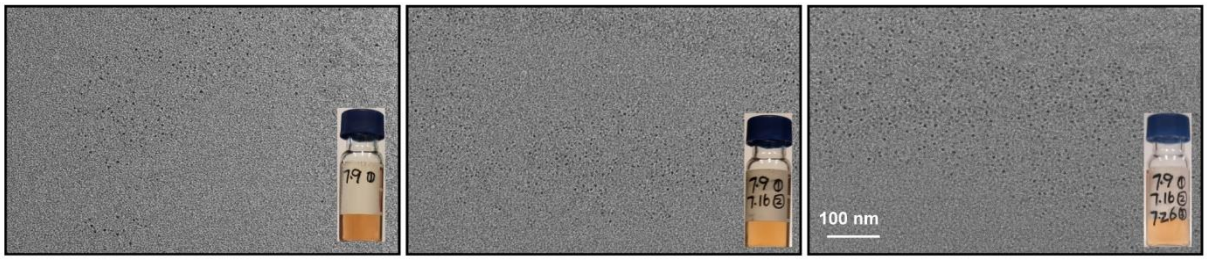

Figure S2. The stability of R-CDs. The TEM of R-CDs and the insert map is the R-CDs solution (1mg mL^{-1}) at various time(1, 7, 17 day).

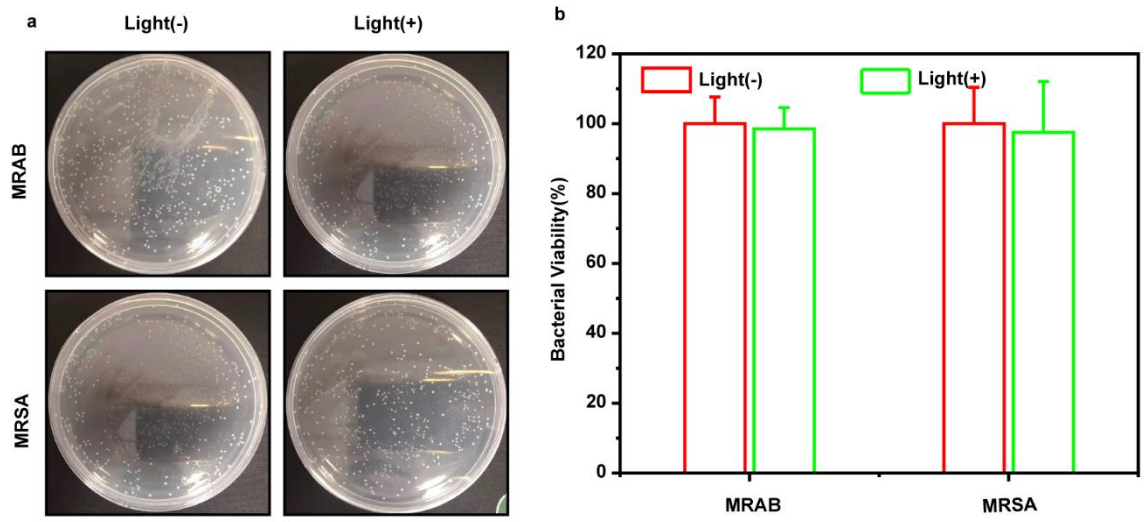

Figure S3. The effect of light irradiation on bacterial activity. (a) Photographs of bacterial colonies (MRAB and MRSA) after being treated with or without light irradiation (590 nm, 30 mW cm^{-2}, 15 min). (b) Bacterial viability of MRAB and MRSA after different treatments.

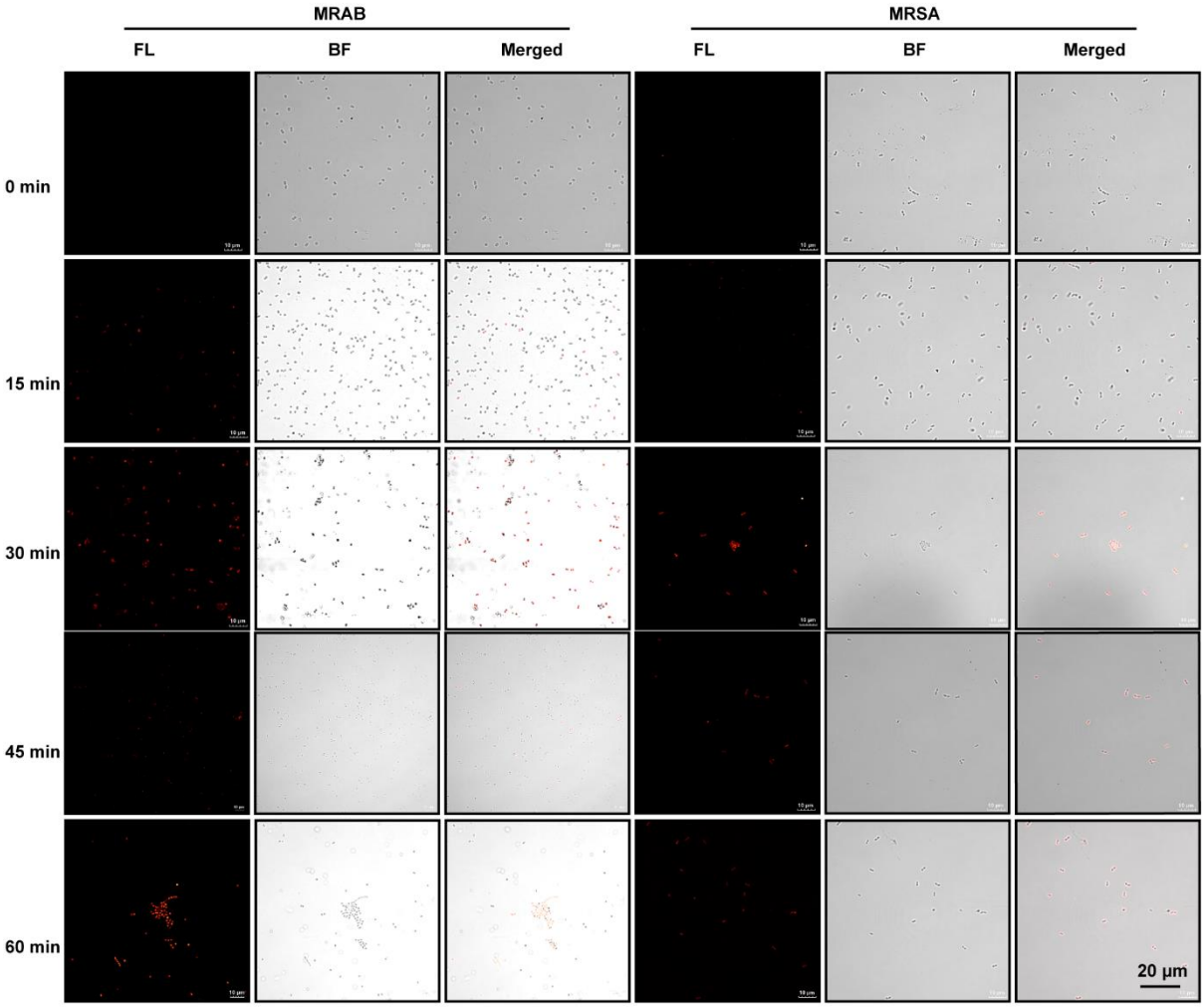

Figure S4. Confocal laser scanning microscope (CLSM) images of bacteria (MRAB and MRSA) incubated with R-CDs (20 μg mL^{-1}) at different times (scale bar: 10 μm). (λ_{Ex}=561 nm, λ_{Em}: 580-650 nm).

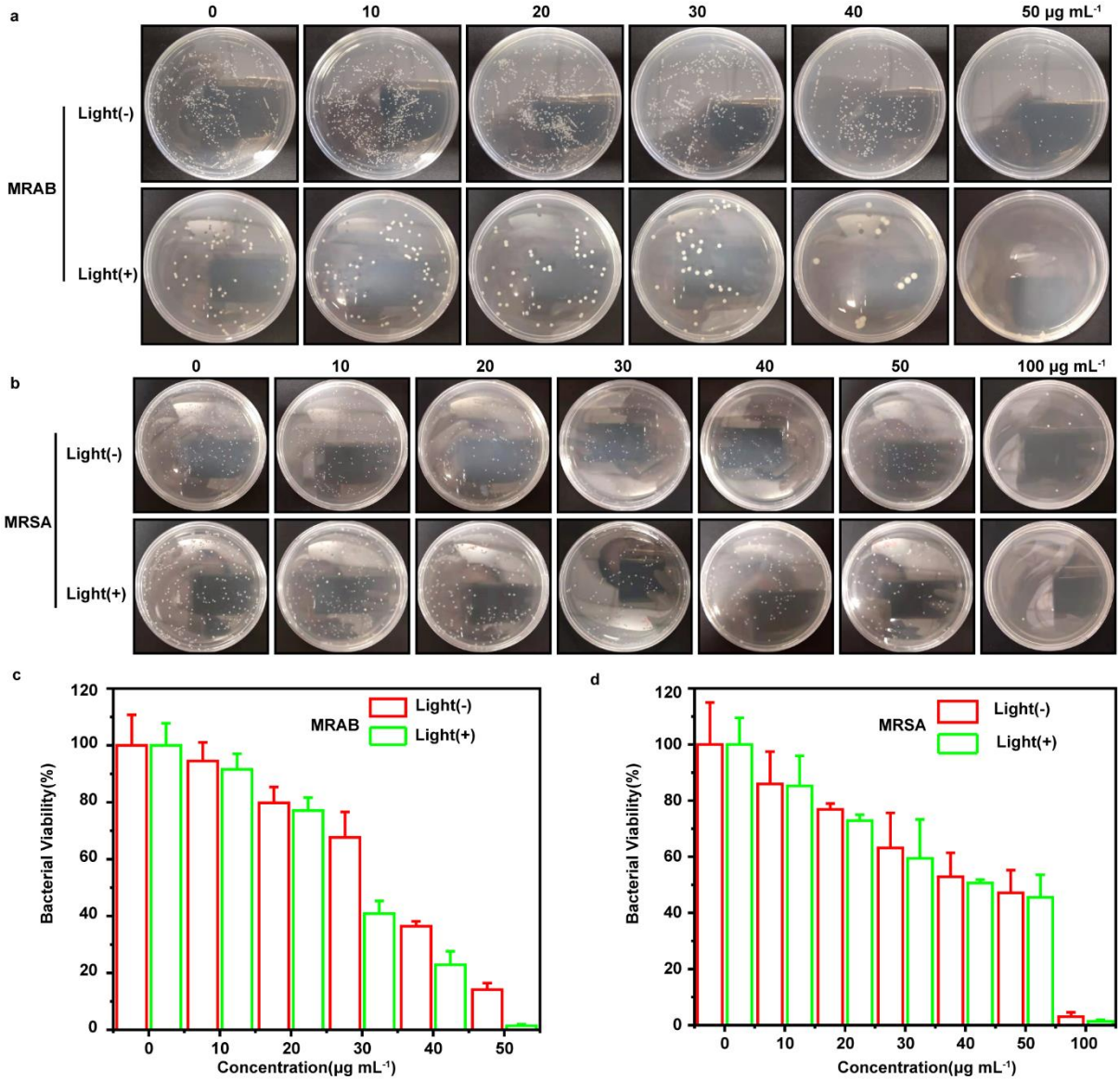

Figure S5**.** Antibacterial activity of R-CDs *in vitro*. Photographs of bacterial colonies of (a) MRAB and (b) MRSA after treatment with R-CDs (0, 10, 20, 30, 40, 50 or 100 μg mL^{-1}) in the dark or after bacterial suspensions had been treated by light irradiation (30 mW cm^{-2}, 10 min), respectively. (c) and (d) Bacterial viability of MRAB and MRSA after treatment with R-CDs (0, 10, 20, 30, 40, 50 or 100 μg mL^{-1}) or after bacterial suspensions had been treated by light irradiation (30 mW cm^{-2}, 10 min), respectively.

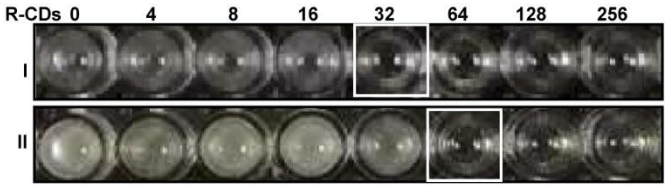

Figure S6. Minimum inhibitory concentration (MIC) of MRAB(I) and MRSA(II), respectively. (R-CDs:0, 4, 8, 16, 32, 64, 128, 256 μg mL^{-1})

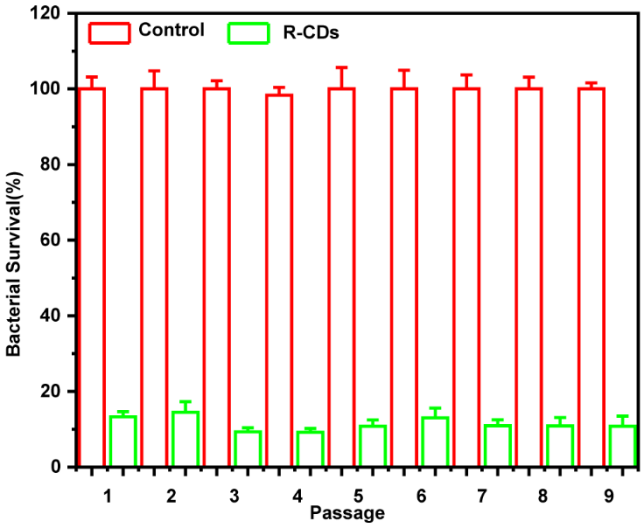

Figure S7. Bacterial viability of MRAB after treating with R-CDs for nine passages.

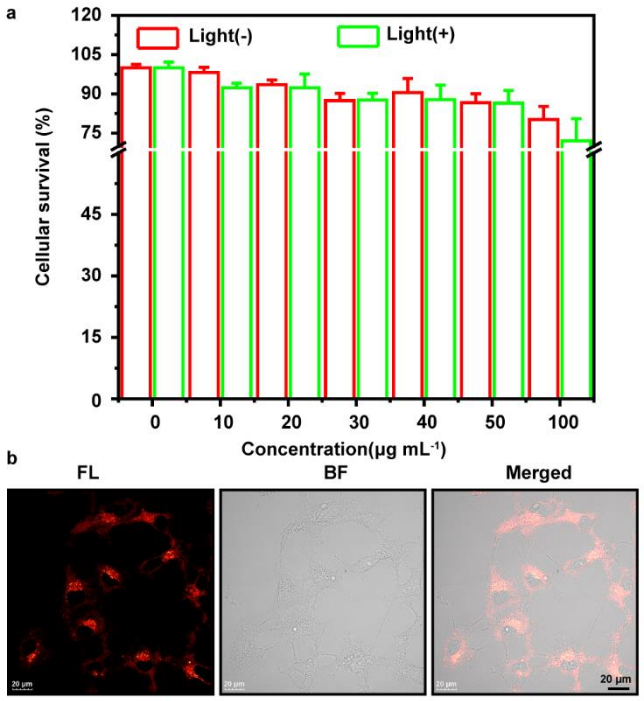

Figure S8. *In Vitro* Cytotoxicity. (a) Cellular survival of COS-7 after treating with R-CDs or light-excited R-CDs (590 nm, 30 mW cm^{-2}, 10 min) for 24 h. (b) CLSM images of COS-7 were treated with R-CDs (50 μg mL^{-1}) for 24 h (scale bar: 20 μm).

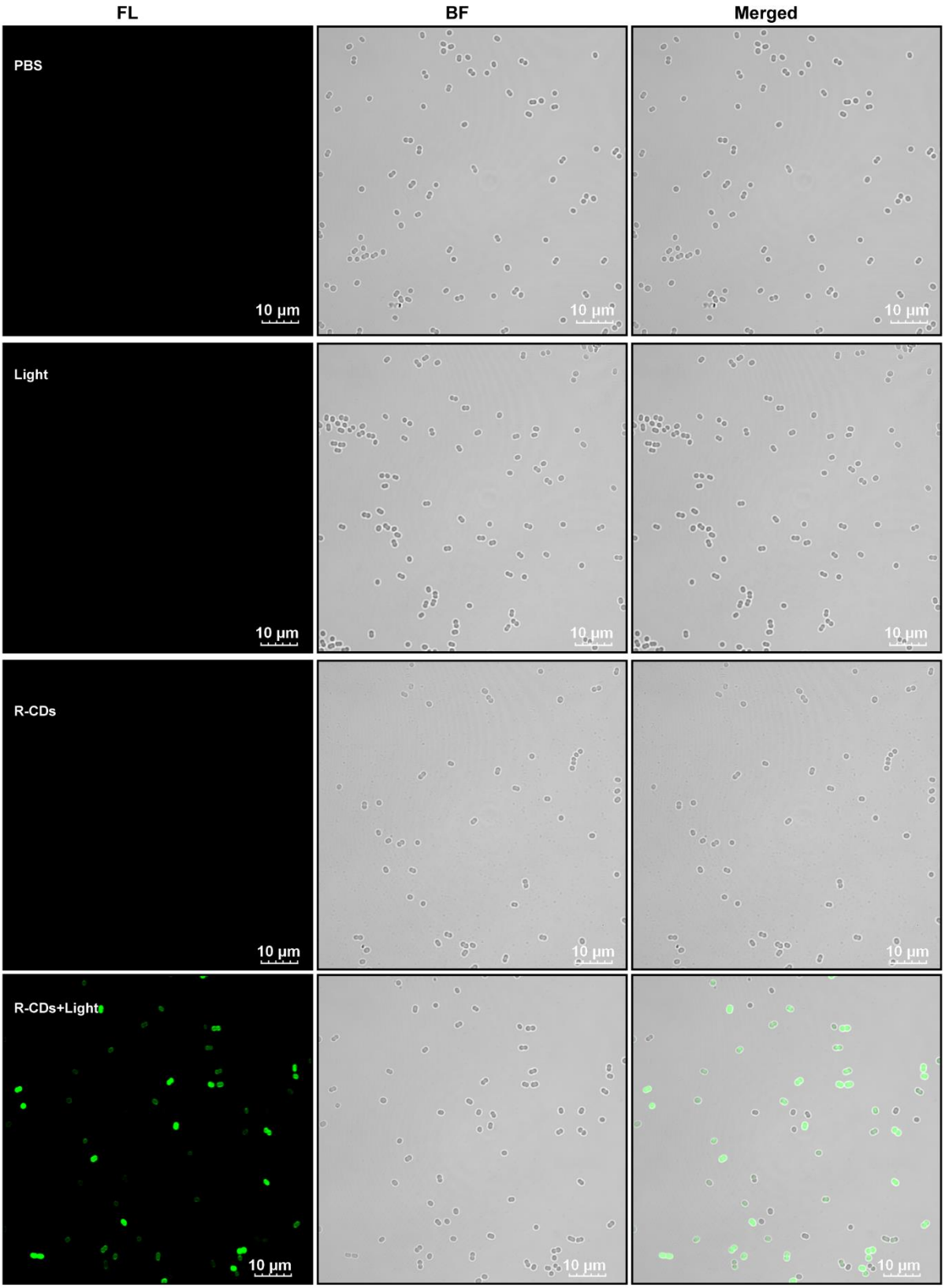

Figure S9. Detection of Total Reactive Oxygen Species (ROS) within the bacteria. Intracellular detection of ROS production in MRAB using confocal laser scanning microscope (CLSM) imaging after being treated with or without light irradiation (590 nm, 30 mW cm^{-2}, 15 min) (scale bar: 5 μm). R-CDs :20 μg mL^{-1}, DCFH-DA: 10 mM, λ_{ex}=488 nm for DCH, λ_{em}=500 to 540 nm.

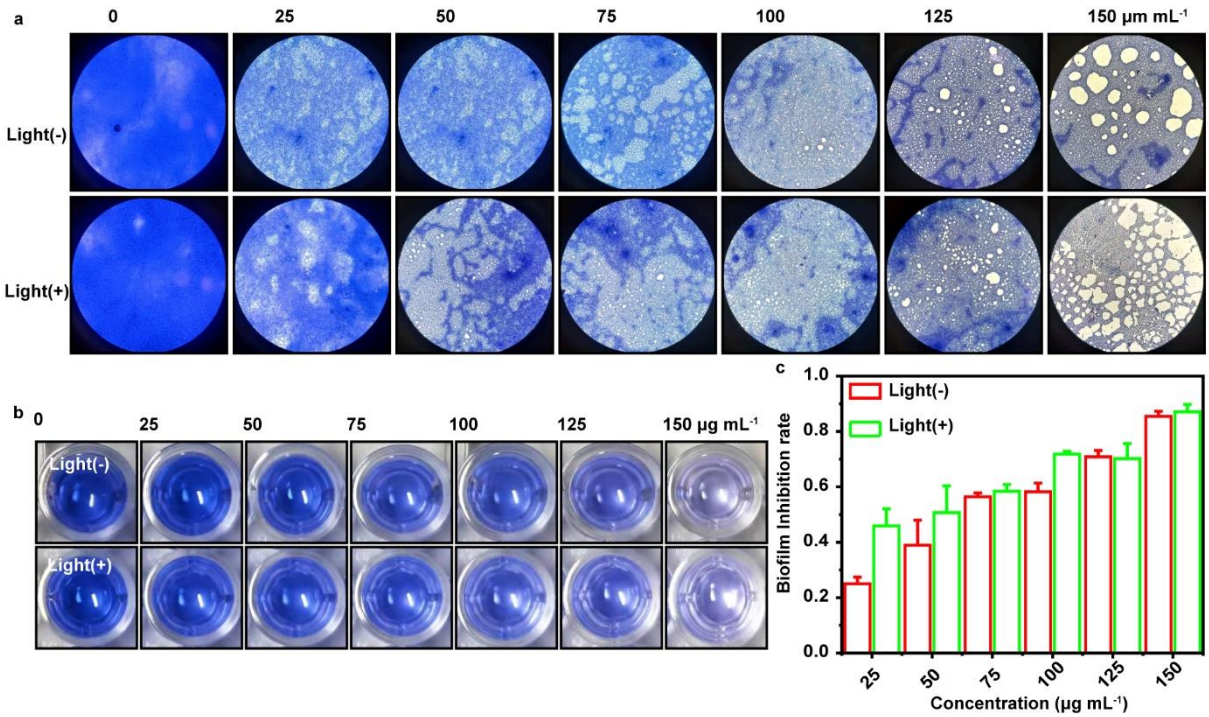

Figure S10. Determination of biofilm biomass by Crystal Violet Assay. (a) Optical-microscopy photographs of crystal-violet staining of MRAB biofilms after treatment with various concentrations of R-CDs. (b) Crystal-violet staining of MRAB biofilms and relative biofilm biomass upon treatments. (c) Relative biofilm biomass after treatment with R-CDs or photoexcited R-CDs. Absorption at 420 nm was obtained using a microplate reader.