

Supplementary Information

Self-Amplifying ROS Nanorobot with Orthogonal NIR Activation for Enhanced Photodynamic-Chemodynamic Combination Therapy

Rongjie Gao[#], Feiyan Chen[#], Yong Li, Zhengshuai Tang, Jinliang Liu*

School of Environmental and Chemical Engineering, Shanghai University, Shanghai,
China, 200444.

*Corresponding Author:

liujl@shu.edu.cn (Jinliang Liu)

Rongjie Gao and Feiyan Chen contributed equally to this work.

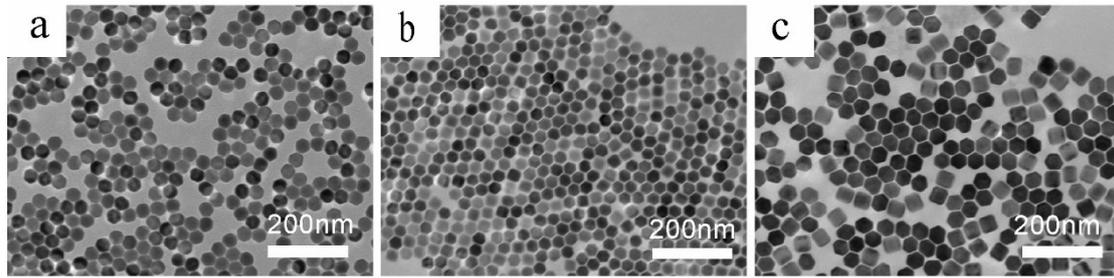


Figure S1. TEM images of (a) NaErF₄: 0.5%Tm core, (b) NaErF₄: 0.5%Tm@NaYF₄ (C@S) and (c) NaErF₄: 0.5%Tm@NaYF₄@NaYbF₄: 0.5%Tm (C@2S) nanoparticles.

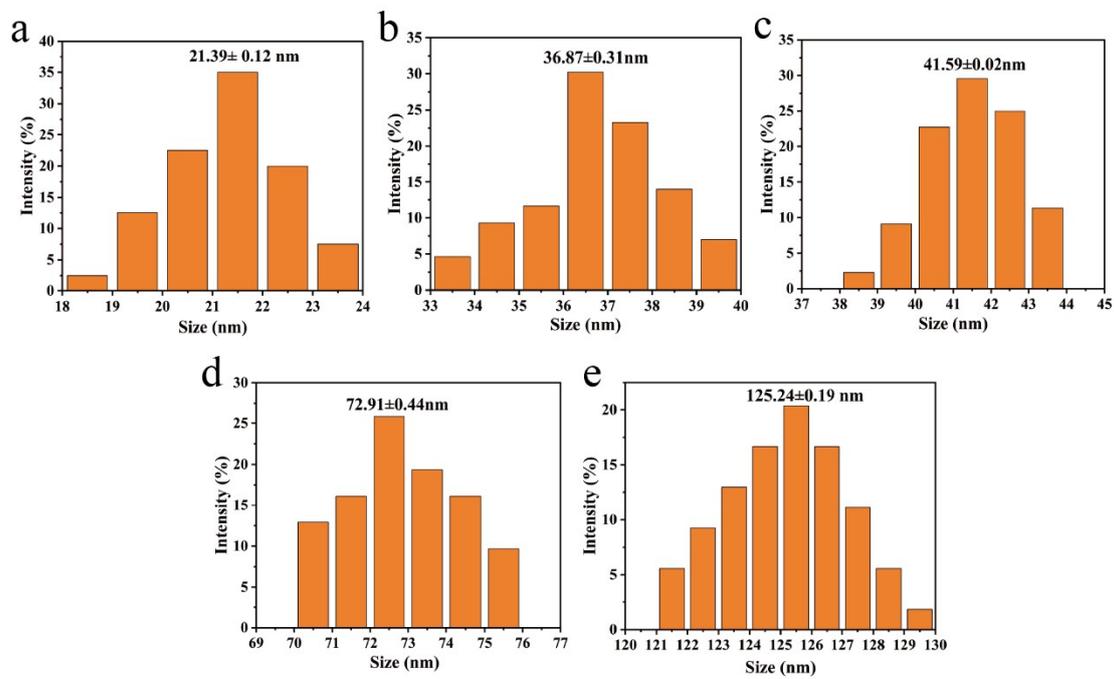


Figure S2. Size distributions of NaErF₄: 0.5%Tm core (a), NaErF₄: 0.5%Tm@NaYF₄ (C@S) (b), NaErF₄: 0.5%Tm@NaYF₄@NaYbF₄: 0.5%Tm (C@2S) (c), NaErF₄: 0.5%Tm@NaYF₄@NaYbF₄: 0.5%Tm@NaYF₄ (C@3S) (d) and US (e) nanoparticles.

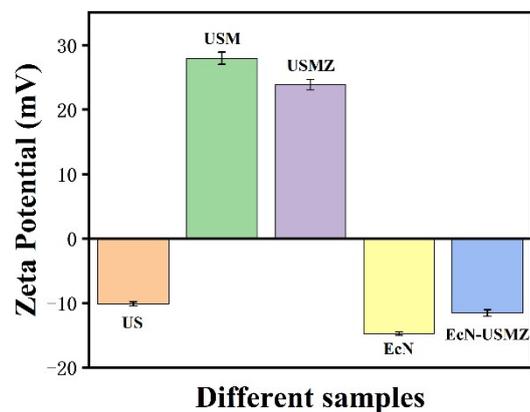


Figure S3. Zeta potential of US ,USM, USMZ, EcN and EcN-USMZ.

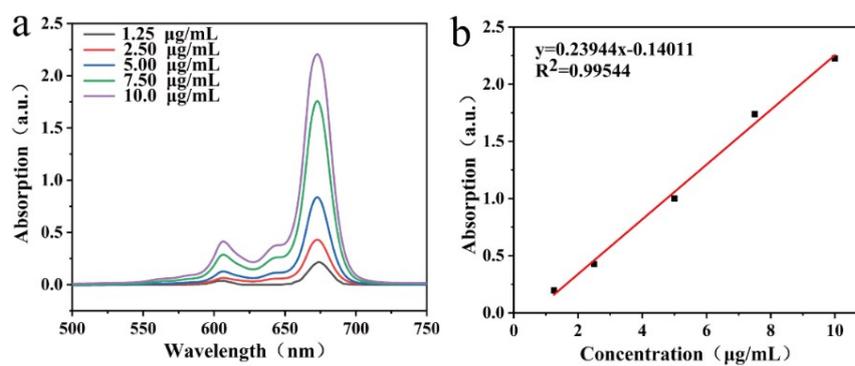


Figure S4. (a) UV-Vis absorption spectra of solutions with different ZnPc concentrations. (b) The calibration curves of absorbance versus concentration for ZnPc.

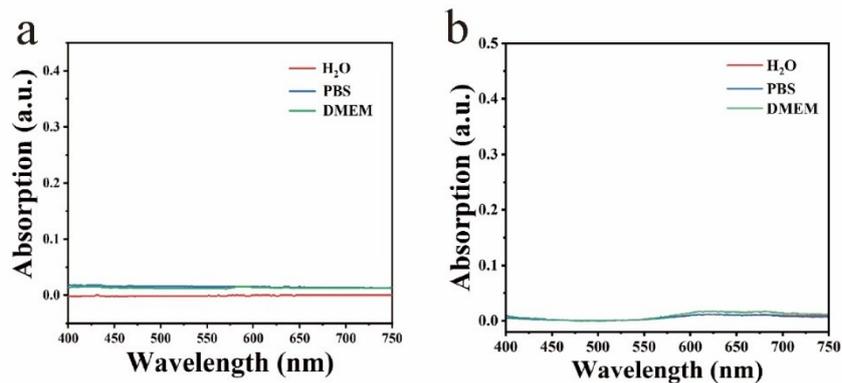


Figure S5. UV-Vis absorption spectra of supernatants collected by centrifugation after soaking USMZ composites in deionized water, PBS and DMEM for 24h (a) and 7d (b). The data are presented as mean \pm SD ($n = 3$).

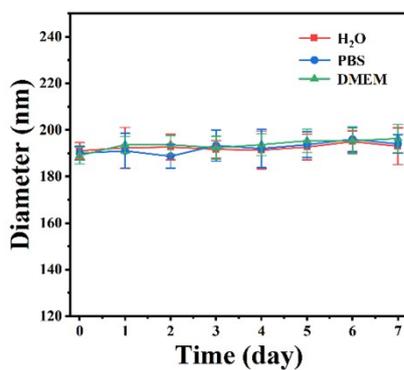


Figure S6. Hydrodynamic size of USMZ incubated in H₂O, PBS (pH=7.4) and DMEM with 10% FBS and for 7 days. The data are presented as mean \pm SD ($n = 3$).

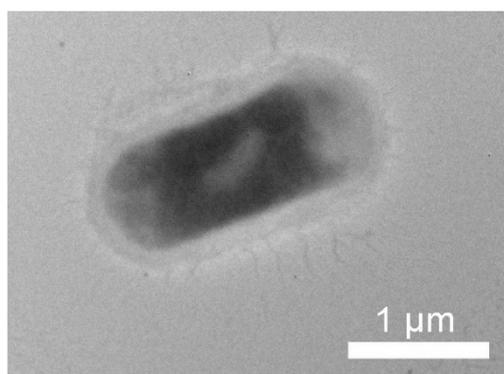


Figure S7. TEM images of engineered bacteria bound with USMZ composites before binding.

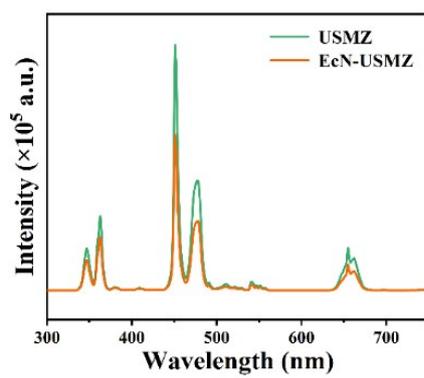


Figure S8. Emission spectra of USMZ and EcN-USMZ under 980 nm laser excitation (power density: 1.0 W/cm²).

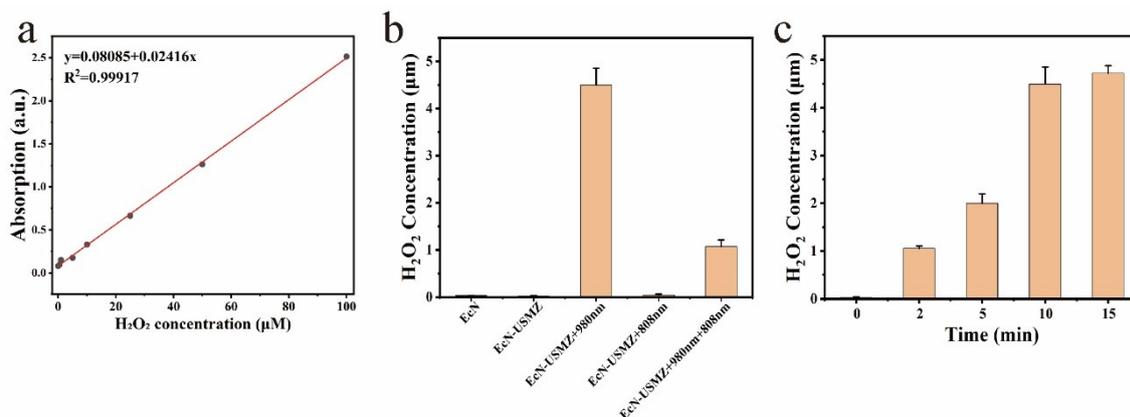


Figure S9. (a) Standard curve of H₂O₂ concentration. (b) Comparative efficacy evaluation of H₂O₂ generation by engineered bacterial nanocomposites in solution. (c) H₂O₂ production by EcN-USMZ nanocomposites in solution under different durations of 980 nm laser irradiation. Data are presented as mean ± standard deviation (n = 3).

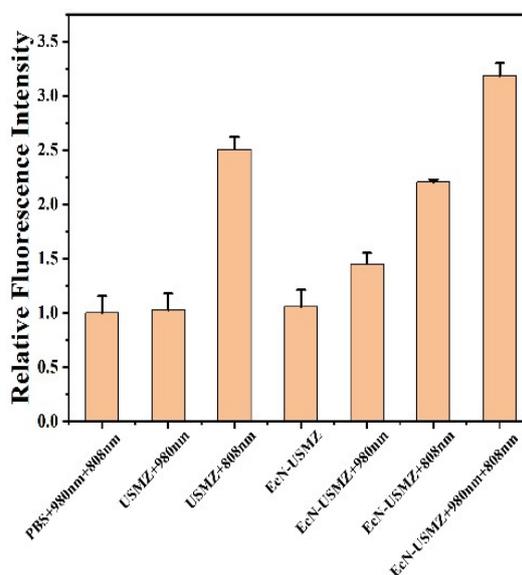


Figure S10. Relative fluorescence intensity of DCF in different treatment groups. The data are presented as mean ± SD (n = 3).

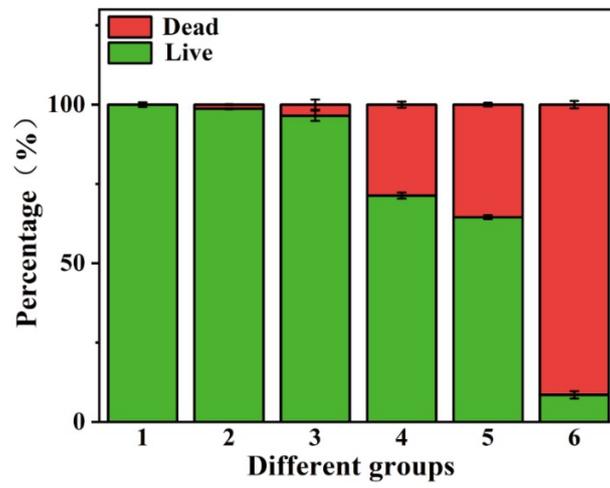


Figure S11. The percentage of living and dead HeLa cells in different treatment groups. The data are presented as mean \pm SD ($n = 3$).