Electronic Supplementary Information

Dual Antibacterial Activities of Chitosan-Modified Upconversion Photodynamic Therapy System againstDrug-resistant Bacteria in Deep Tissue

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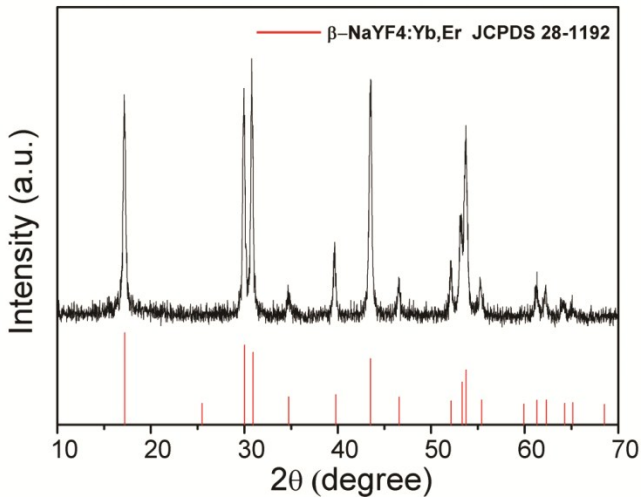

Fig. S1 XRD patterns of $NaYF_4$:Yb,Er@$NaYF_4$ UCNPs. The red line represents the calculated XRD pattern of the hexagonal phase $NaYF_4$ (JCPDS No. 28-1192).

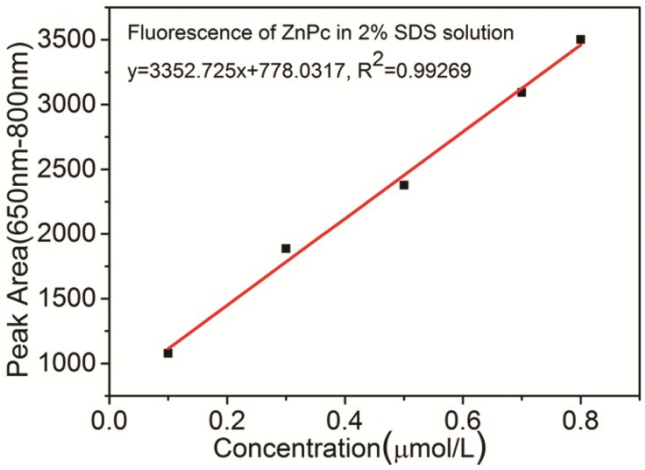

Fig. S2 The standard curve of ZnPc in phosphate buffer containing 2% SDS.

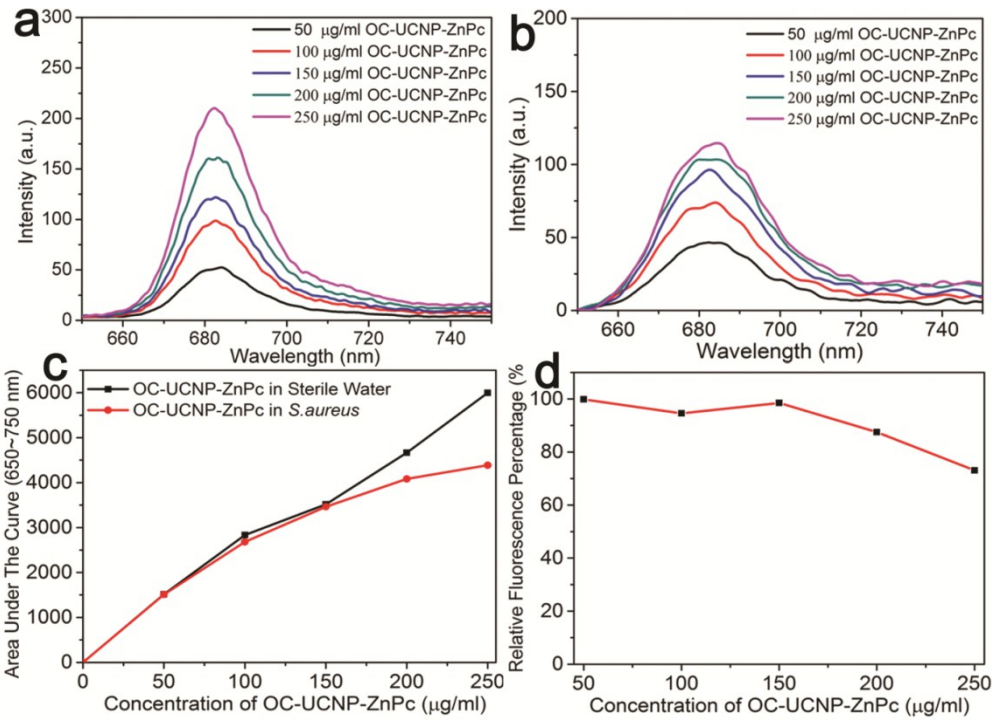

Fig. S3 Cell uptake of OC-UCNP-ZnPc in *S. aureus*. ZnPc fluorescence spectra in OC-UCNP-ZnPc nanoconstructs at different concentrations in (a) sterile water and (b) *S. Aureus*;(c-d) Quantification of cell uptake of OC-UCNP-ZnPc by *S. aureus*.

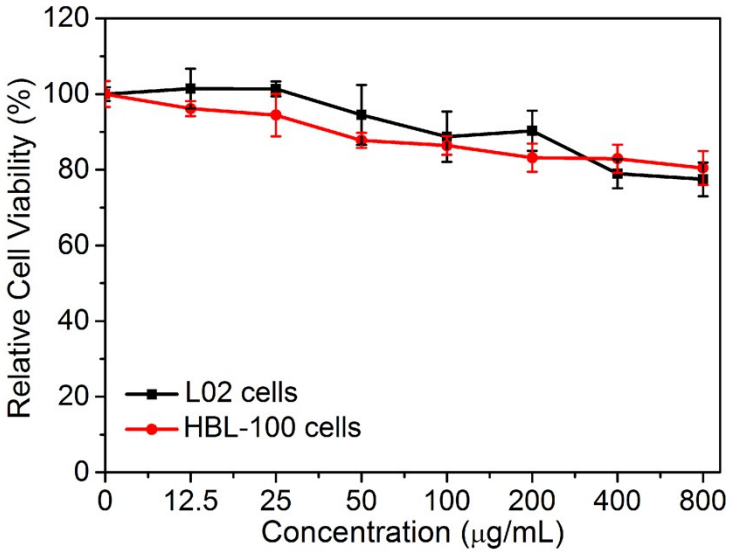

Fig. S4. Cytotoxicity assays of the OC-UCNP-ZnPc in human normal liver cell line L02 and breast epithelial cell line HBL-100.

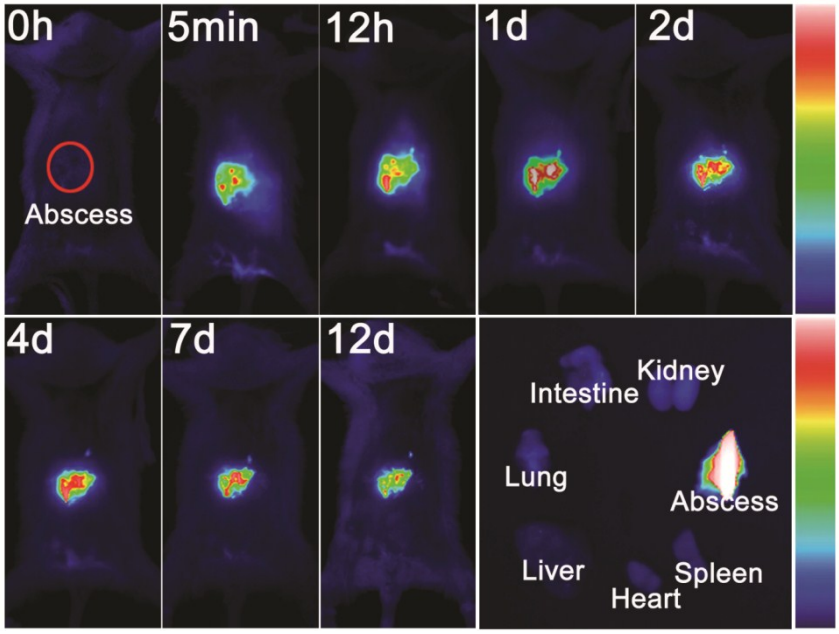

Fig. S5 *In vivo*dynamic behaviors of ICG derivative-loaded OC-UCNP nanoconstructs in the mice at different time points (0 h, 5 min, 12 h, 1 d, 2 d, 4 d, 7 d and 12 d) after local injection, and biodistribution of the nanoconstructs in various isolated organs/tissues (λex = 765 nm).

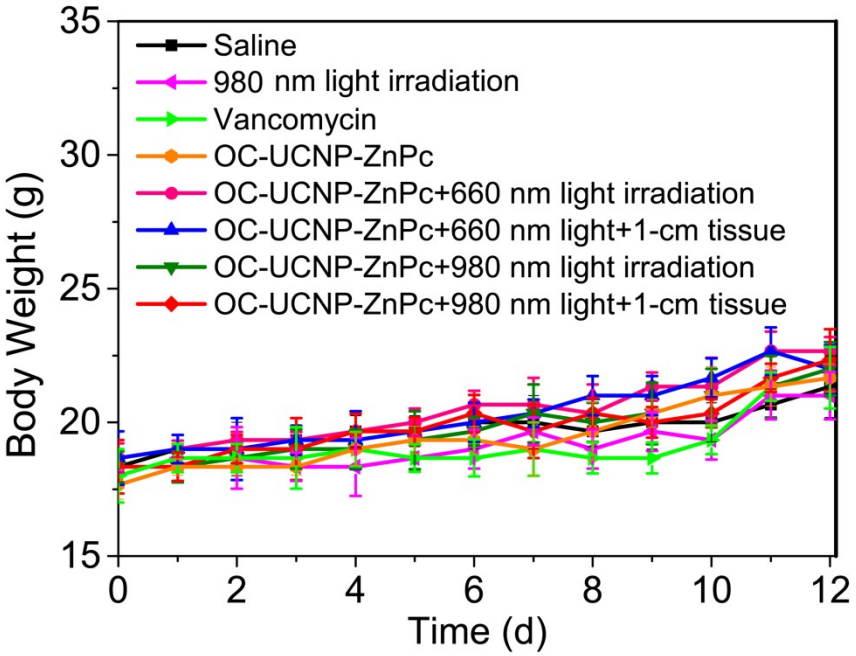

Fig. S6 Changes of body weight of MRSA-infected mice in different treatment groups within the entire experimental period.

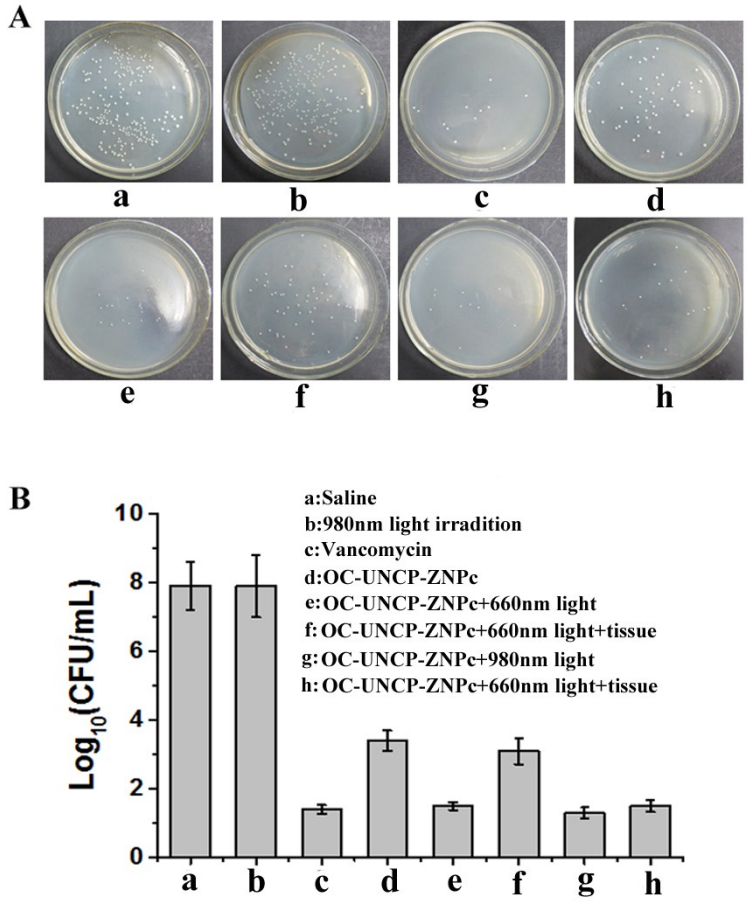

Fig. S7 The quantification numbers of viable bacteria in the skin tissue. A, Photographs of plate samples of bacteria from skin tissues of different groups. a:Saline, b:980 nm light irradiation, c:Vancomycin, d:OC-UCNP-ZnPc, e: OC-UCNP-ZnPc+660 nm light, f: OC-UCNP-ZnPc+660 nm light +tissue, g: OC-UCNP-ZnPc +980 nm light, h: OC-UCNP-ZnPc +980 nm light +tissue. B, quantification numbers histogram of plate samples.