Supporting Information

A Protein-Polymer Bioconjugate-Coated Upconversion Nanosystem for Simultaneous Tumor Cell Imaging, Photodynamic Therapy, and Chemotherapy

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Figure S1. Transmission electron microscope image of self-assembled nano-micelles of BSA-PCL bioconjugate

Figure S2. The Energy dispersive spectroscopy (EDS) spectrum of NaYF₄:Yb,Er (Y:Yb:Er = 78:20:2).

Figure S3. X-ray diffraction (XRD) spectrum of NaYF₄:Yb,Er (Y:Yb:Er = 78:20:2).

Figure S4. FTIR spectra of pure UCNs, BSA-PCL and the assembled UCNs@BSA-PCL

Figure S5. TEM images of UCN/ZnPc@BSA-PCL (A), DOX-loaded UCN@BSA-PCL (B), and DOX-loaded UCN/ZnPc@BSA-PCL (C) nanocarriers. The bars represent 50 nm.

Figure S6. Ultraviolet-visible absorption spectrum of photosensitizer ZnPc

Figure S7. ZnPc loading efficiency of UCN/ZnPc@BSA-PCL with different volume of added ZnPc stock solution

Figure S8. Fluorescence spectra of DOX, ZnPc and DOX-loaded UCN/ZnPc@FA-BSA-PCL

Figure S9. UV-Vis absorption spectrum of DOX-loaded UCN/ZnPc@FA-BSA-PCL

Figure S10. Particle size stability of DOX-loaded UCN/ZnPc@FA-BSA-PCL

Figure S11. (A) The photos of dialysis PBS buffer solution (pH 7.4) for DOX-loaded UCN@BSA-PCL and UCN/ZnPc@BSA-PCL separately, and (B) The DOX release behavior of DOX-loaded UCN@BSA-PCL in PBS buffer solution (pH 7.4) at 37 °C.

Figure S12. The effect of near-infrared (NIR) 980 nm laser irradiation alone on HeLa cell viability