

Figure S1. The secondary structures of nucleic acids as predicted by the DNAMAN® software. (A) CpG1826; (B) Aptamer; (C) CpG-Apt-24T.

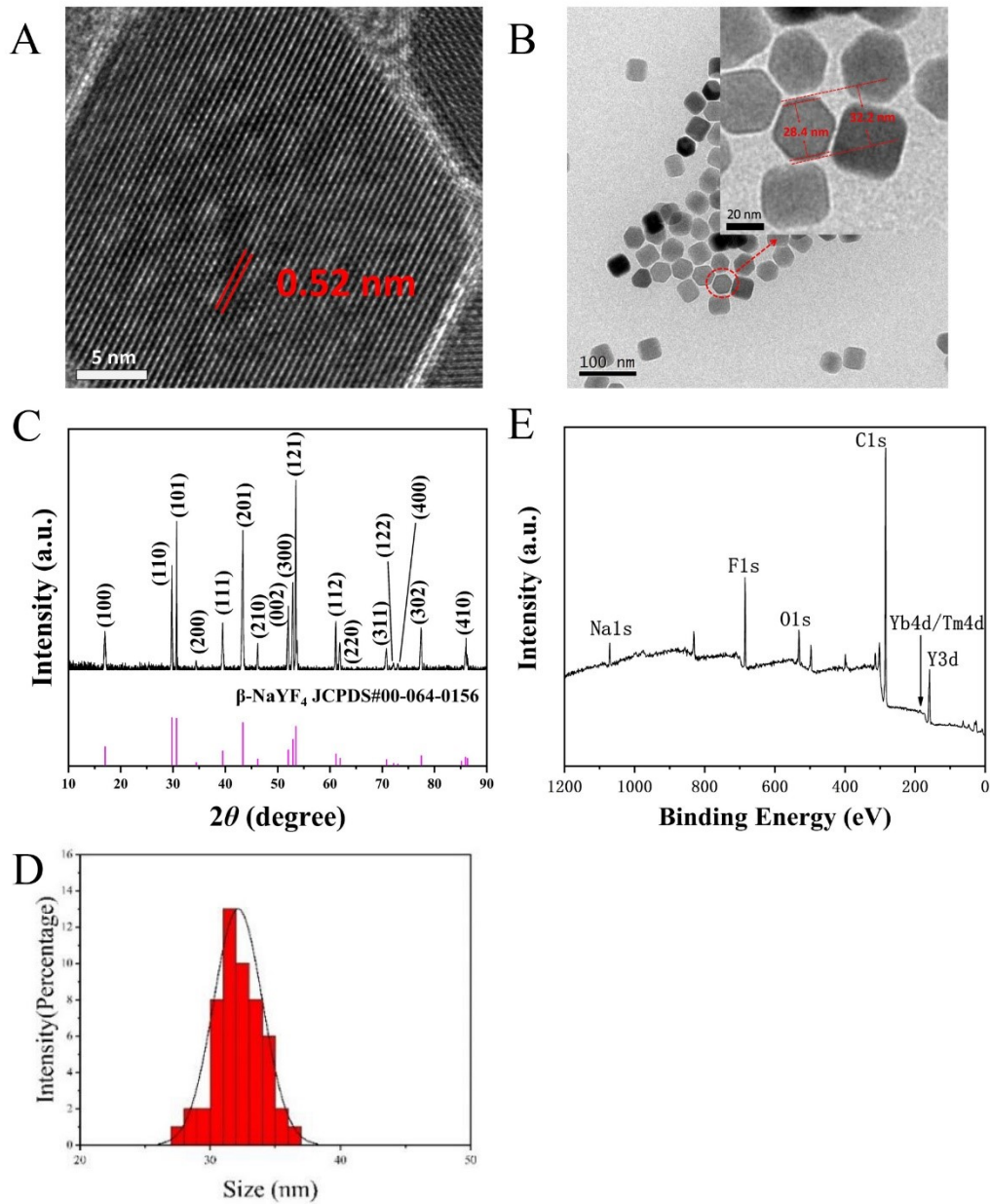


Figure S2. (A) HRTEM image of the NaYF<sub>4</sub>:Yb/Tm. The HRTEM image of UCNP showed that the lattice distance was 0.52 nm, corresponding to the typical plane (110 and 010) of the hexagonal NaYF<sub>4</sub> structure. (B) HRTEM image of UCNP. The shell thickness of the UCNP was about 3.8 nm. (C) XRD patterns of UCNP and the standard card of β-NaYF<sub>4</sub> (JCPDS: 00-064-0156). (D) XPS survey spectrum of UCNP. (E) Size distribution of 50 UCNP by ImageJ software.

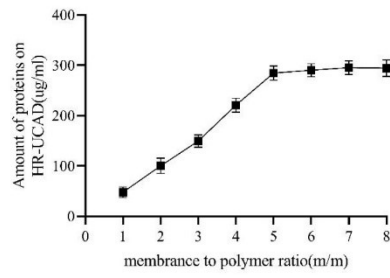


Figure S3:Determination of total membrane protein content on HR-UCAD.

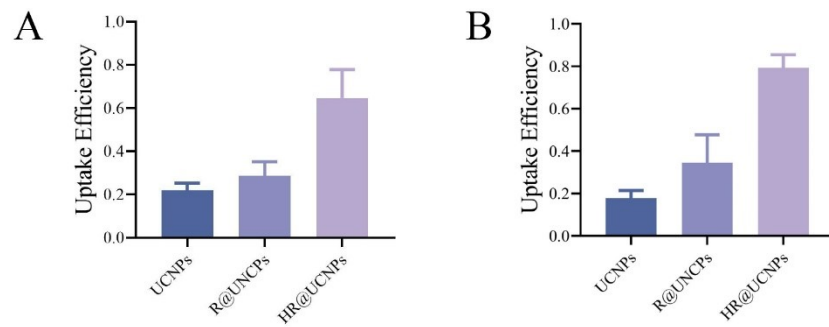


Figure S4: (A)The uptake percentages of UCNPs, R@UCNPs and HR@UCNPs in 4T1 cells were 22%, 29% and 65%, respectively. (B) The uptake percentages of UCNPs, R@UCNPs and HR@UCNPs in tumor tissues were 18%, 34% and 79%, respectively.

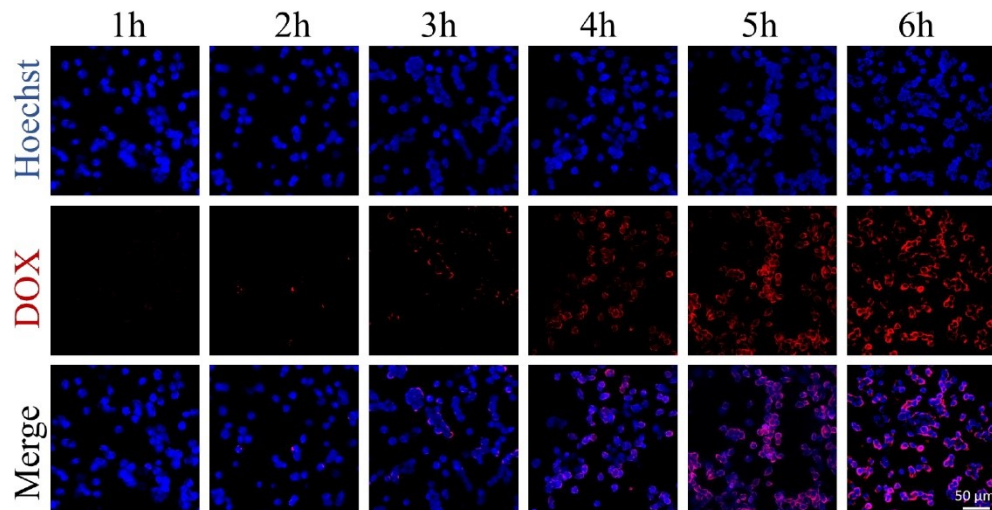


Figure S5 Fluorescence image of intracellular uptake of HR-UCAD by 4T1 cells at different times. Nuclei were stained with Hoechst 33342 (blue). Scale bar: 50  $\mu$ m.