Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Upconversion Nanoparticles Loaded with eIF4E siRNA and Platinum (IV) Prodrug to Sensitize Platinum Based Chemotherapy for Laryngeal Cancer and Bioimaging

Bo Teng,[a] Ping'an Ma,[a.b,] Chang Yu,[b,c] Xinyang Zhang,[b] Qingjie Feng, [a] Lianji Wen,[a] Chunxia Li,[b] Ziyong Cheng,[b] Dayong Jin,[d] and Jun Lin[b,*]*

[a]Department of Otolaryngology Head and Neck Surgery, The Second Hospital, Jilin University, Changchun, 130041, China.

[b]State Key Laboratory of Rare Earth Resource Utilization, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, 13002, P. R. China.

[c]University of Chinese Academy of Sciences, Beijing, 100049, People's Republic of China

[d]Institute for Biomedical Materials and Devices, Faculty of Science, University of Technology Sydney, NSW, 2007, Australia.

***E-mail: jlin@ciac.ac.cn (Prof. Jun Lin) and mapa675@ciac.ac.cn (Dr. Ping'an Ma);**

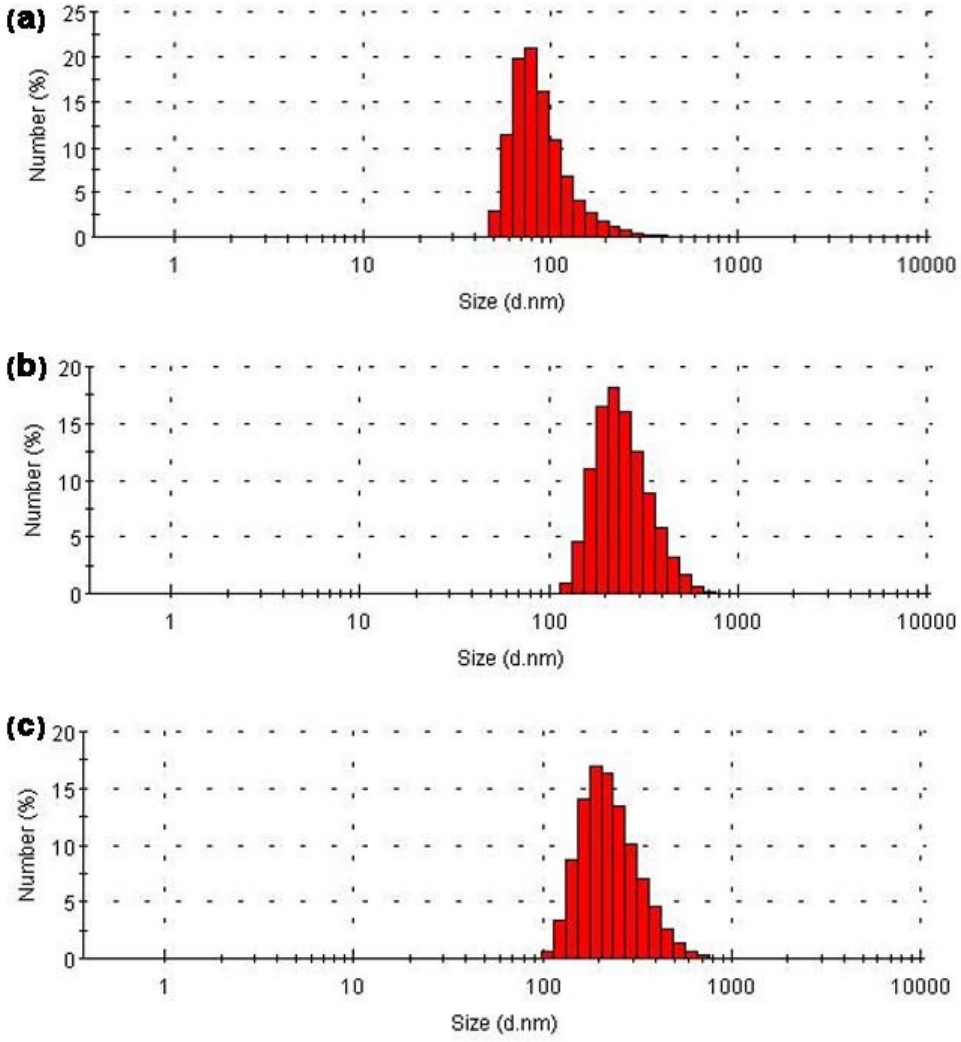

Figure S1. Particle size distribution of different nanoparticles in water. (a) UCNP@PEI with the average hydrodynamic diameter of 98 nm, (b) NP-1 with the average hydrodynamic diameter of 254 nm,, (c) NP-2 with the average hydrodynamic diameter of 240 nm, determined by dynamic light scattering (DLS).

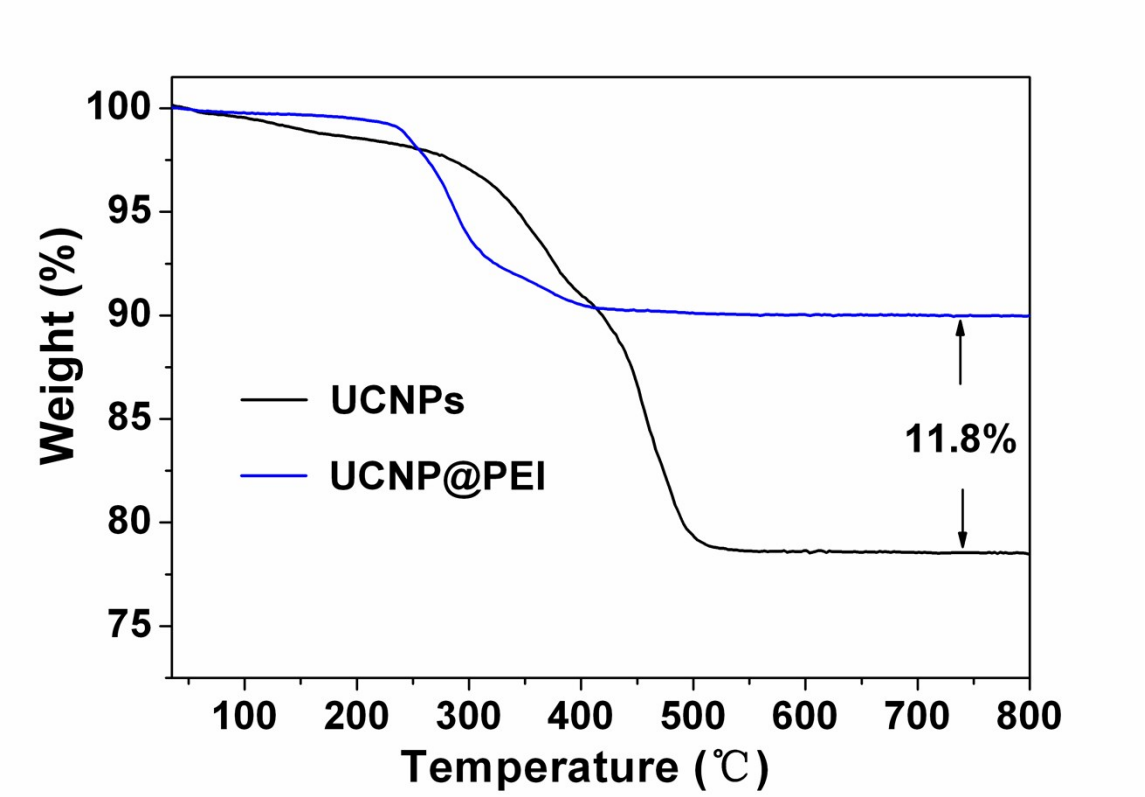

Figure S2. Thermo-gravimetric (TG) analysis of UCNPs, and PEI encapsulated UCNPs (UCNP@PEI) nanoparticles.

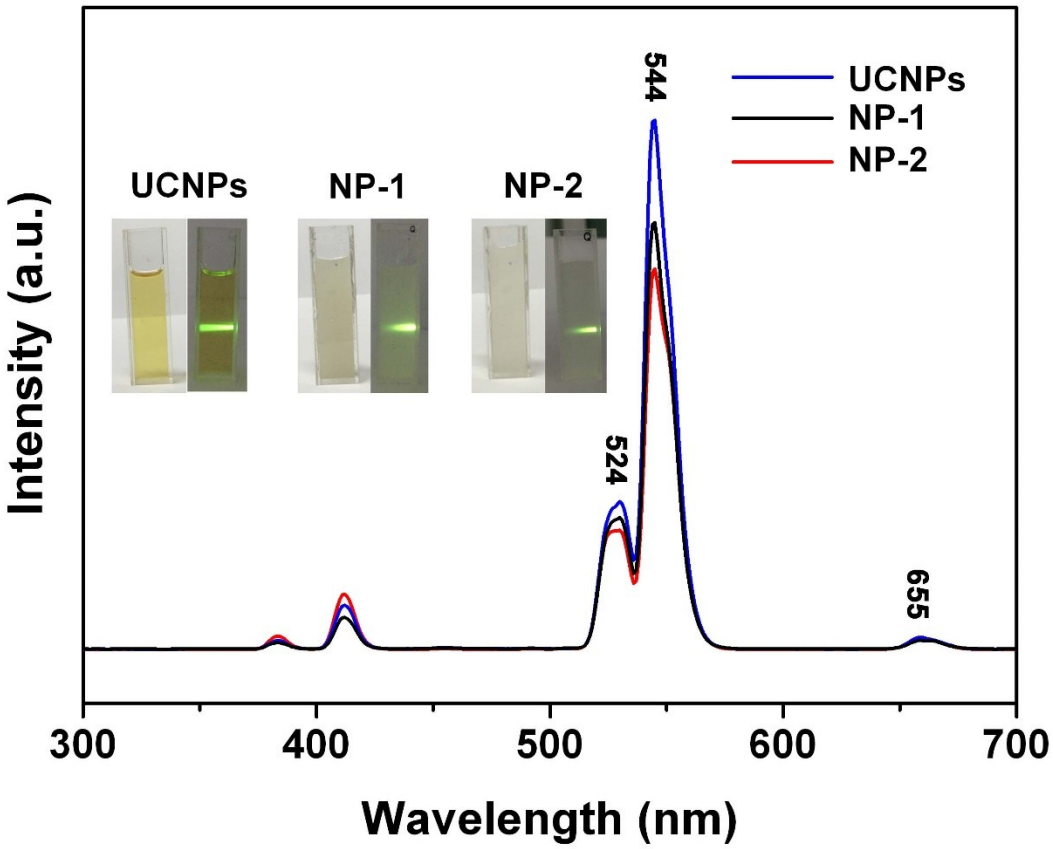

Figure S3. 980 nm laser excited upconversion emission spectra and digital photographs of UCNPs, NP-1 and NP-2.

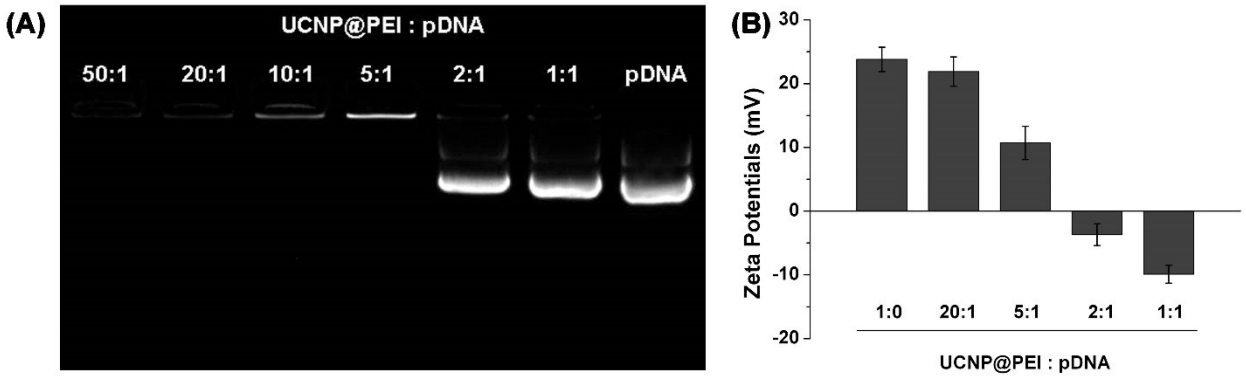

Figure S4. (A) Gel retardation assay. 0.5 μg of plasmid DNA (pEGFP-N1, pDNA) was incubated with varying NP-1 nanoparticles:pDNA weight ratios (N/P ratio) of 1:1, 2:1, 5:1, 10:1, and 20:1 and the mixture was briefly vortexed. After 30 min incubation at room temperature, the mixture with addition of loading buffer was loaded on a 1% agarose gel. The electrophoresis was carried out at 100 V for 40 min in TAE buffer. (C) Zeta potential of the UCNP@PEI:pDNA.

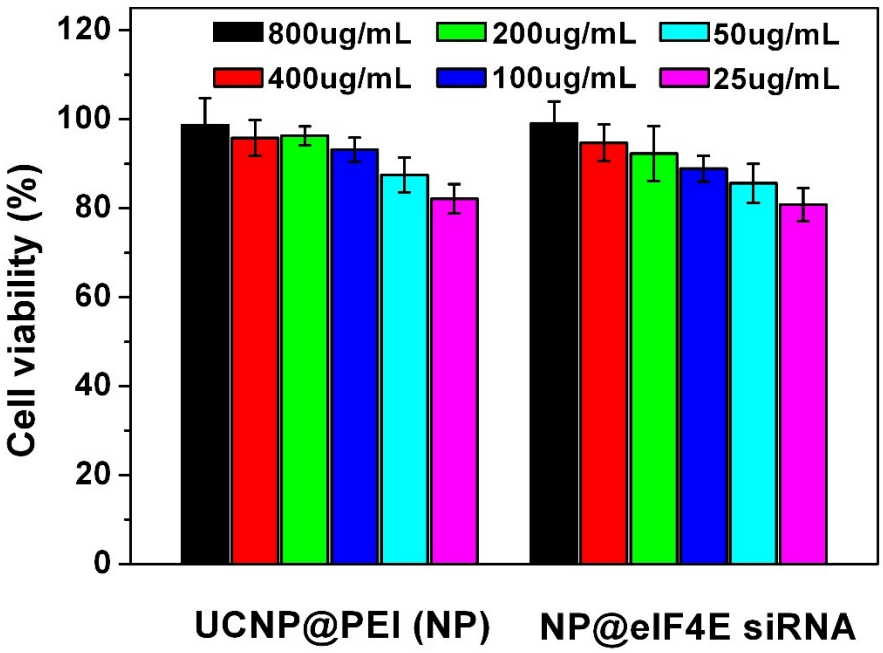

Figure S5. The Hep-2 cells viabilities after incubation with UCNP@PEI nanoparticles (NP) and UCNP@PEI@eIF4E siRNA (NP@ eIF4E siRNA) for 48 h measured by MTT assay.

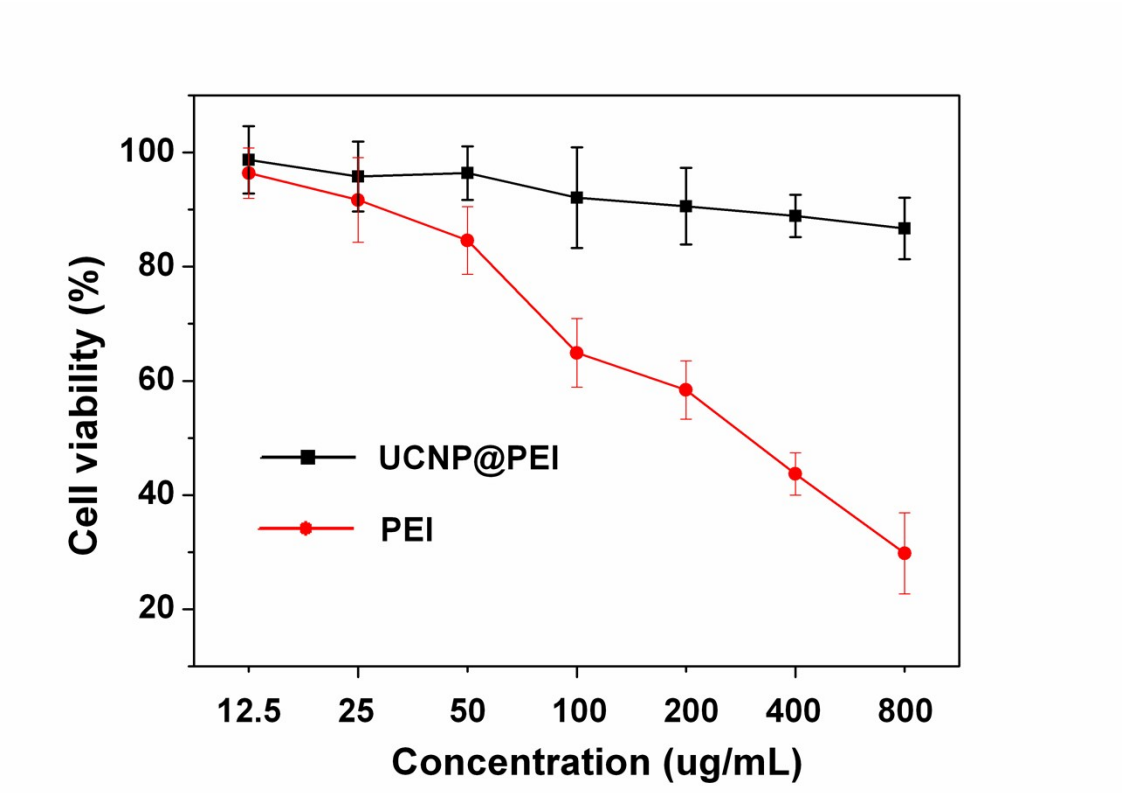

Figure S6. The L929 fibroblast cells viabilities after incubation with UCNP@PEI nanoparticles (without platinum) and PEI for 48 h measured by MTT assay.

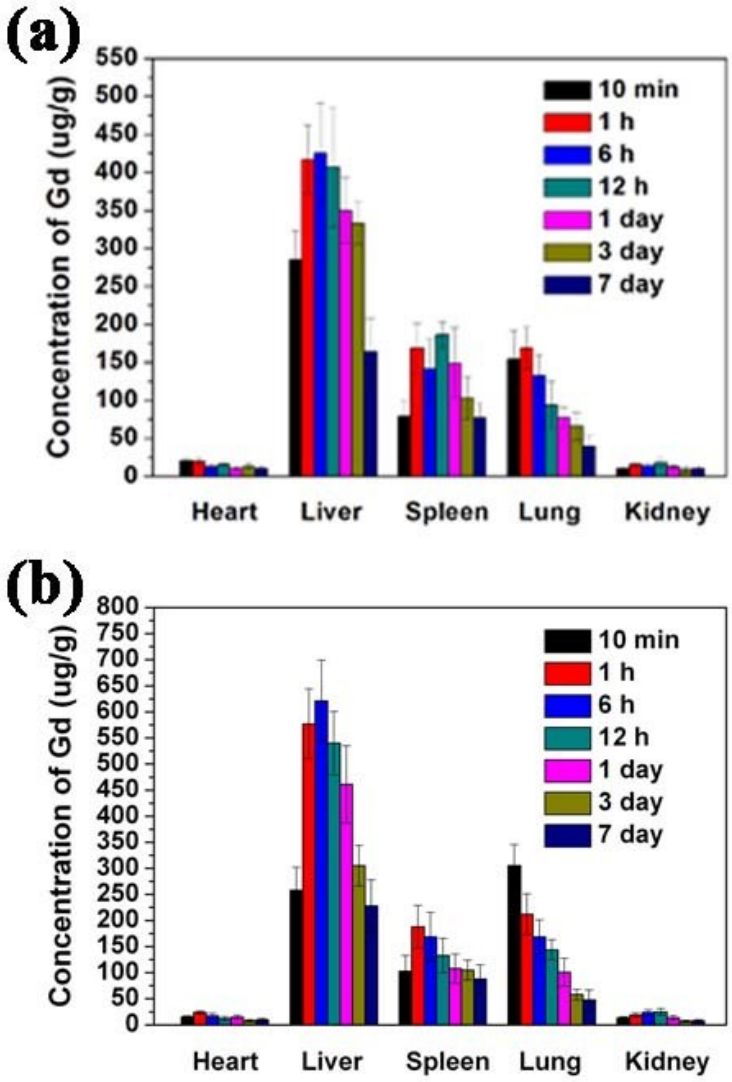

Figure S7. *In vivo* biodistribution of UCNP@PEI (a) and NP-2 (b). The biodistribution is measured by testing the Gd^{3+} concentration in collected tissues and organs by ICP-MS.

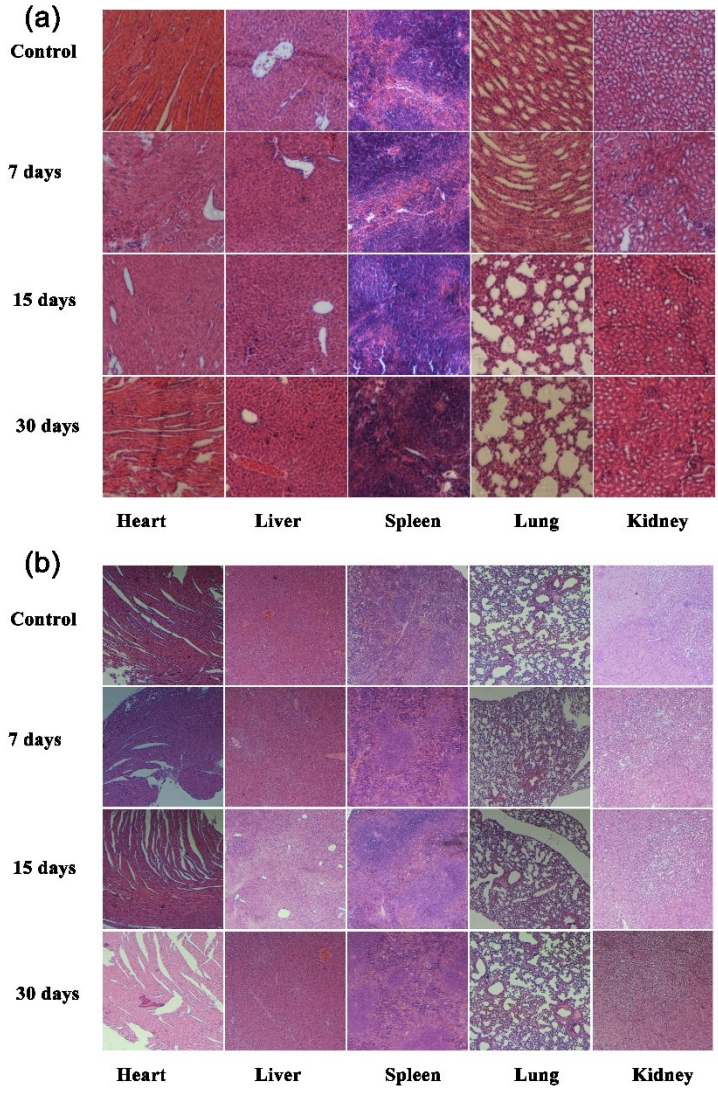

Figure S8. H&E immune-staining of organs collected after treatment of UNCP@PEI (a) and NP-2 (b) for 7 days, 15 days and 30 days.

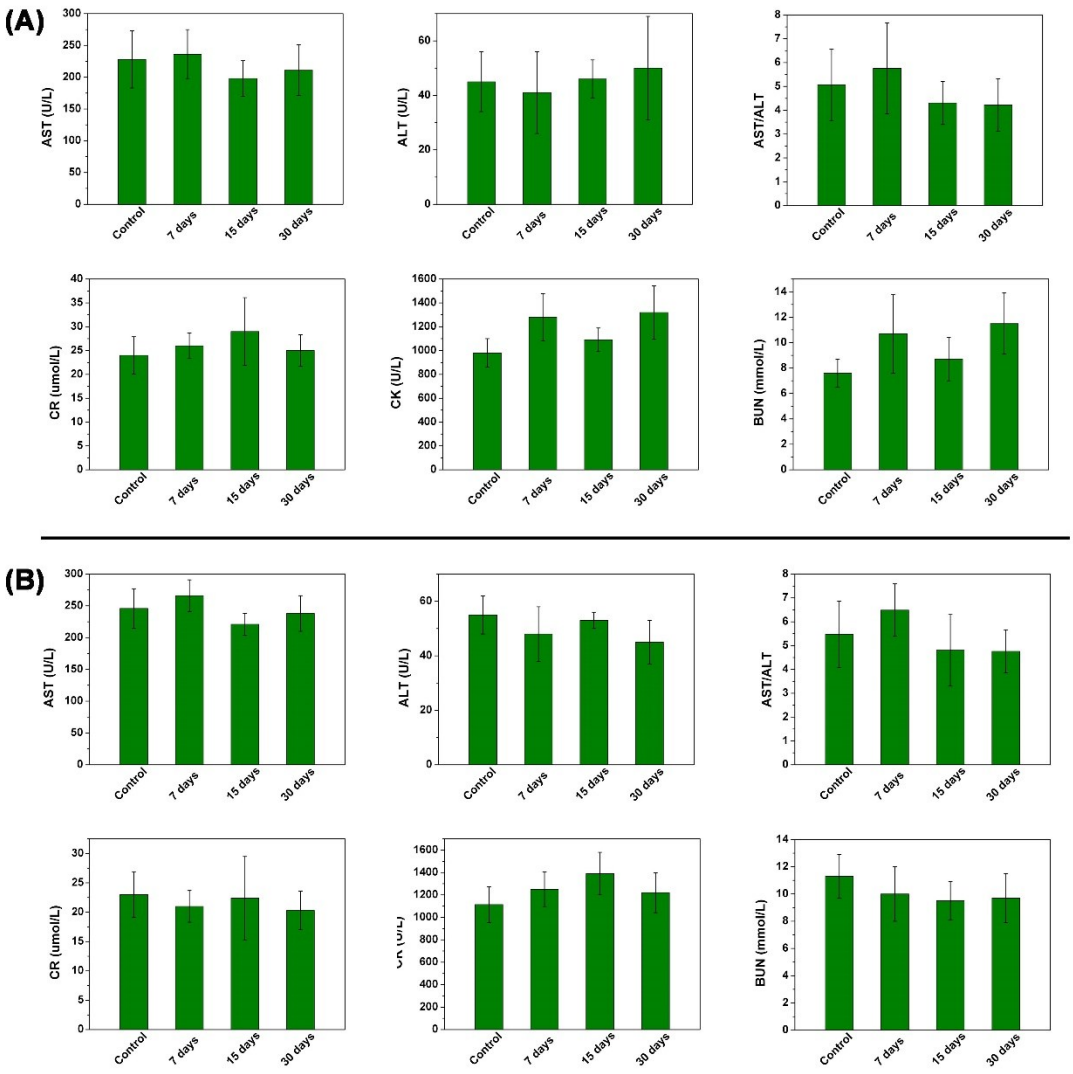

Figure S9. Blood analysis of the mice after treatment of UCNP@PEI (A) and NP-2 (B) for 7 days, 15 days and 30 days.

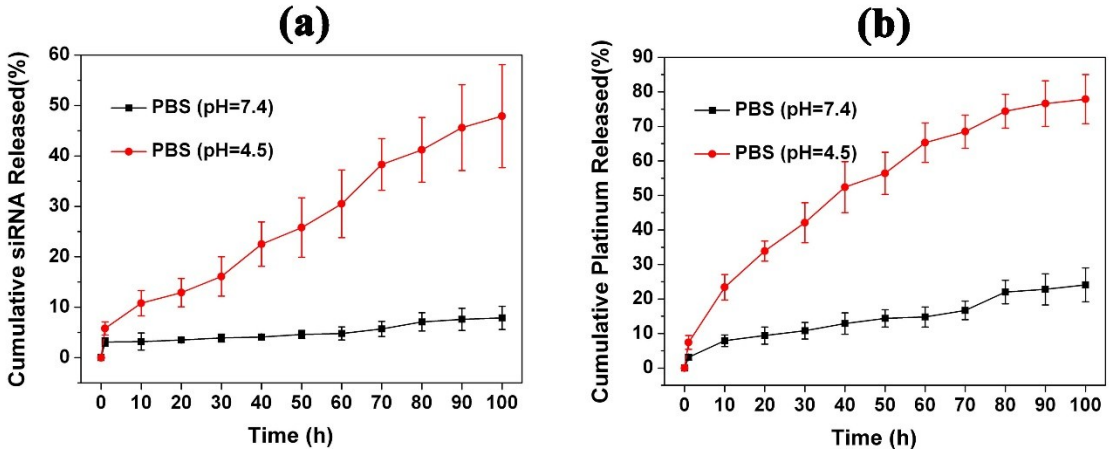

Figure S10. The cumulative release of siRNA (a) and Pt (b) at pH 7.5 and pH 4.5.