

Supporting Information

Dual-inhibition of lactate metabolism and Prussian blue-mediated radicals generation for enhanced chemodynamic therapy and antimetastatic effect

Wenting Li^a, Shikai Liu^a, Yangyang Zhang^b, Jialing Zhou^a, Rumin Li^a, Shili Gai^{a,}, Lei Zhong^{c,*}
and Piaoping Yang^{a,*}*

^a Key Laboratory of Superlight Materials and Surface Technology, Ministry of Education, College of Material Sciences and Chemical Engineering, Harbin Engineering University, Harbin, 150001, P. R. China

^b Key Laboratory of Hepatosplenic Surgery, Ministry of Education, the First Affiliated Hospital of Harbin Medical University, Harbin 150001, P. R. China

^c Department of Breast Surgery, Second Affiliated Hospital of Harbin Medical University, Harbin 150086, PR China.

E-mail addresses: gaishili@hrbeu.edu.cn; zhonglei@hrbmu.edu.cn; yangpiaoping@hrbeu.edu.cn

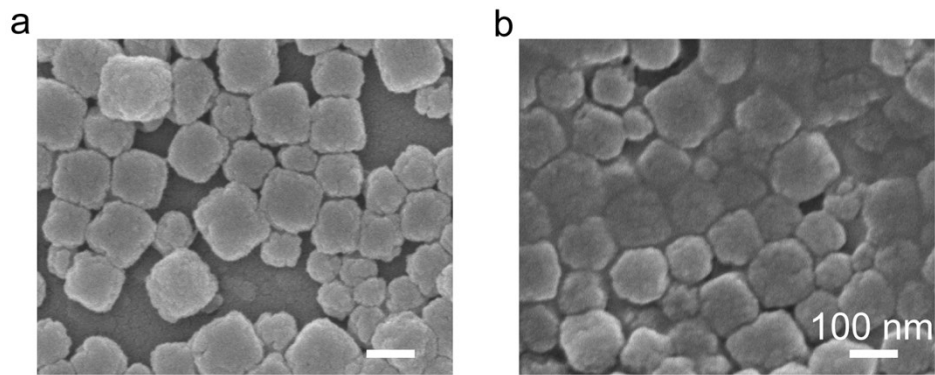


Fig. S1. SEM images of (a) HPB, and (b) HCLP NPs.

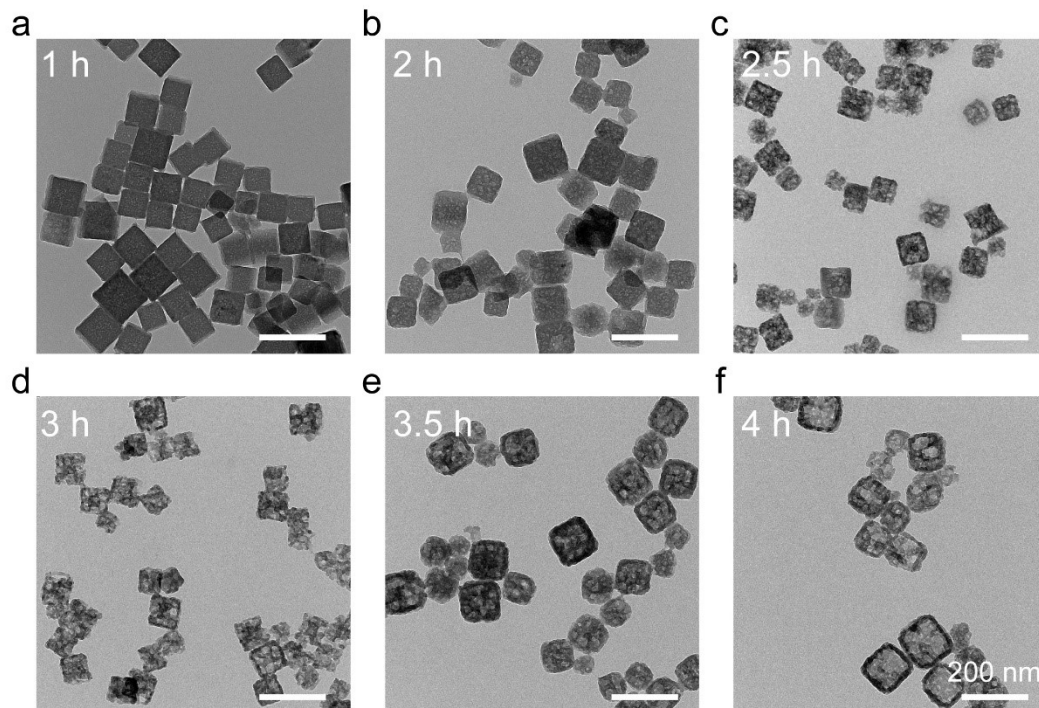


Fig. S2. TEM images of PB NPs treated with HCl for different times (a) 1 h, (b) 2 h, (c) 2.5 h, (d) 3 h, (e) 3.5 h, (f) 4 h.

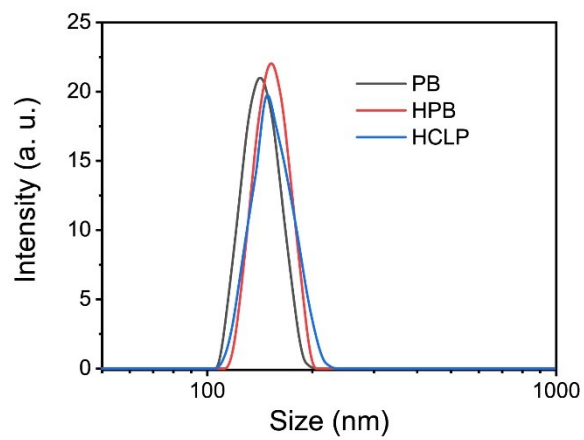


Fig. S3. DLS of PB, HPB and HCLP NPs.

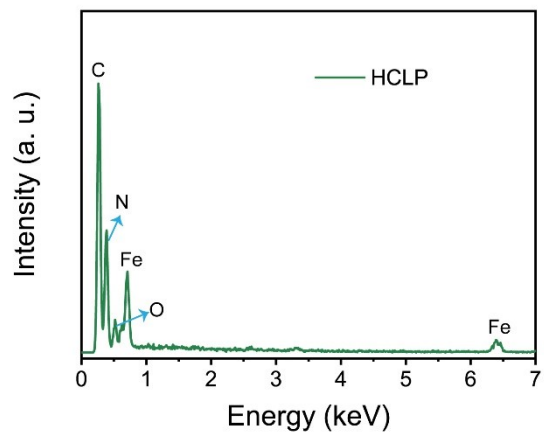


Fig. S4. Energy-dispersive X-ray spectroscopy (EDS) spectrum of HCLP NPs.

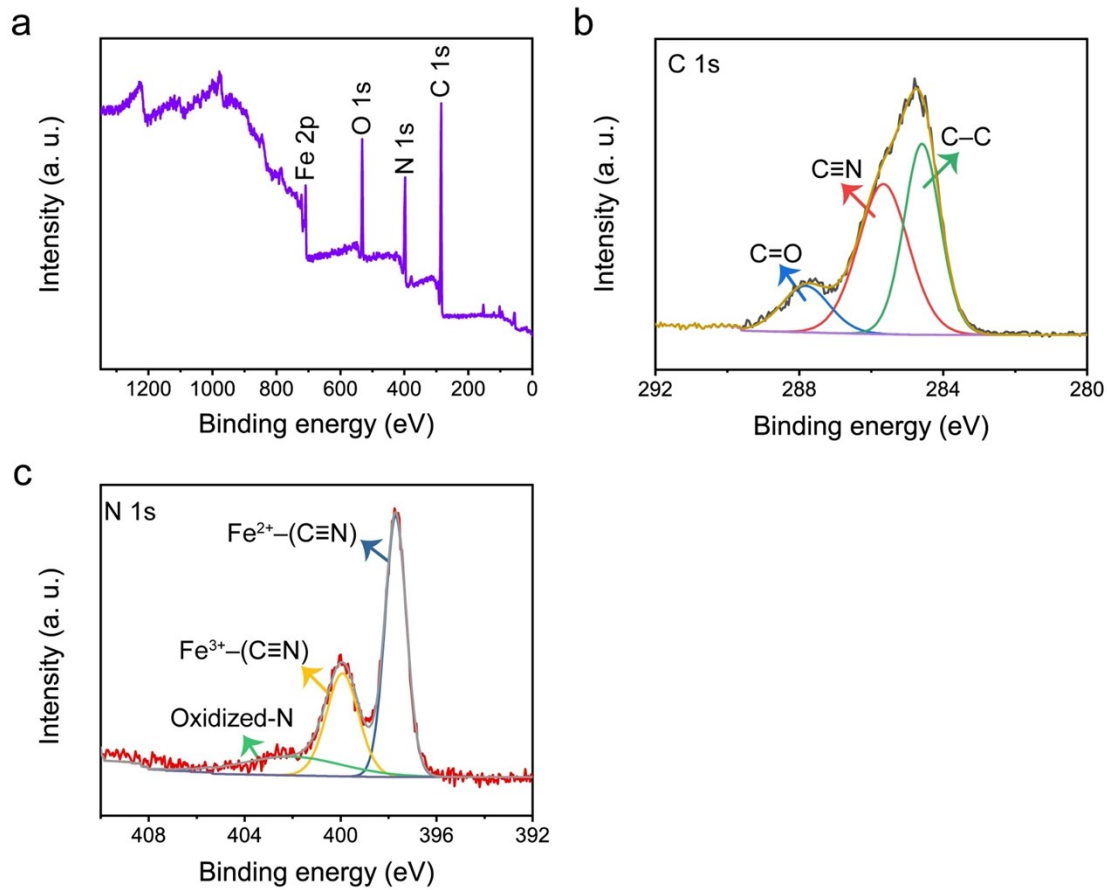


Fig. S5. (a) XPS spectrum of HCLP NPs. High resolution XPS spectra of (b) C 1s and (c) N 1s of HCLP NPs.

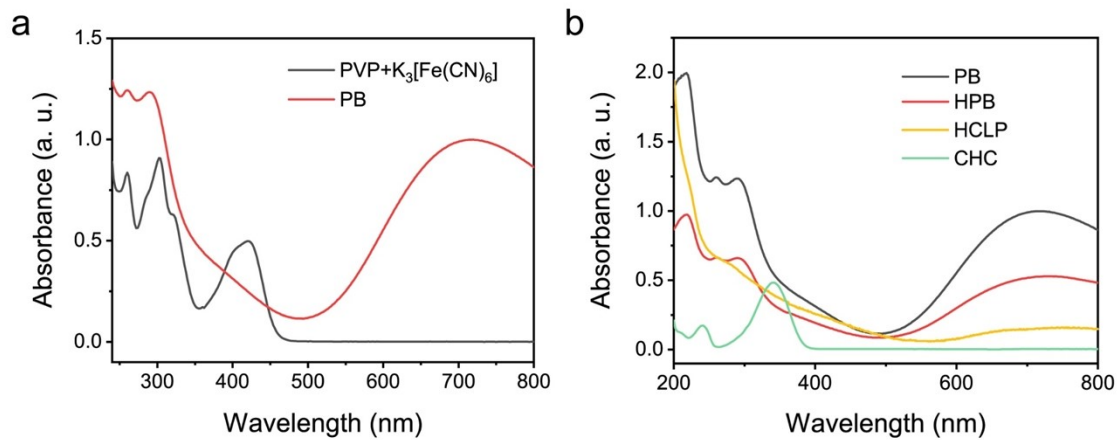


Fig. S6. UV-vis absorption spectra of (a) before and after synthesis of PB NPs, (b) PB, HPB, CHC and HCLP NPs.

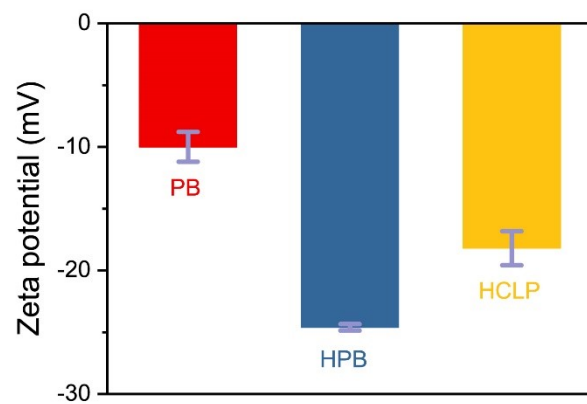


Fig. S7. Zeta potentials of PB, HPB and HCLP NPs.

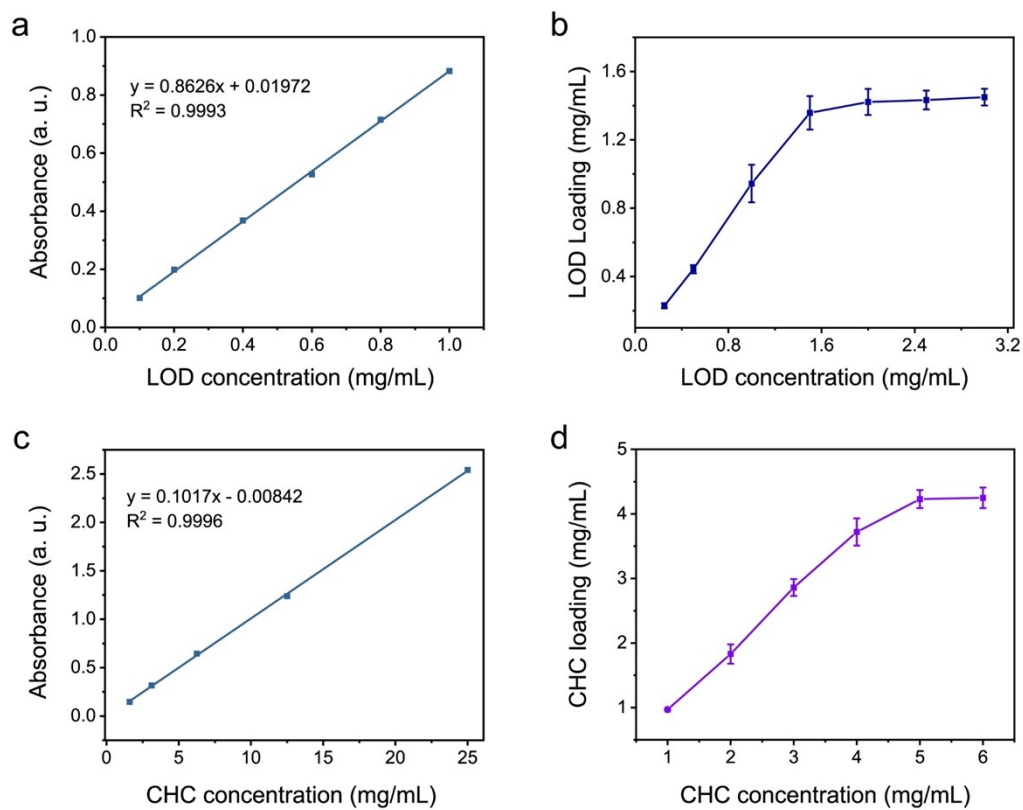


Fig. S8. (a) The standard curve of LOD. (b) LOD loading capacities with the increase of LOD concentration. (c) The standard curve of CHC. (d) CHC loading capacities with the increase of CHC concentration.

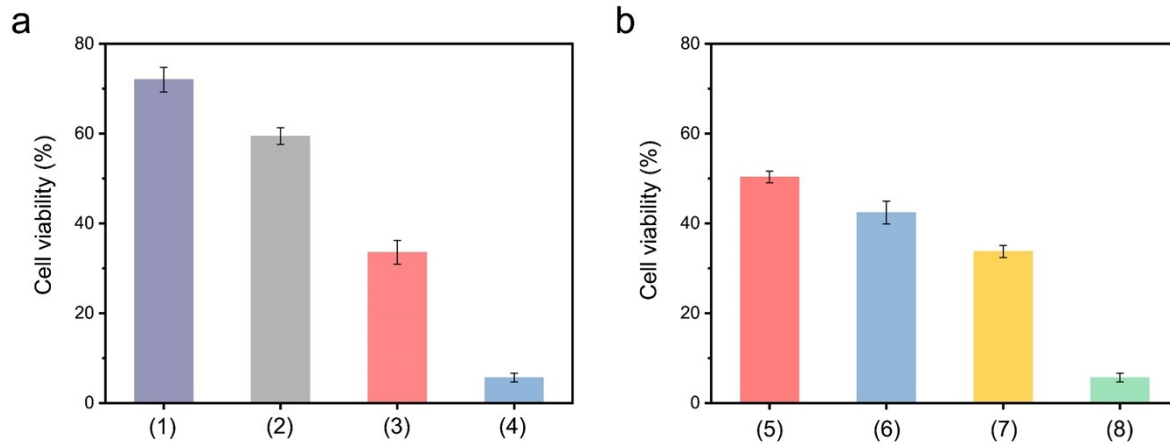


Fig.

S9. (a,b) The cell viabilities of HCLP NPs ($200 \mu\text{g mL}^{-1}$) with different loading amounts of LOD and CHC. 1 mg HPB loading with 1.358 ± 0.098 mg LOD and (1) 0 mg CHC; (2) 0.976 ± 0.093 mg CHC; (3) 2.15 ± 0.056 mg CHC, (4) 3.854 ± 0.106 mg CHC; 1 mg HPB loading with 4.05 ± 0.15 mg CHC and (5) 0 mg LOD (6) 0.335 ± 0.032 mg LOD; (7) 0.733 ± 0.083 mg LOD; (8) 1.358 ± 0.063 mg LOD.

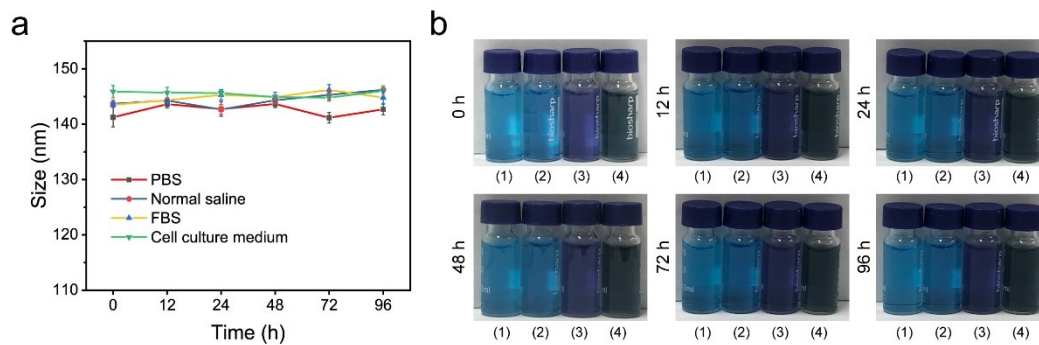


Fig. S10. (a) The changes of particle sizes of HCLP in various solutions for different times. (b) The pictures of HCLP NPs with various solutions including (1) PBS, (2) Normal saline (3) FBS and (4) Cell culture medium for different times.

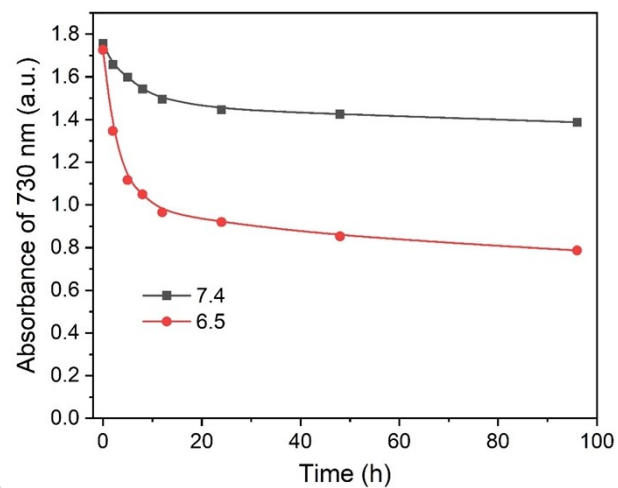


Fig. S11. Curves of HPB absorbance at 730 nm after immersion in PBS of different pH values.

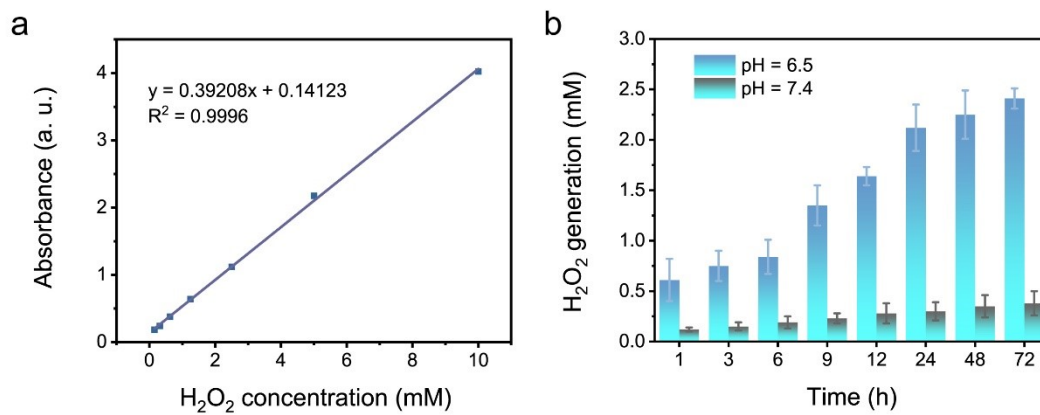


Fig. S12. (a) The standard curve of H₂O₂. (b) H₂O₂ generation of HCLP NPs with lactate in different PBS buffer

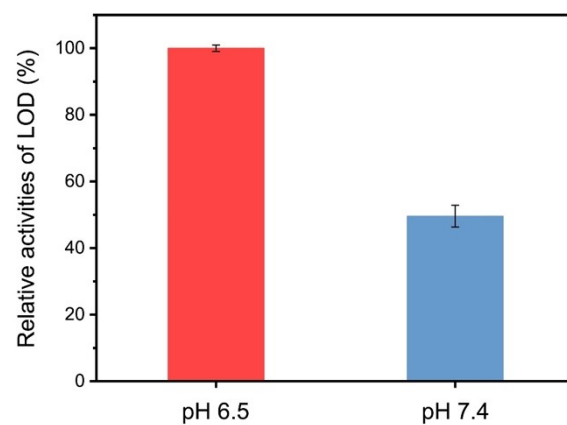


Fig. S13. The relative activities of LOD in the pH value of 6.5 and 7.4 (the activity of LOD in pH value of 6.5 was set as 100%).

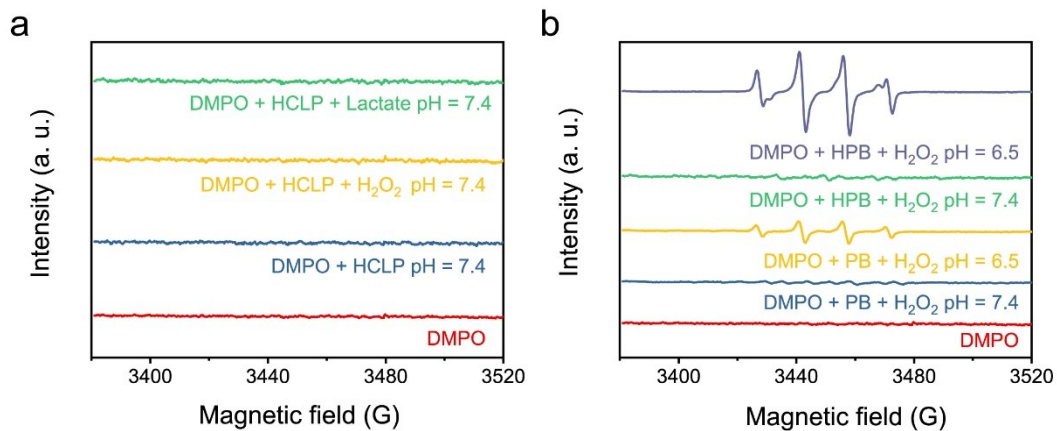


Fig. S14. (a) ESR spectra of HCLP NPs under different conditions. (b) ESR spectra of PB and HPB NPs under different conditions.

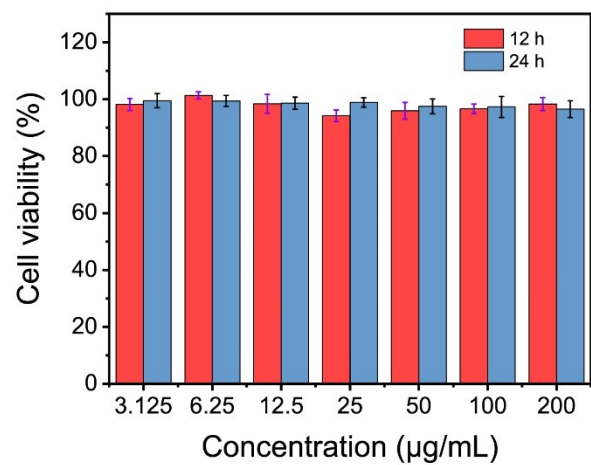


Fig. S15. Cell viabilities of L929 cells after incubated with HCLP NPs for 12 h and 24 h.

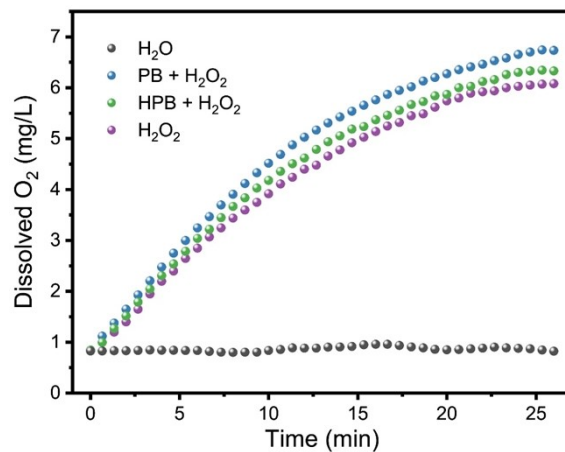


Fig. S16. The dissolved O₂ with different treatments (pH = 6.5)..

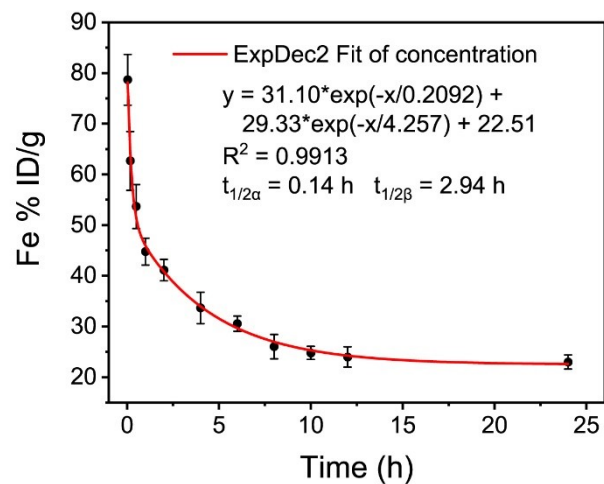


Fig. S17. Fe concentrations in blood taken from mice after treatment with HCLP NPs for various durations.

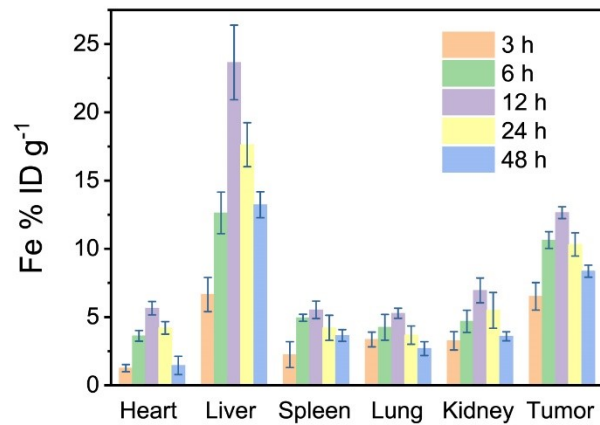


Fig. S18. Time-dependent biodistribution of Fe element in tumor-bearing mice after intravenous injection of HCLP NPs.

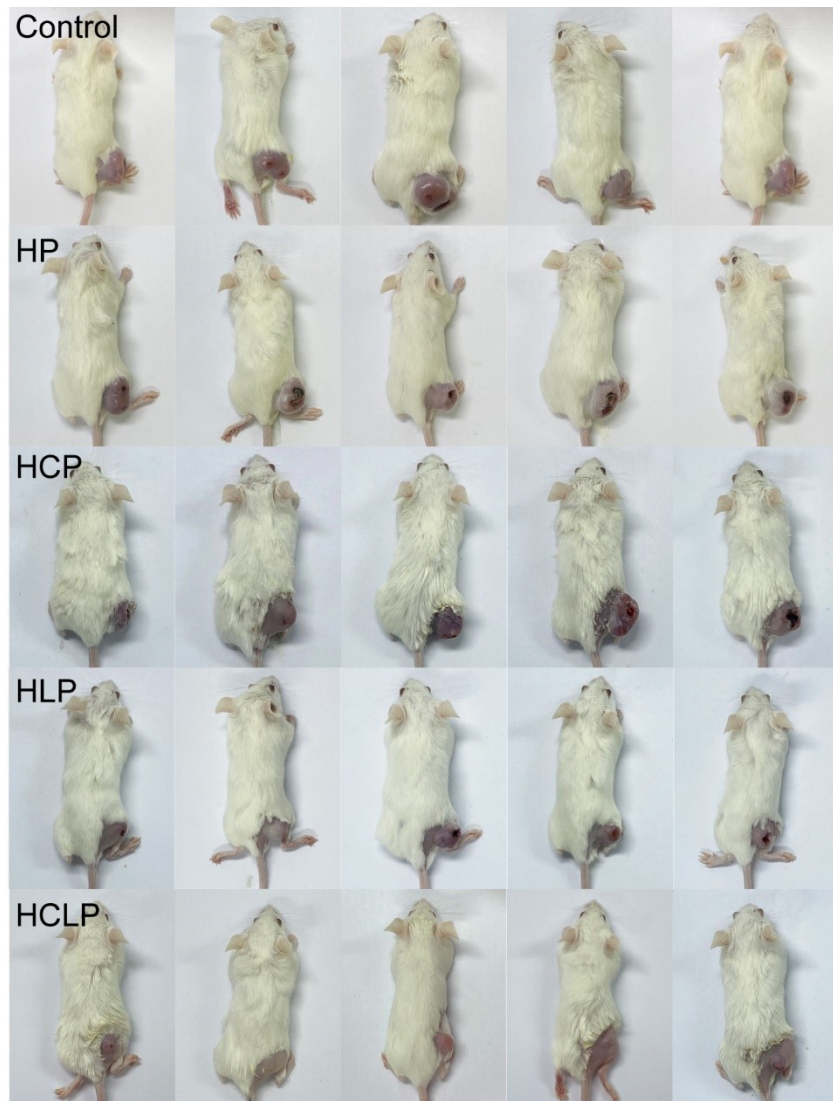


Fig. S19. Digital photographs of mice in five groups after 14 days.

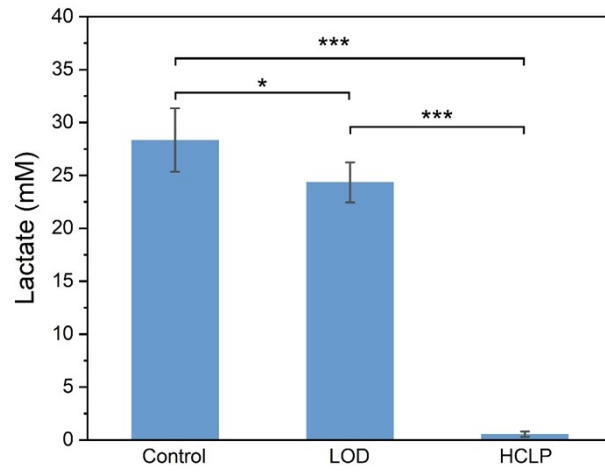


Fig. S20. Lactate concentration within tumors of CT26 tumor bearing mice at 24 h post intratumoral (*i.t.*) injections.

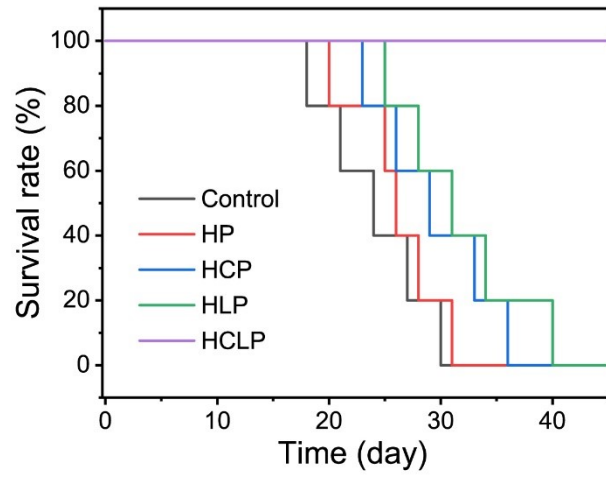


Fig. S21. The survival rates of tumor-bearing mice with different treatment.

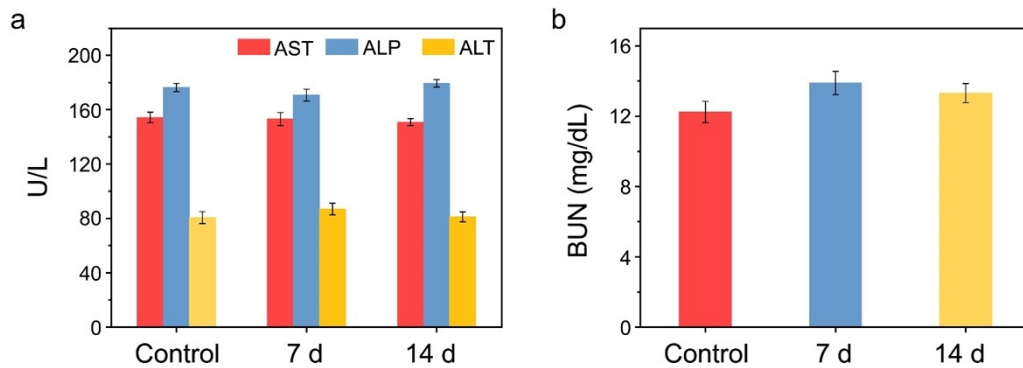


Fig. S22. Blood biochemistry of BALB/c mice treated with HCLP NPs at different times (a) liver function indicators (AST, ALP, and ALT) and (b) spleen function indicator (BUN).

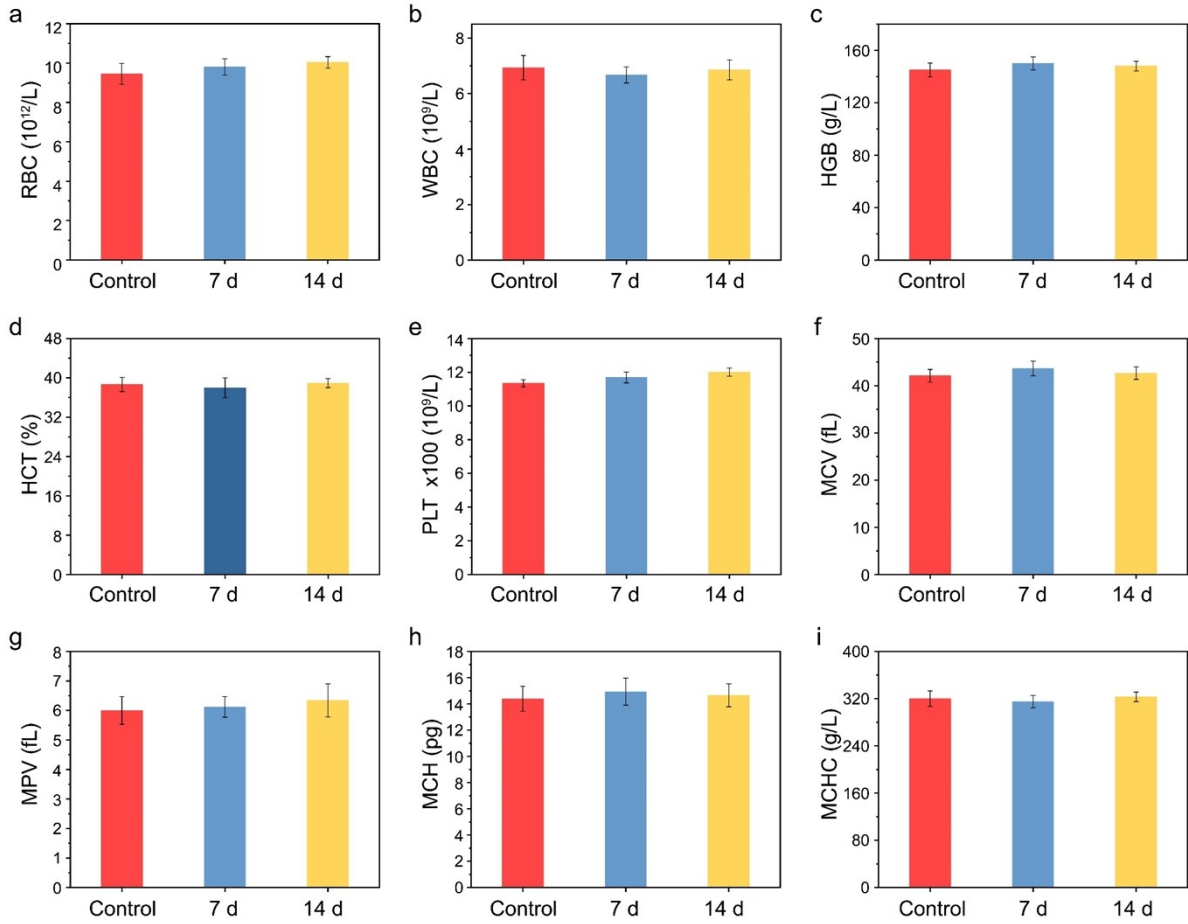


Fig. S23. Hematology data of BALB/c mice treated with HCLP NPs at different times. (a) RBC, (b) WBC, (c) HGB, (d) HCT, (e) PLT, (f) MCV, (g) MPV, (h) MCH, and (i) MCHC.

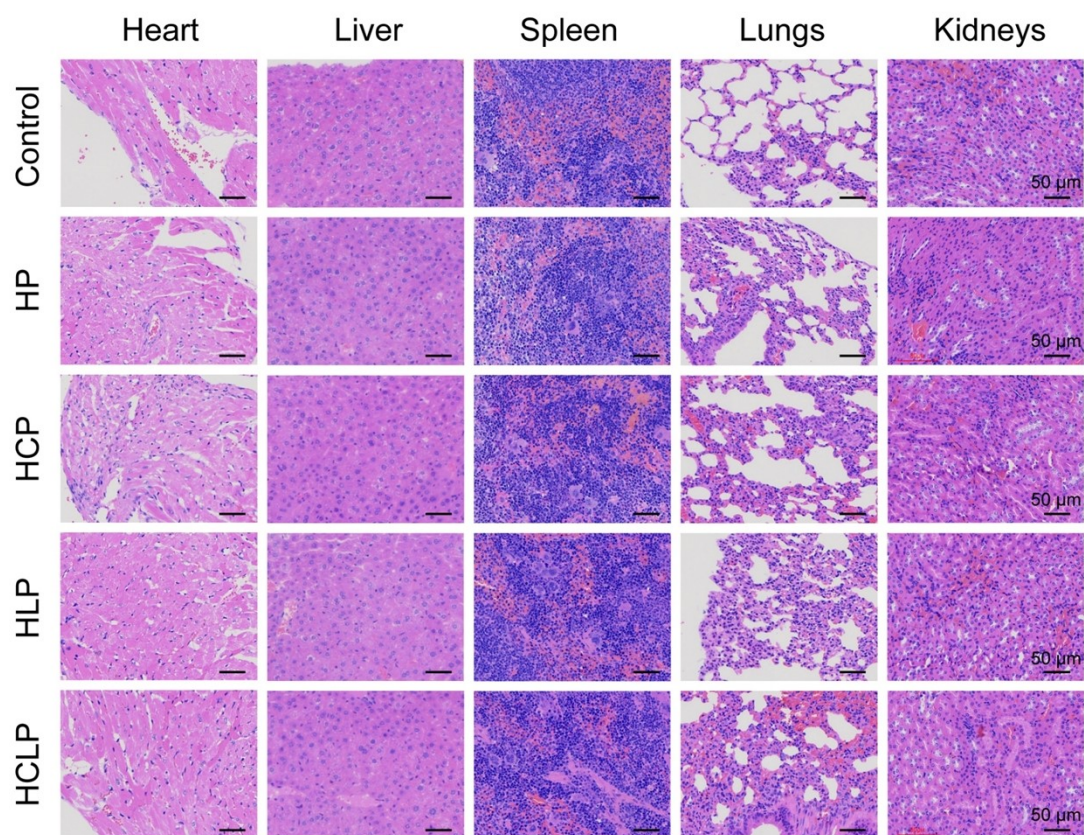


Fig. S24. H&E staining images of main organs (heart, liver, spleen, lungs and kidneys) collected from the mice in various groups at day 14. (Scale bars: 50 μ m)