

Supporting Information

Hyaluronic Acid Conjugated Magnetic Prussian Blue@Quantum Dot Nanoparticles for Cancer Theranostics

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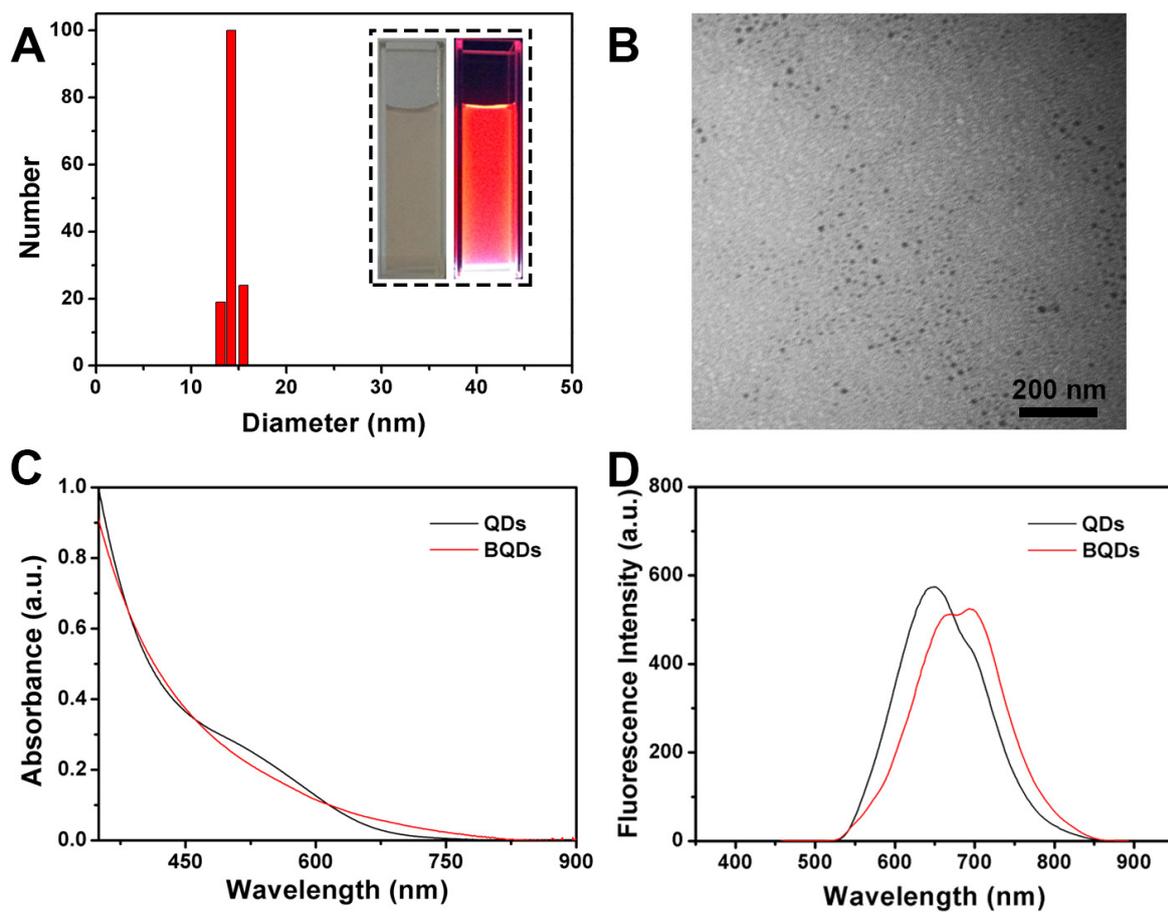


Figure S1. (A) Dynamic light scattering measurement of BQDs NPs. Insets: photographs of BQDs NPs dispersed in PBS under sunlight (left) and UV irradiation (right), respectively; (B) TEM micrograph of BQDs NPs; (C) UV-vis adsorption spectra and (D) Fluorescence spectra of ZCIS QDs and BQDs NPs.

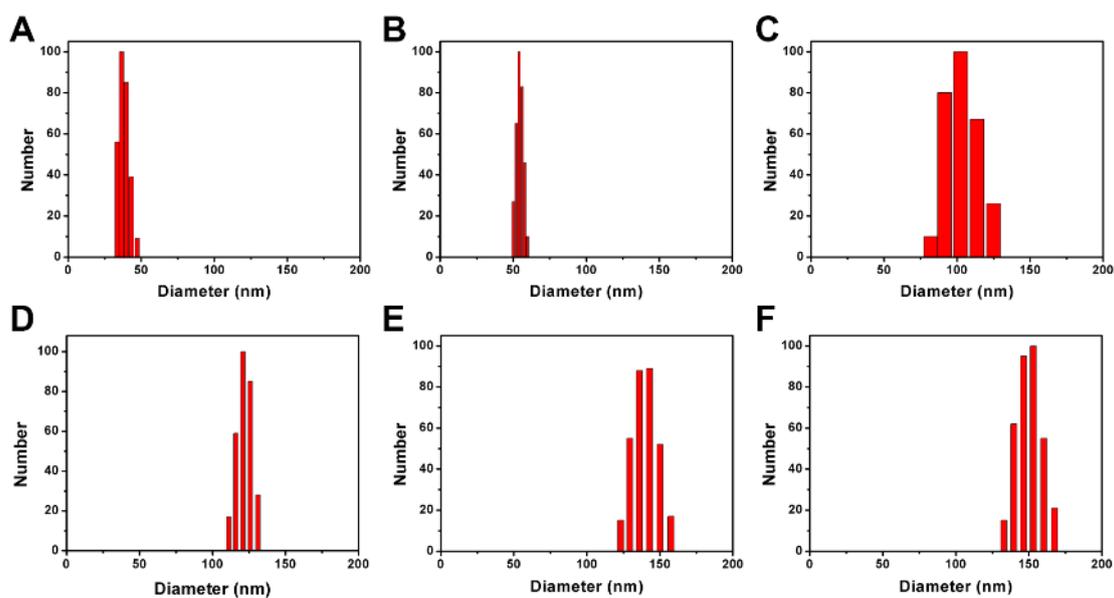


Figure S2. Dynamic light scattering measurement of (A) Fe_3O_4 NPs, (B) FP NPs, (C) FPP NPs, (D) FPPB NPs, (E) FPPBH_{6k} NPs and (F) FPPBH_{31k} NPs.

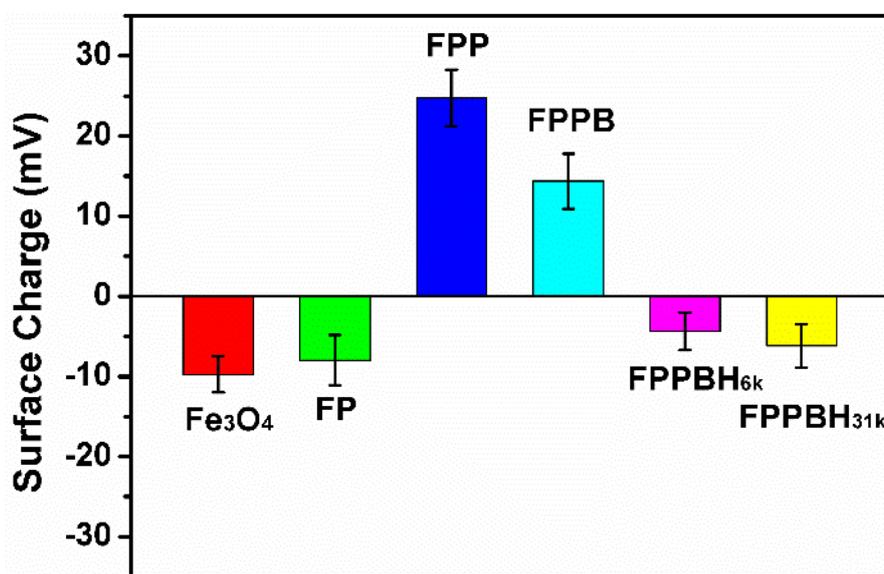


Figure S3. Zeta potentials of Fe_3O_4 NPs, FP NPs, FPP NPs, FPPB NPs, FPPBH_{6k} NPs and FPPBH_{31k} NPs. Data shown as mean SD, n=3.

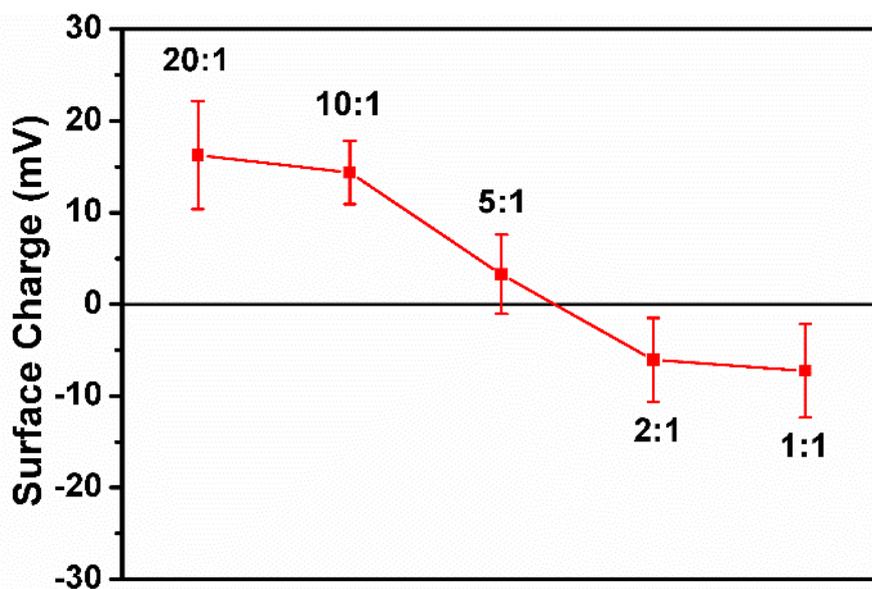


Figure S4. Zeta potentials of FPPB NPs with various mass ratio of FPP / BQDs. Data shown as mean SD, n=3.

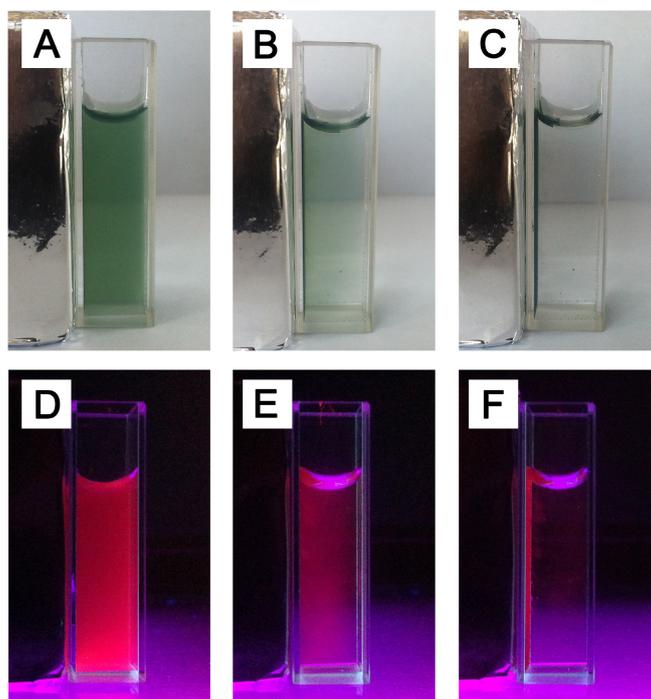


Figure S5. Photographs of FPPBH_{31k} NPs dispersed in PBS after placing them near the magnet for 0 min (A, D), 10 min (B, E) and 30 min (C, F) under sunlight (A-C) and UV irradiation (D-F).

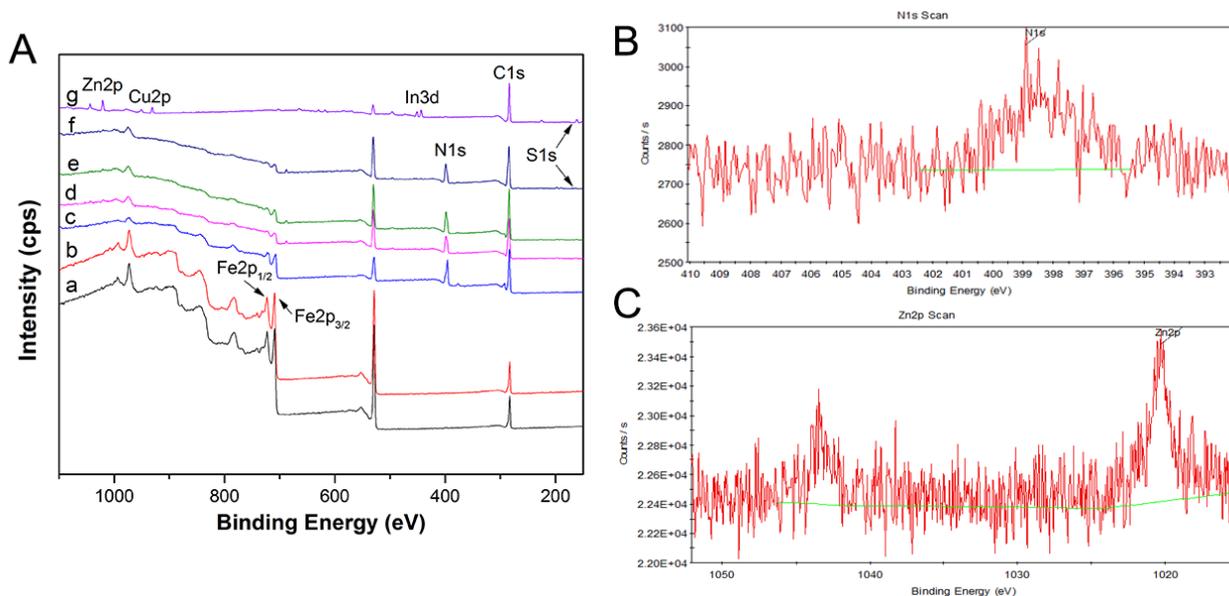


Figure S6. (A) XPS spectra of (a) Fe₃O₄ NPs, (b) FP NPs, (c) FPP NPs, (d) FPPB NPs, (e) FPPBH_{6k} NPs, (f) FPPBH_{31k} NPs and (g) BQDs NPs; (B) N1s XPS spectra of FP NPs; (C) Zn2p XPS spectra of FPPB NPs.

Tablet S1. The corresponding elemental quantification reports of XPS analyze

| Sample | Atomic % | | | | | | |
|--------------------------------|----------|-------|-------|------|------|------|------|
| | C1s | N1s | Fe2p | S2p | In3d | Cu2p | Zn2p |
| BQDs | 87.42 | 1.87 | 0 | 5.34 | 1.01 | 1.55 | 2.8 |
| Fe ₃ O ₄ | 70.26 | 0 | 29.74 | 0 | 0 | 0 | 0 |
| FP | 66.27 | 1.07 | 32.66 | 0 | 0 | 0 | 0 |
| FPP | 70.75 | 25.64 | 3.61 | 0 | 0 | 0 | 0 |
| FPPB | 72.71 | 22.99 | 2.73 | 0.46 | 0.21 | 0.32 | 0.58 |
| FPPBH _{6K} | 74.18 | 22.09 | 2.38 | 0.41 | 0.19 | 0.29 | 0.46 |
| FPPBH _{31K} | 74.75 | 21.96 | 2.09 | 0.35 | 0.17 | 0.26 | 0.41 |

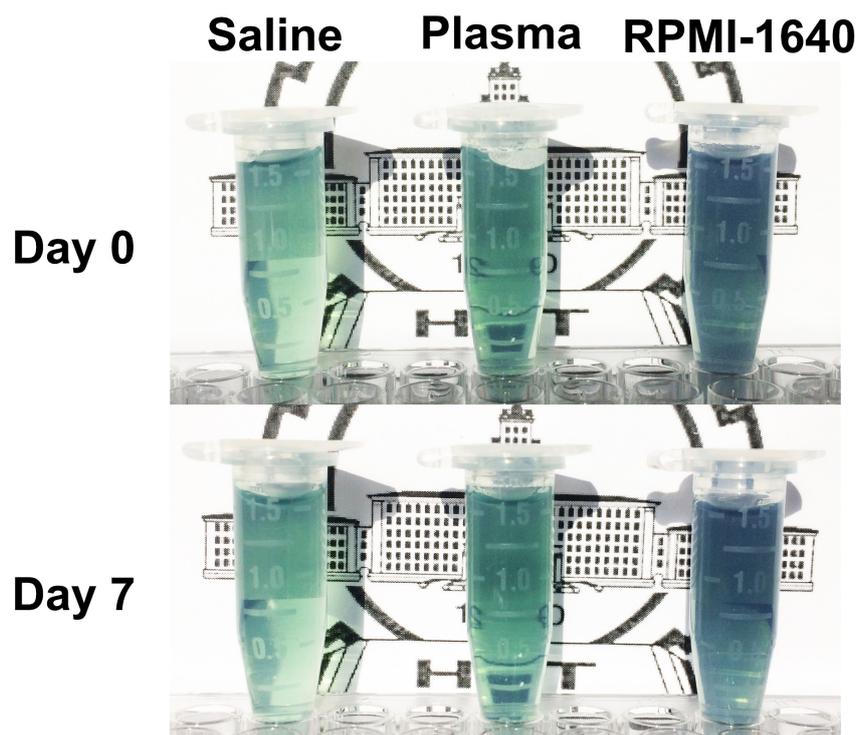


Figure S7. FPPBH_{31k} NPs suspended in different physiologic medium including saline, plasma and RPMI-1640 medium.

Table S2. The hydrodynamic diameter and PDI of FPPBH_{31k} NPs suspended in different physiologic medium at day 0 and day7. Data shown as mean SD, n=3.

| Sample | Day 0 | | | Day 7 | | |
|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Saline | Plasma | RPMI-1640 | Saline | Plasma | RPMI-1640 |
| hydrodynamic diameter (nm) | 143.7±8.9 | 151.5±12.1 | 147.2±15.4 | 156.2±20.6 | 149.3±17.5 | 151.9±11.1 |
| PDI | 0.319±0.007 | 0.351±0.013 | 0.383±0.009 | 0.417±0.014 | 0.391±0.006 | 0.364±0.010 |

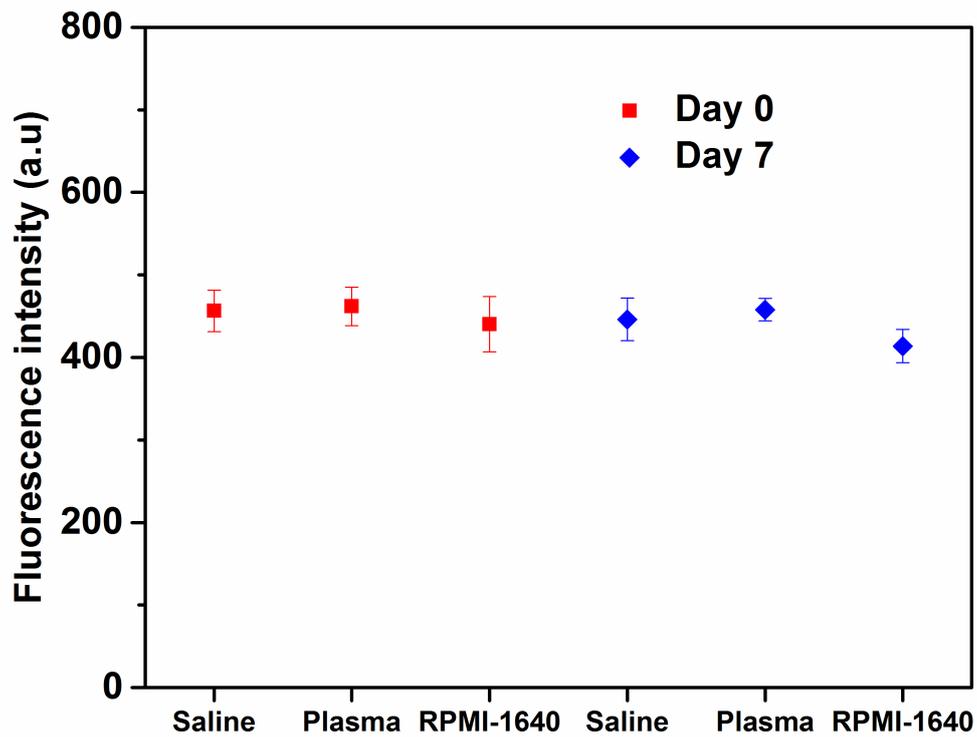


Figure S8. The fluorescence intensity of FPPBH_{31k} NPs suspended in different physiologic medium at day 0 and day7. Data shown as mean SD, n=3.

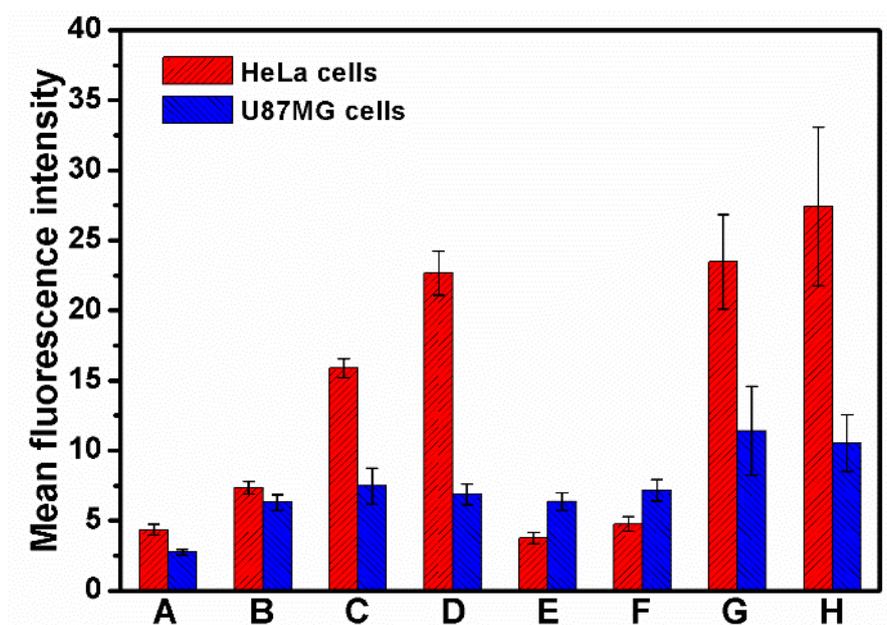


Figure S9. The mean fluorescence intensity of HeLa cells and U87MG cells treated with (A) PBS for 4 h, (B, J) FPPB NPs for 4 h, (C, K) FPPBH_{6k} NPs for 4 h, (D, L) FPPBH_{31k} NPs for 4 h, (E, M) HA_{6k} for 2 h followed by FPPBH_{6k} NPs for 4 h, (F, N) HA_{31k} for 2 h followed by FPPBH_{31k} NPs for 4 h, (G, O) and FPPBH_{6k} NPs with external MF for 15 min followed by without external MF for 4 h and (H, P) FPPBH_{31k} NPs with external MF for 15 min followed by without external MF for 4 h at the iron concentration of 10 mg/L. Data shown as mean SD,

n=3.

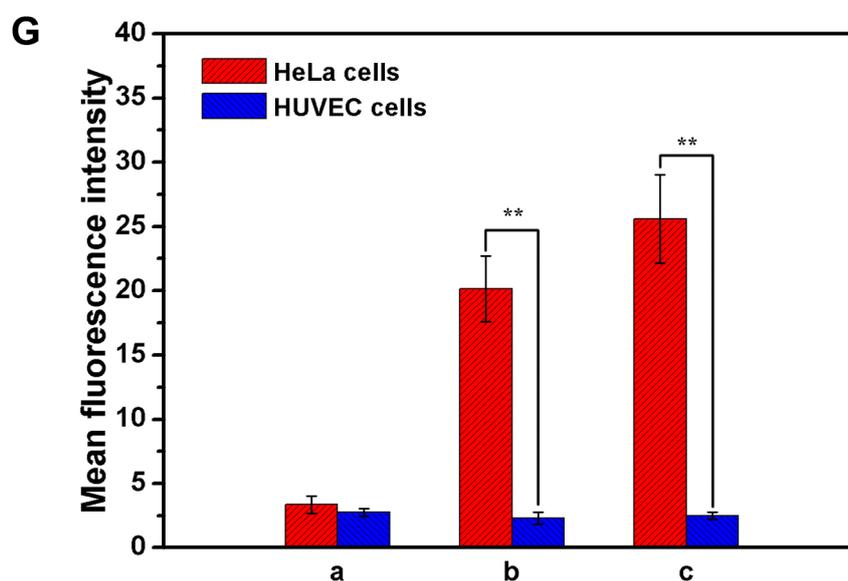
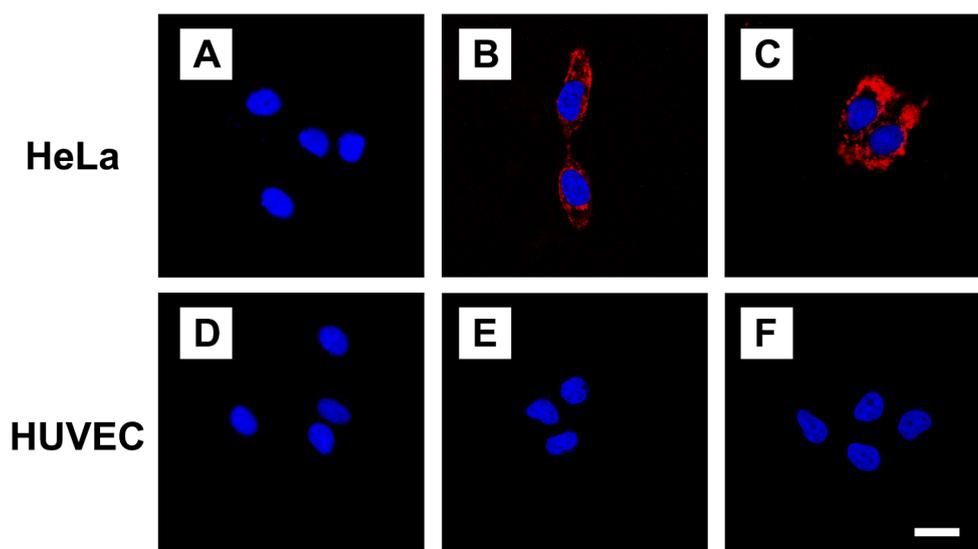


Figure S10. CLSM micrographs of HeLa cells and HUVEC cells treated with PBS for 4 h (A, D); FPPBH_{31k} NPs for 4 h (B, E) and FPPBH_{31k} NPs with external MF for 15 min followed by without external MF for 4 h (C, F). Scale bar is 40 μ m. Scale bar is 40 μ m. The mean fluorescence intensity (G) of HeLa cells and HUVEC cells treated with PBS for 4 h (a); FPPBH_{31k} NPs for 4 h (b) and FPPBH_{31k} NPs with external MF for 15 min followed by without external MF for 4 h (c). All these NPs have the iron concentration of 10 mg/L. Data shown as mean SD, n=3.

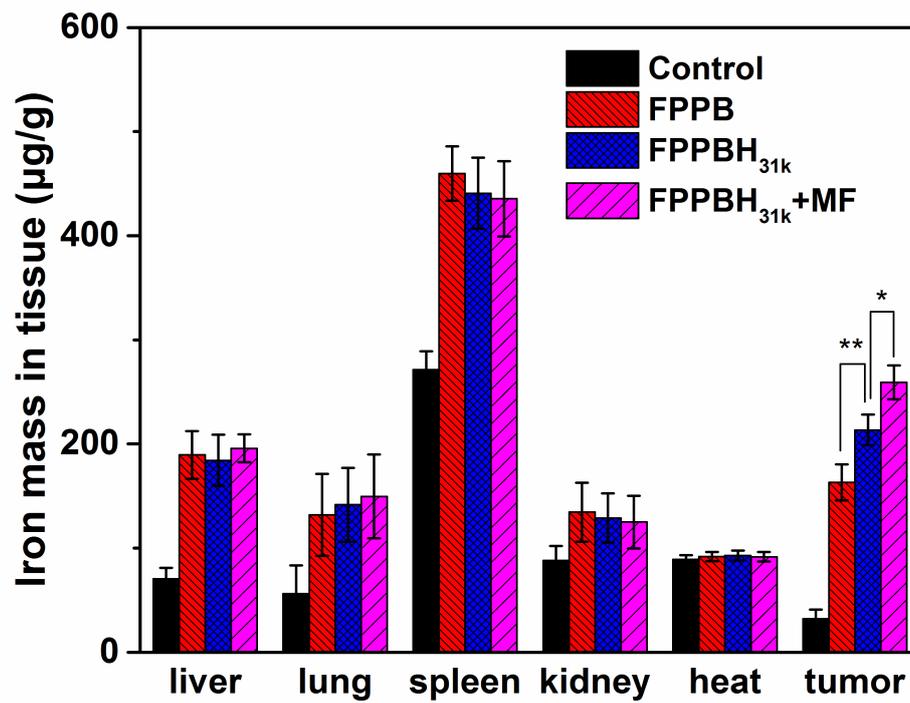


Figure S11. The *in vivo* biodistribution of iron element after 48 h tail vein injection of FPPB NPs, FPPBH_{31k} NPs without and with MF. Data shown as mean standard deviation (SD), n=6.

(* $p < 0.05$, ** $p < 0.01$)

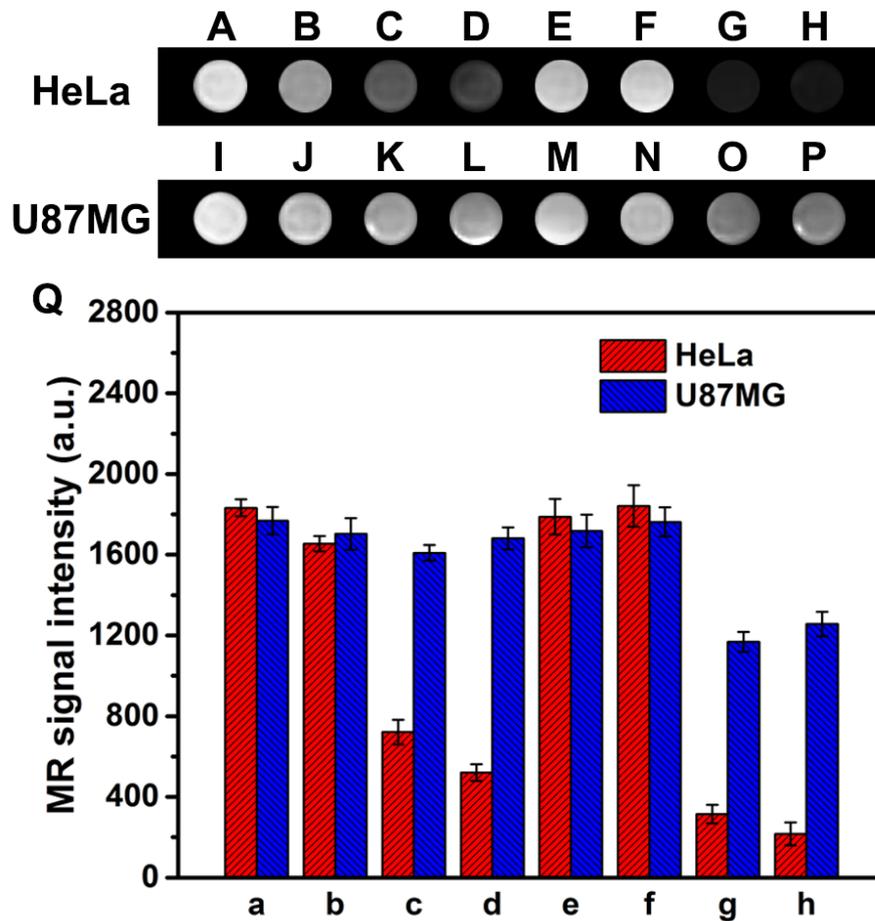


Figure S12. T₂-weighted MR images of HeLa cells and U87MG cells treated with (A, I) PBS for 4h, (B, J) FPPB NPs for 4 h, (C, K) FPPBH_{6k} NPs for 4 h, (D, L) FPPBH_{31k} NPs for 4 h, (E, M) HA_{6k} for 2 h followed by FPPBH_{6k} NPs for 4 h, (F, N) HA_{31k} for 2 h followed by FPPBH_{31k} NPs for 4 h, (G, O) FPPBH_{6k} NPs with external MF for 15 min followed by without external MF for 4 h and (H, P) FPPBH_{31k} NPs with external MF for 15 min followed by without external MF for 4 h at the iron concentration of 10 mg/L. MR signal intensity (Q) of HeLa cells and U87MG cells treated with FPPBH_{31k} NPs with (a) PBS for 4h, (b) FPPB NPs for 4 h, (c) FPPBH_{6k} NPs for 4 h, (d) FPPBH_{31k} NPs for 4 h, (e) HA_{6k} for 2 h followed by FPPBH_{6k} NPs for 4 h, (f) HA_{31k} for 2 h followed by FPPBH_{31k} NPs for 4 h, (g) FPPBH_{6k} NPs with external MF for 15 min followed by without external MF for 4 h and (h) FPPBH_{31k} NPs with external MF for 15 min followed by without external MF for 4 h. Data shown as mean SD, n=3.