Supporting Information

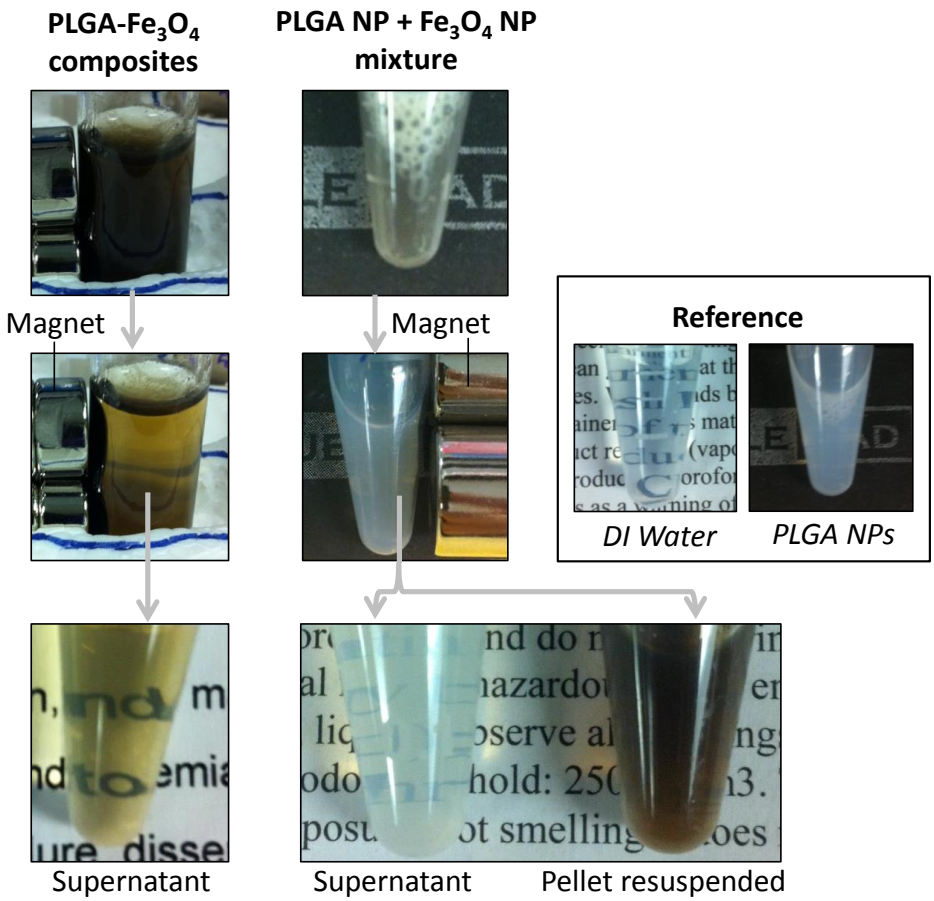
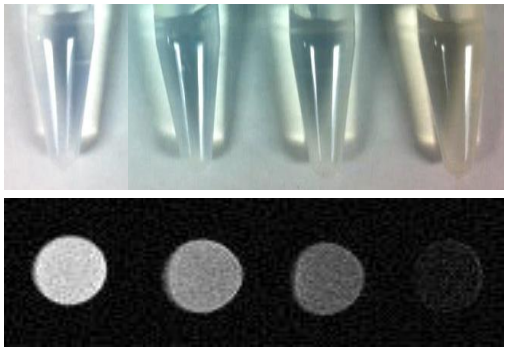


Figure S1. A simple mixture of PLGA NPs and Fe_3O_4 NPs without pD coating did not produce Fe_3O_4 NP-decorated PLGA NPs, given that PLGA NPs were not attracted by the magnet.



Fe (μM)	**0 (DI water)**	**18**	**36**	**72**
T2 relaxation time (ms)	**541**	**93.35**	**42.57**	**34.82**

Figure S2. T_2-weighted images and T_2 relaxation times of PINCs in aqueous suspensions at different concentrations (based on Fe content).

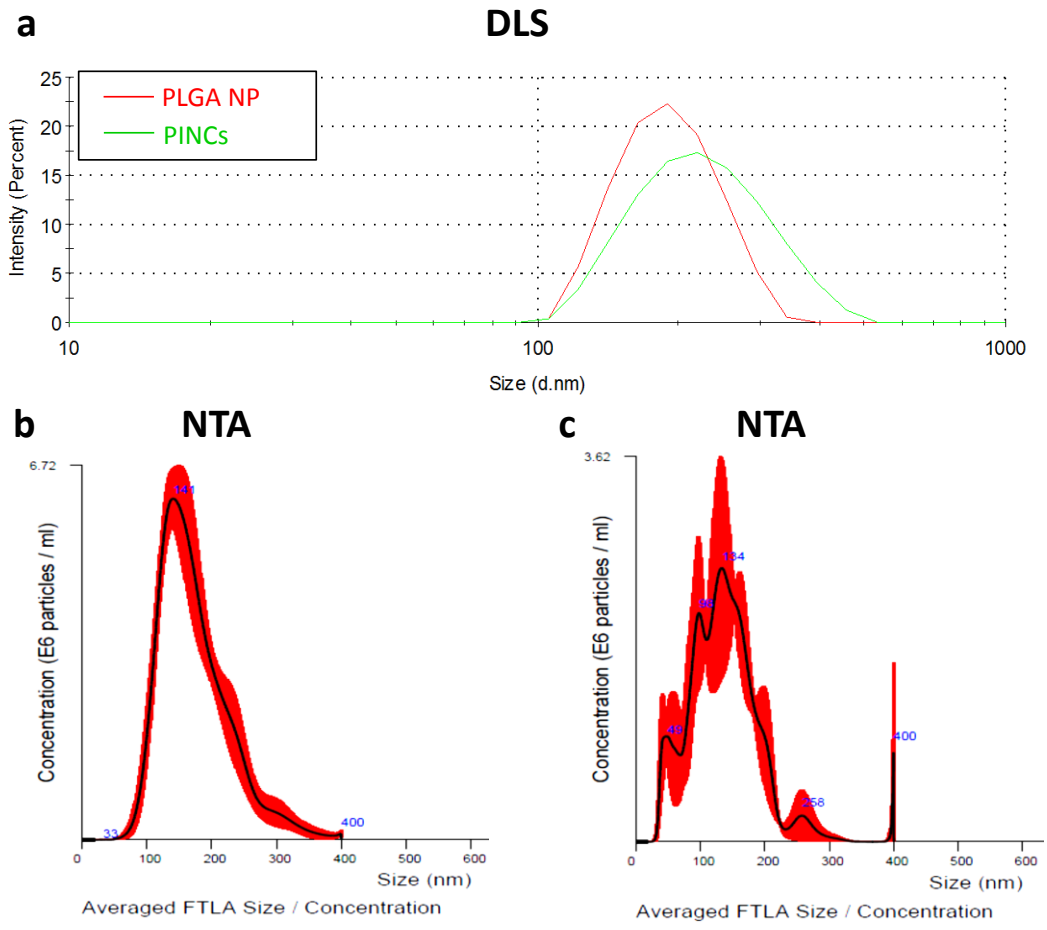
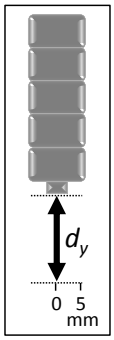
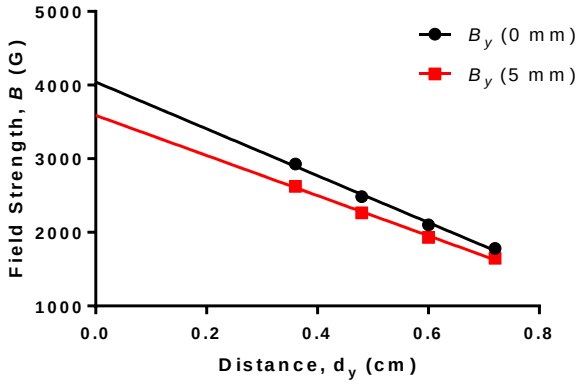


Figure S3. (a) Hydrodynamic size analysis of PLGA NPs and PINCs by dynamic light scattering (DLS). (b) Hydrodynamic size analysis of PINCs in water by nanoparticle tracking analysis (NTA). (c) NTA of PINCs after exposure to 50% (v/v) FBS for 12 hours, followed by 3 rounds of washing.



Distance from magnet (cm)	*B*-field relative to central axis (G)	
d_y	B_y (0 mm)	B_y (5 mm)
0.36	2927	2626
0.48	2486	2266
0.60	2101	1930
0.72	1783	1648



Field gradient along axis (x = 0 mm): G_y = 3.2 kG/cm
Field gradient along edge (x = 5 mm): G_y = 2.7 kG/cm

Figure S4. Measurement of magnetic field gradient, generated by cylindrical stack of NdFeB magnets (five 1.0 × 0.5 cm magnets plus one 0.2 × 0.1 mm magnet). Field strengths (B_y) were measured in gauss at 4 different positions along the central axis (x = 0 mm) and along the edge (x = 5 mm), then extrapolated linearly to yield upper and lower values for field gradient (G_y = 3.2 and 2.7 kG/cm, respectively).

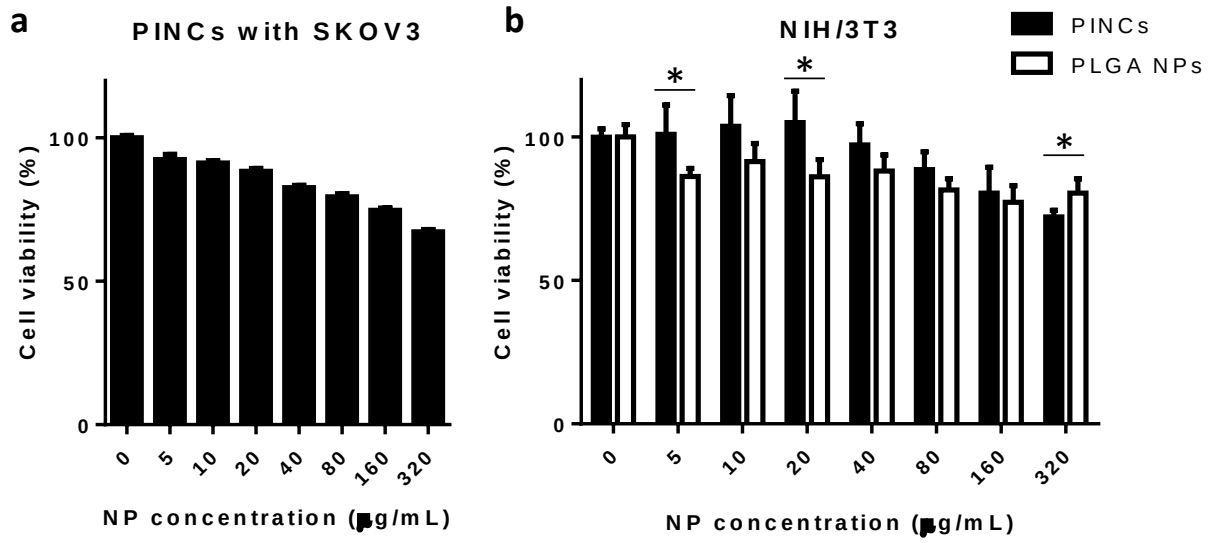


Figure S5. Viability of (a) SKOV3 or (b) NIH/3T3 cells incubated with PINCs for 1 day (without externally applied field). (c) NIH/3T3 cells incubated with PLGA NPs. n=5 wells. *: $p<0.05$ by 2-tailed t-test.

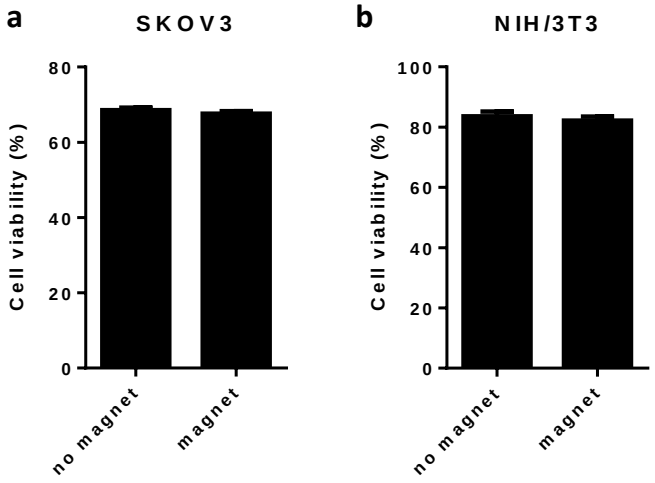


Figure S6. Viability of (a) SKOV3 and (b) NIH/3T3 cells treated with PINCs (80 μg/mL), with or without exposure to a magnetic field gradient (30 min), followed by a 24-hour incubation period. n=6 wells.

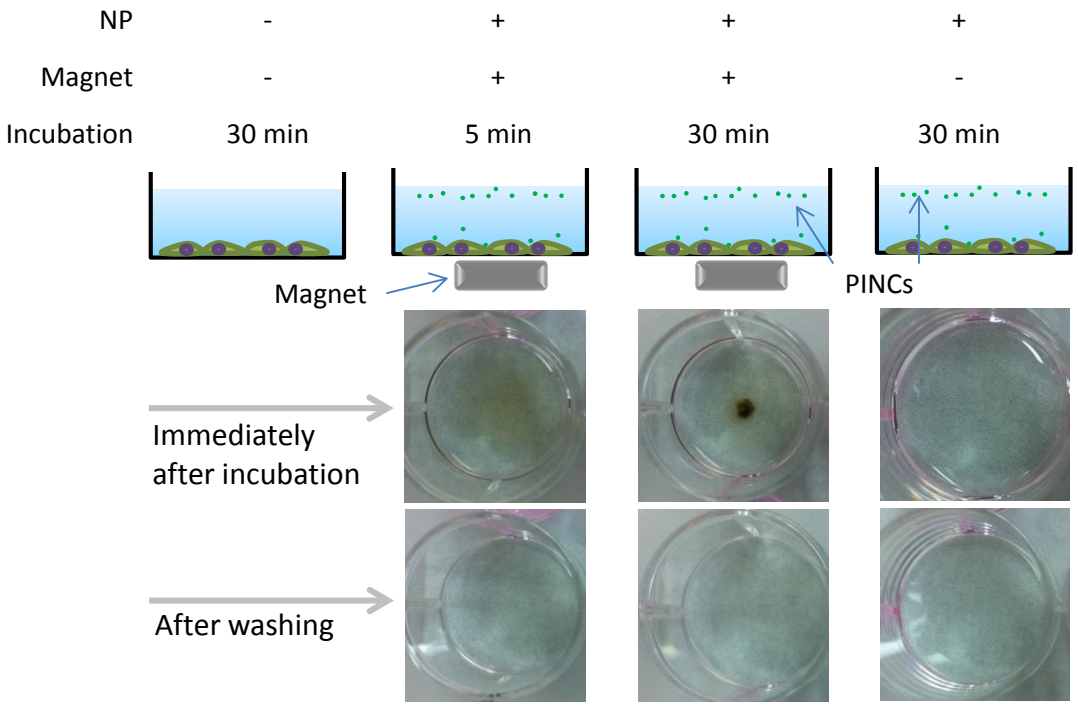


Figure S7. Multiwell plates containing adherent SKOV3 cells and PINCs, with and without exposure to a magnetic field gradient (up to 30 min prior to washing).

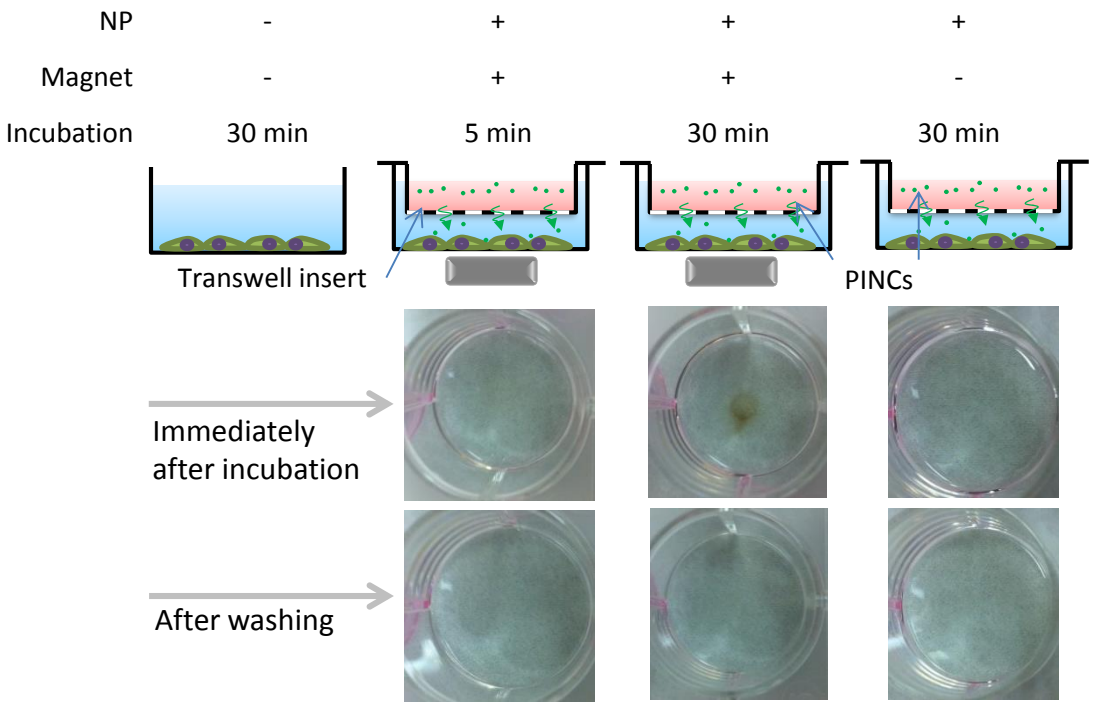


Figure S8. Multiwell plates containing adherent SKOV3 cells with PINCs loaded into a Transwell insert, with and without exposure to a magnetic field gradient (up to 30 min prior to washing).

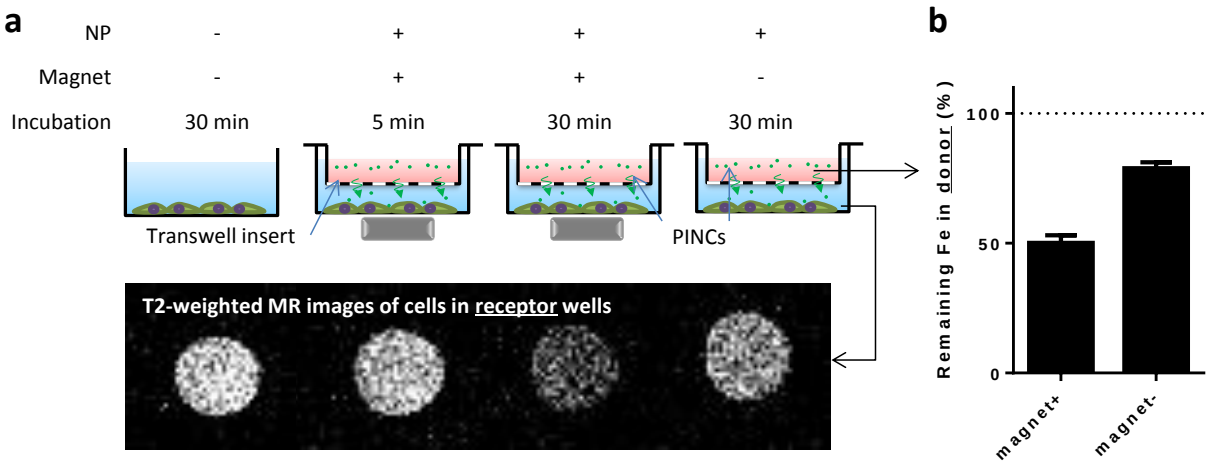


Figure S9. (a) T_2-weighted MR images of SKOV3 cells incubated with PINCs loaded in a Transwell insert, with and without exposure to a magnetic field gradient (up to 30 min prior to washing). (b) Relative concentration of PINCs remaining in the Transwell insert after 30 min exposure to a magnetic field gradient, based on Fe content as measured by AAS. n=3 wells.

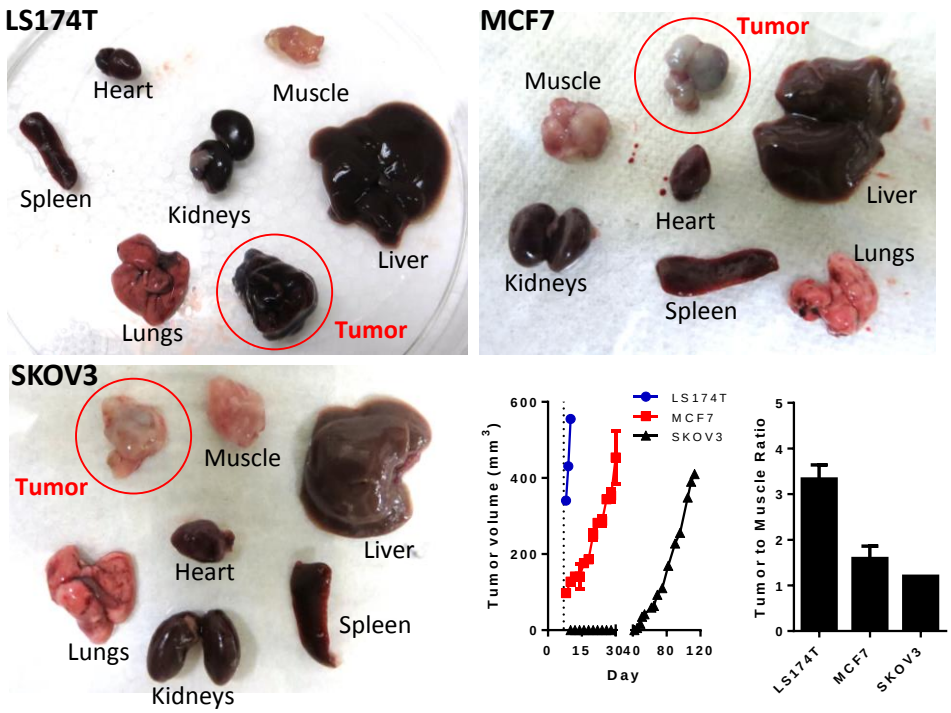


Figure S10. Comparison of tumor vascularization: Female nude mice were inoculated subcutaneously with 5×10^6 SKOV3 cells (human ovarian carcinoma), MCF7 cells (human breast adenocarcinoma), or LS174T cells (human colon adenocarcinoma). When tumor size reached ~400 mm^3, 200 µL of 0.25% Evans blue (Abcam, Cambridge, UK) in PBS was injected via tail vein. After 1 hour, the mice were sacrificed, and tumors and muscle tissues were sampled. Evans blue in each tissue was quantified according to the literature [1] with slight modification: tissues were incubated in 1 mL of formamide for 1 day at 55 °C and spun down at 4000 rcf for 5 min to separate supernatant. Absorbance of the supernatant was measured at 610 nm with a SpectraMax M3 microplate reader. Tumor to muscle ratio was calculated as dye content in tumor (ng/mg) / dye content in muscle (ng/mg).

[1] Radu M, Chernoff J. An in vivo Assay to Test Blood Vessel Permeability. J. Vis. Exp. 2013:e50062.

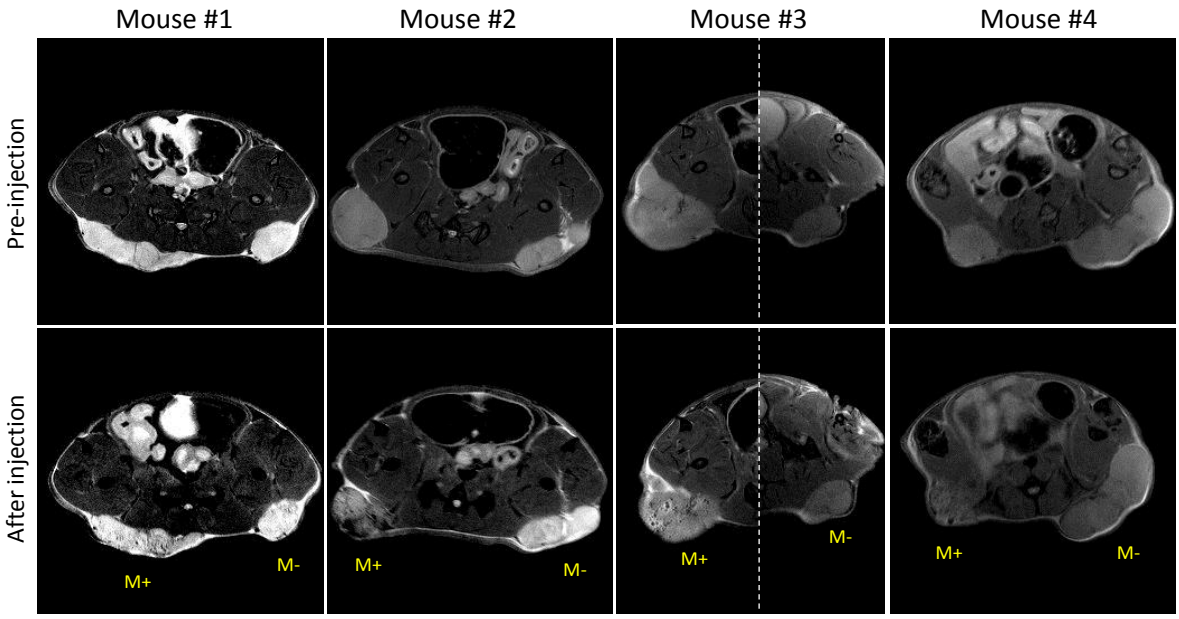


Figure S11. T_2-weighted MR images of tumors of all tested mice before and after NP treatment, with or without 30-min field exposure. The time interval between two imaging events was approximately 1 hour. Dotted lines in Mouse #3 indicate that tumors were on different imaging planes.

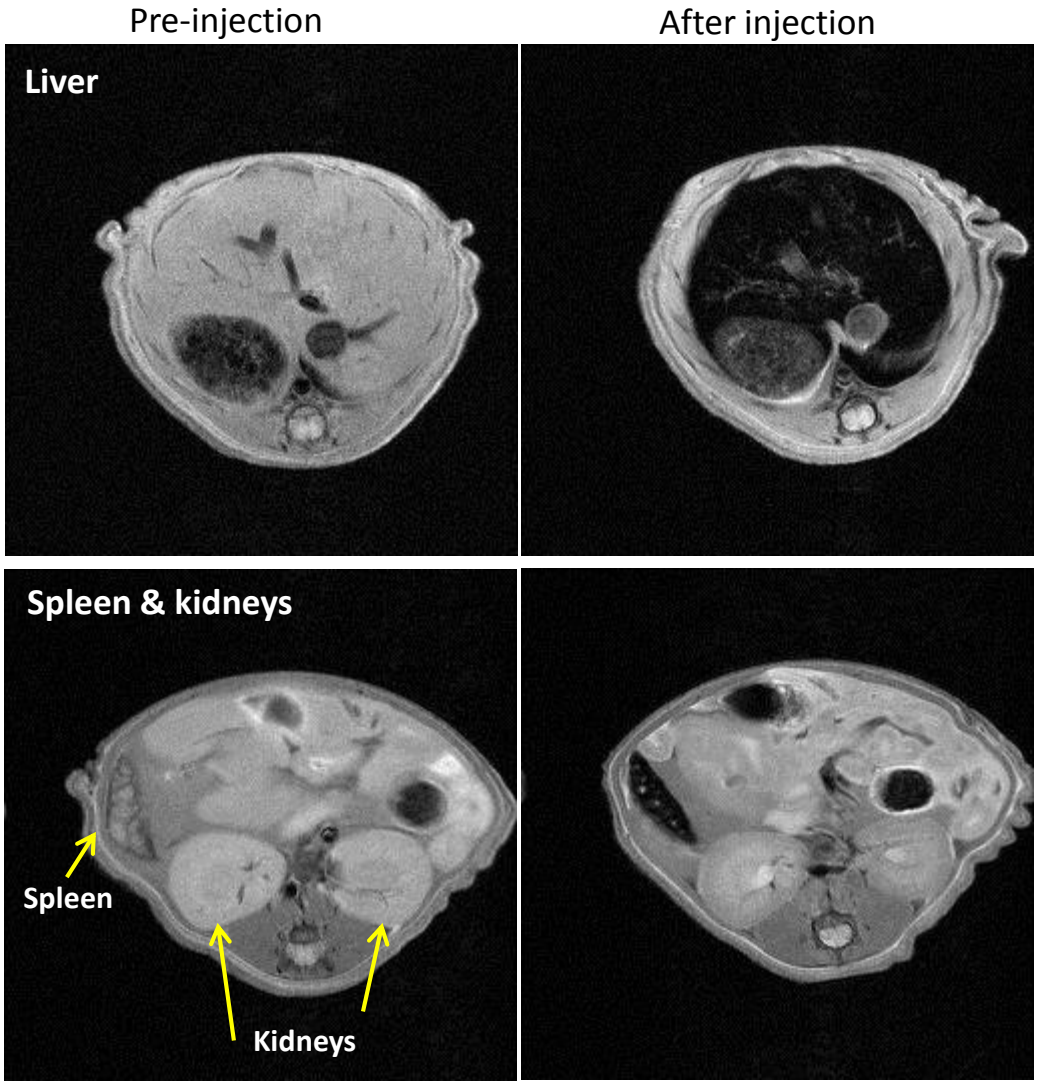


Figure S12. Representative T_2-weighted MR images of liver, spleen and kidneys before and after NP treatment, with or without 30-min field exposure. The time interval between two imaging events was approximately 1 hour.

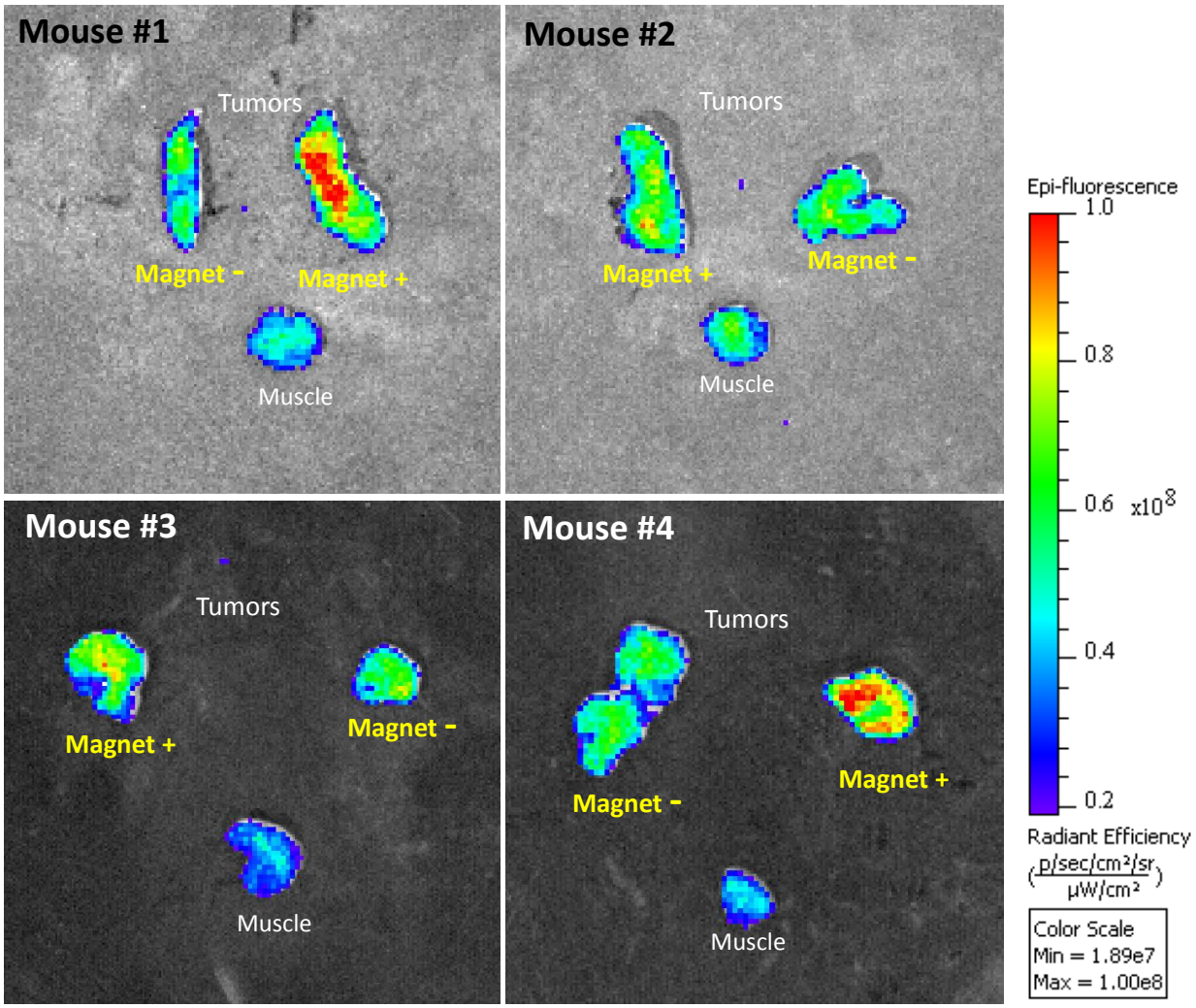


Figure S13. *Ex vivo* fluorescence images of tumors and muscle tissues of all tested mice receiving PINCs, with or without 30-min field exposure. Tissue samples were obtained from animals sacrificed 1 hour after NP injection.

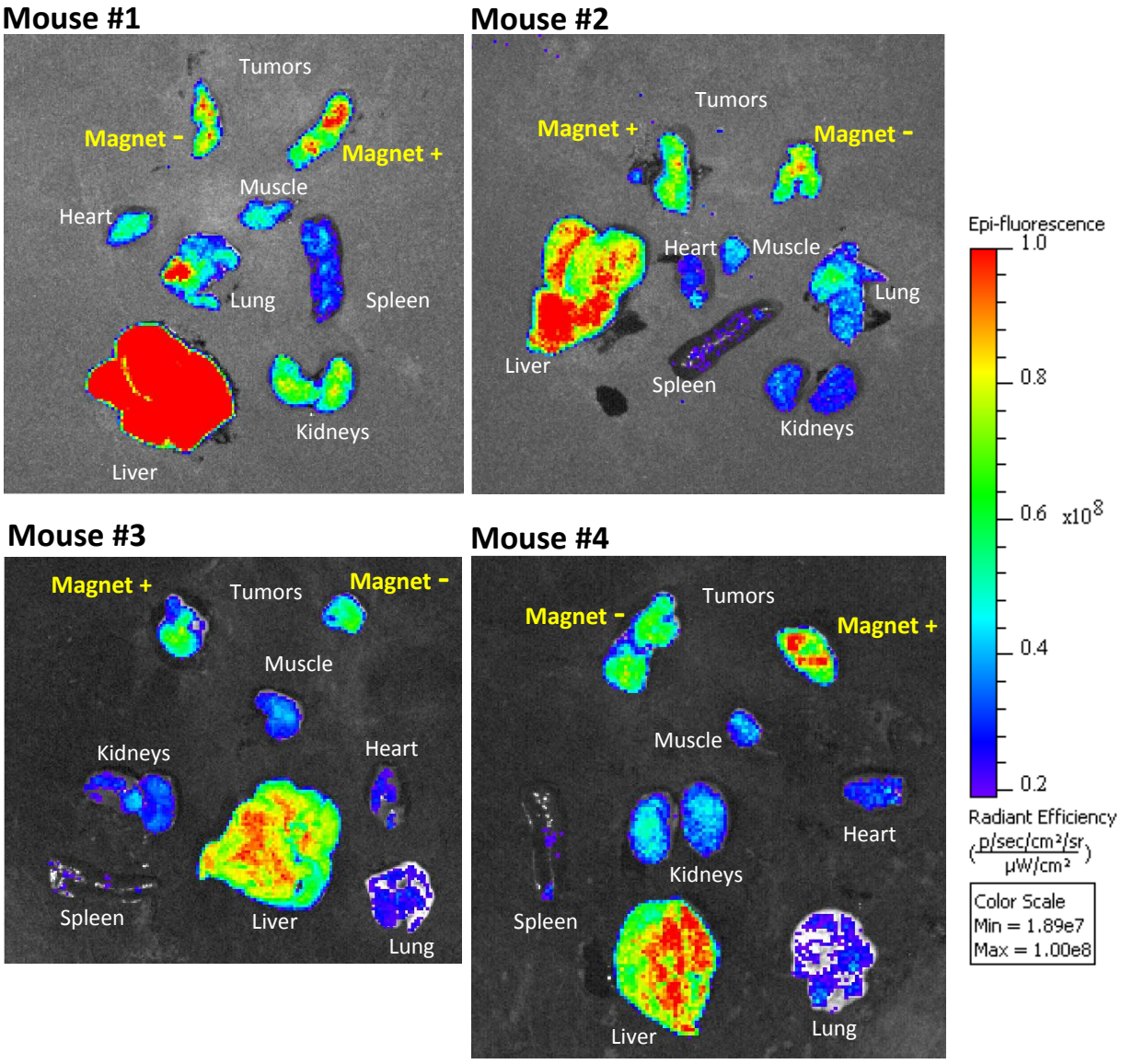


Figure S14. *Ex vivo* fluorescence images of tumors and major organs of all tested mice receiving PINCs, with or without 30-min field exposure. Tissue samples were obtained from animals sacrificed 1 hour after NP injection.