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

Folate-conjugated cross-linked magnetic nanoparticles as potential magnetic resonance probes for in vivo cancer imaging

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Experiment

Synthesis of as-synthesized iron oxide nanocrystals

Fe_3O_4 nanocrystals were produced by a seed-mediated growth method using 6 nm sized nanocrystals synthesized using the thermal decomposition method.[42] Briefly, for the synthesis of 6 nm Fe_3O_4, iron (III) acetylacetonate (0.706 g, 2 mmol), 1,2-hexadecanediol (2.5845 g, 10 mmol), oleic acid (1.902 mL, 6 mmol), oleylamine (1.974 mL, 6 mmol), and benxyl ether (20 mL) were mixed under a nitrogen atmosphere. The mixture was heated to 200 ^{o}C for 2 h and further heated to 300 ^{o}C for 1 h under reflux. After being cooled to room temperature, excess ethanol was used to wash the reactant. Nanocrystals were collected by centrifugation.

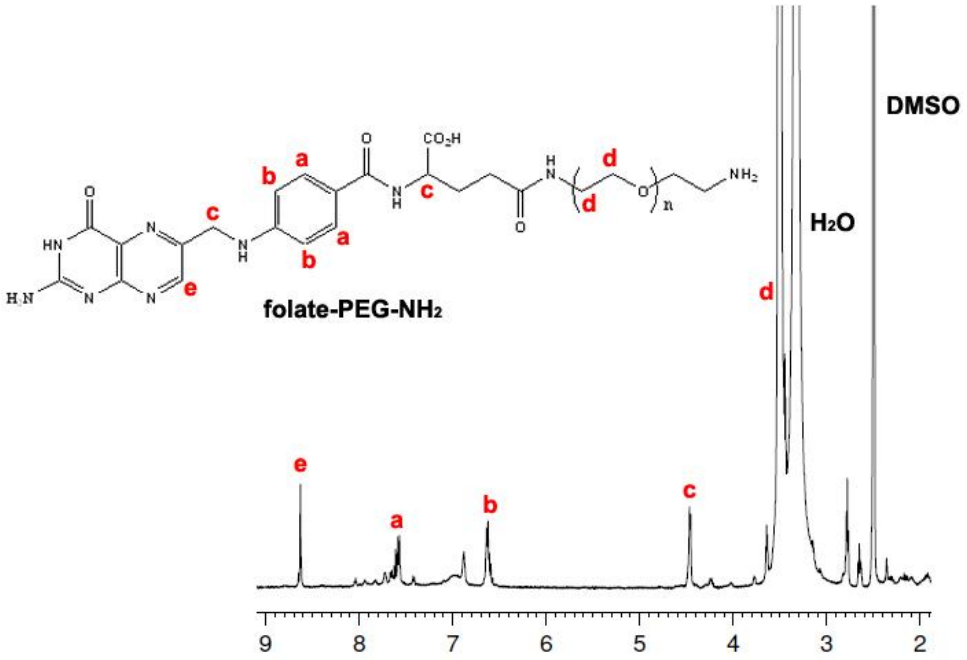

Fig. S1. ^{1}H NMR spectra of folate-PEG-NH_2 in DMSO-d_6.

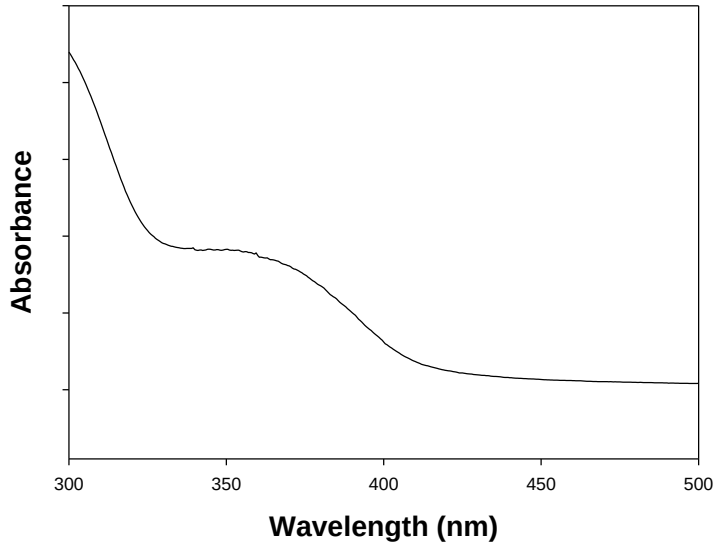

Fig. S2. UV-visible absorption spectra of folate conjugated PEG (Fol-PEG-NH_2).

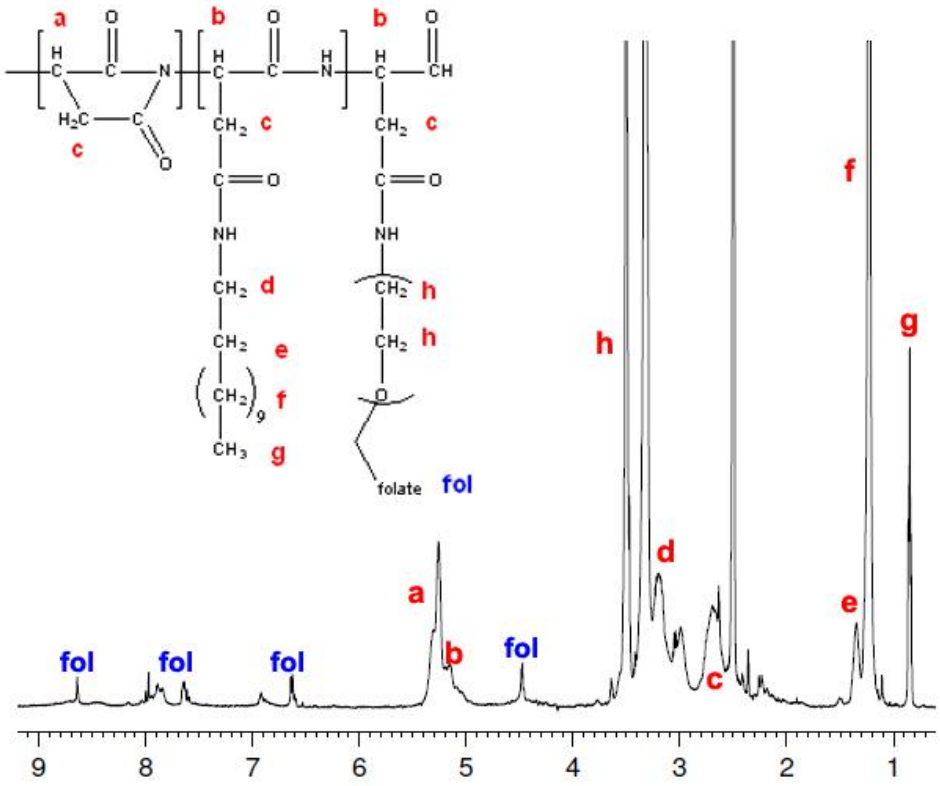

Fig. S3. ^{1}H NMR spectra of PSI-*g*-C_{12}-PEG-folate in DMSO-d_6.

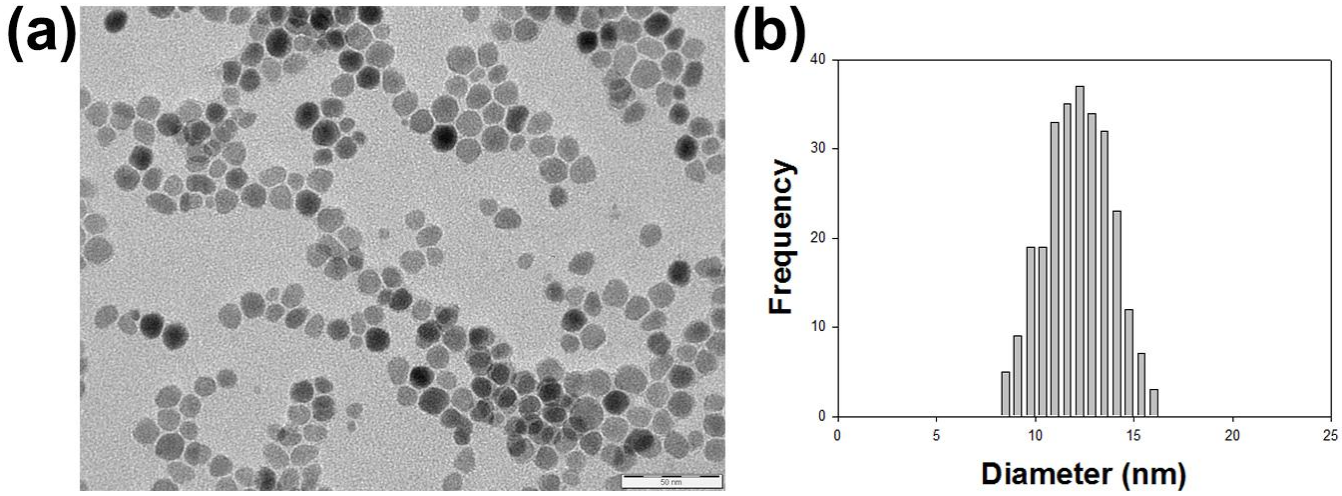

Fig. S4. (a) TEM image and (b) size histogram of as-synthesized iron oxide nanocrystals. A scale bar is 50 nm.

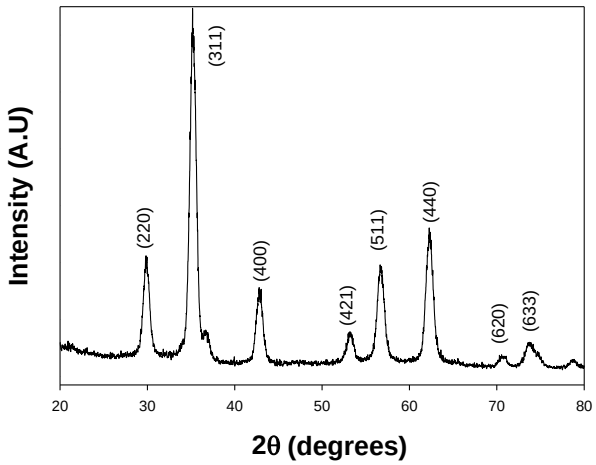

Fig. S5. X-ray diffraction patterns of as-synthesized Fe_3O_4 nanocrystals using a Rigaku D/max-RB apparatus and a Cu Kα source (λ = 0.154 nm); powder samples were analyzed.

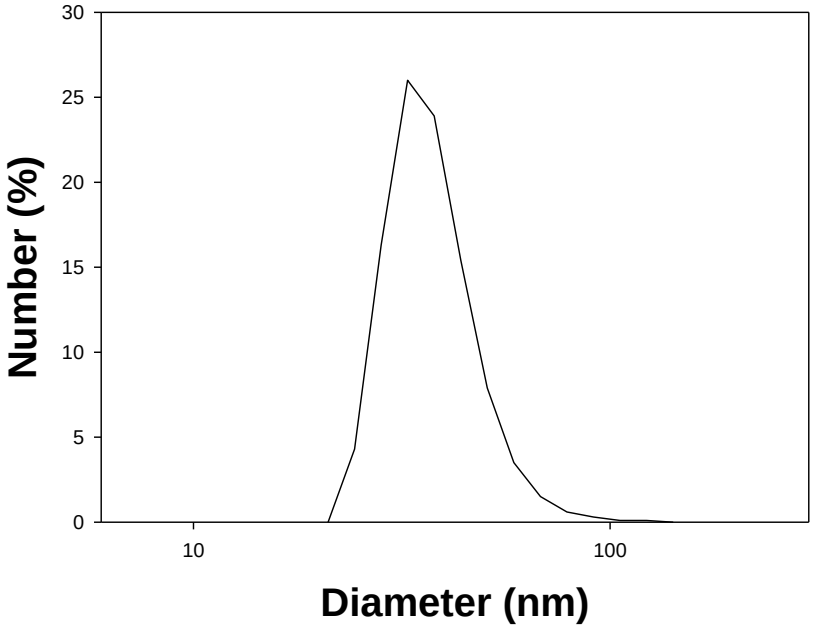

Fig. S6. Size distribution of the F-CLMNPs in water at 37 ^{o}C determined by DLS.

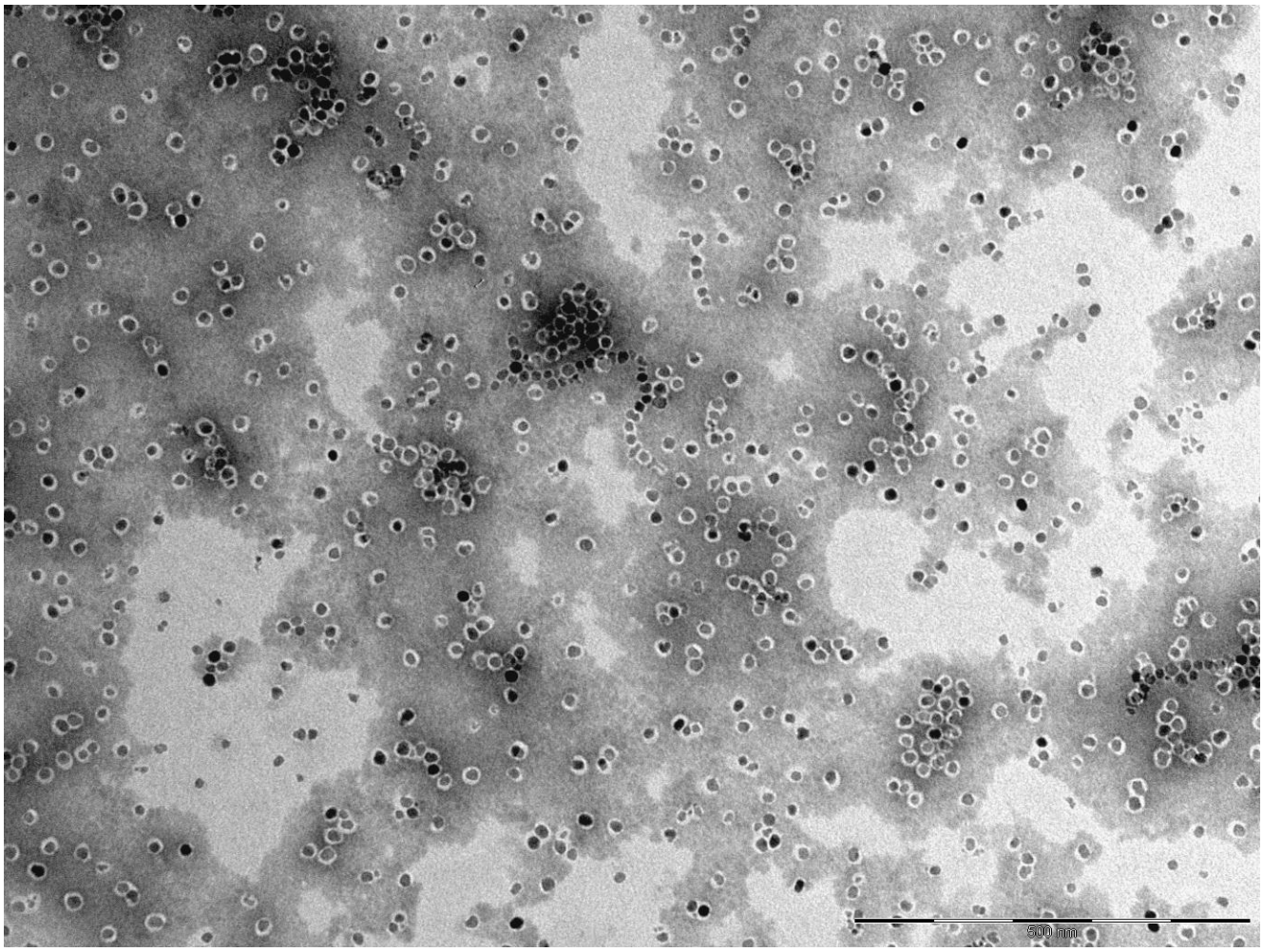

Fig. S7. TEM image of F-CLMNPs in water. Scale bar is 500 nm

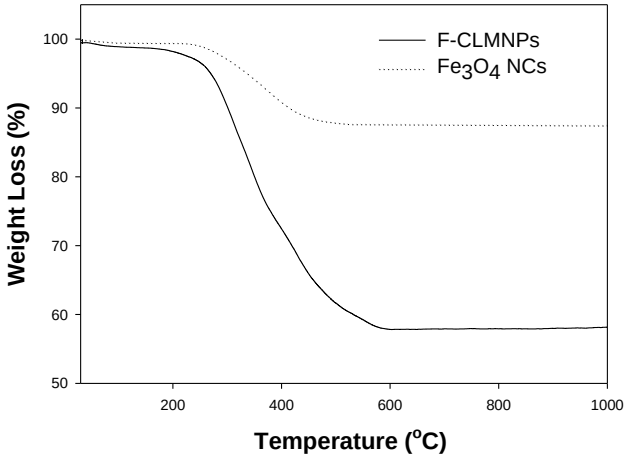

Fig. S8. Thermogravity analysis results of as-synthesized iron oxide nanocrystals and folate-conjugated CLMNPs (F-CLMNPs).

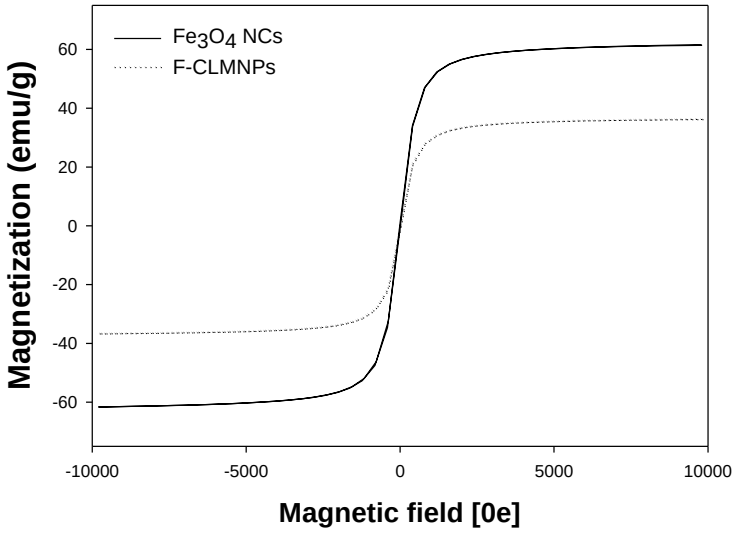

Fig. S9. Magnetization curve of as-synthesized iron oxide nanocrystals and folate conjugated CLMNPs at room temperature (F-CLMNPs).

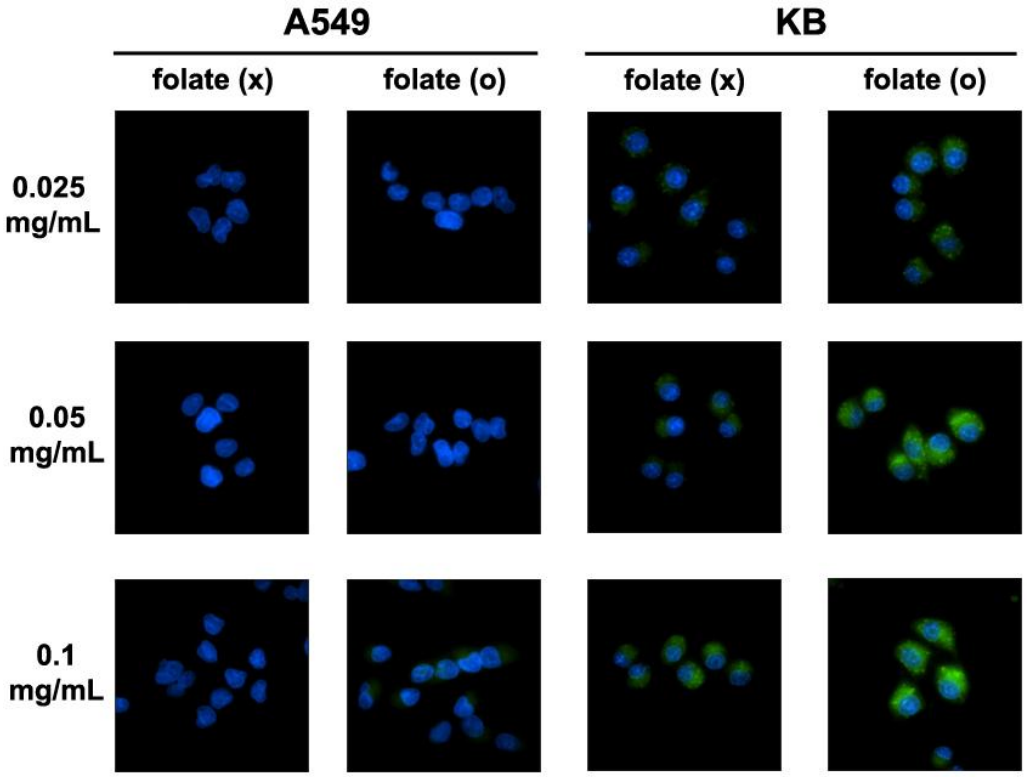

Fig. S10. Fluorescence microscopy images of A549 and KB cells treated with 0.025, 0.05, and 0.1 mg/ml of F-CLMNPs or CLMNPs for 2 h.

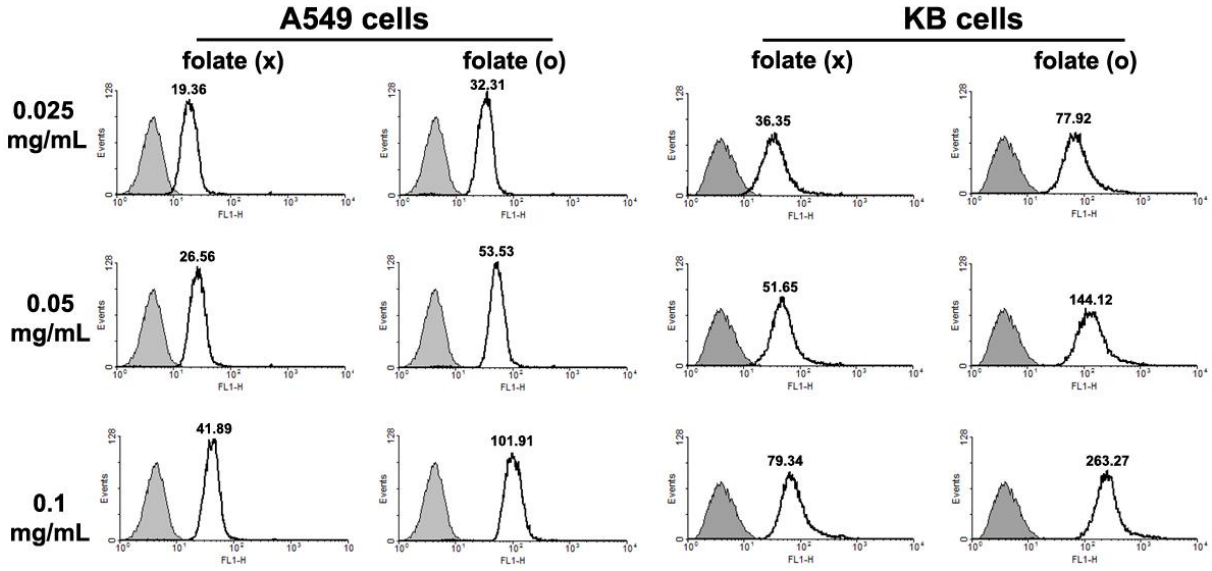

Fig. 11. Flow cytometry results of A549 and KB cells treated with 0.025, 0.05, and 0.1 mg/ml of F-CLMNPs and CLMNPs. Gray histograms represent control cells, value in the top middle part of each panel represents the mean fluorescence intensity (MFI) of nanoparticle treated cells.

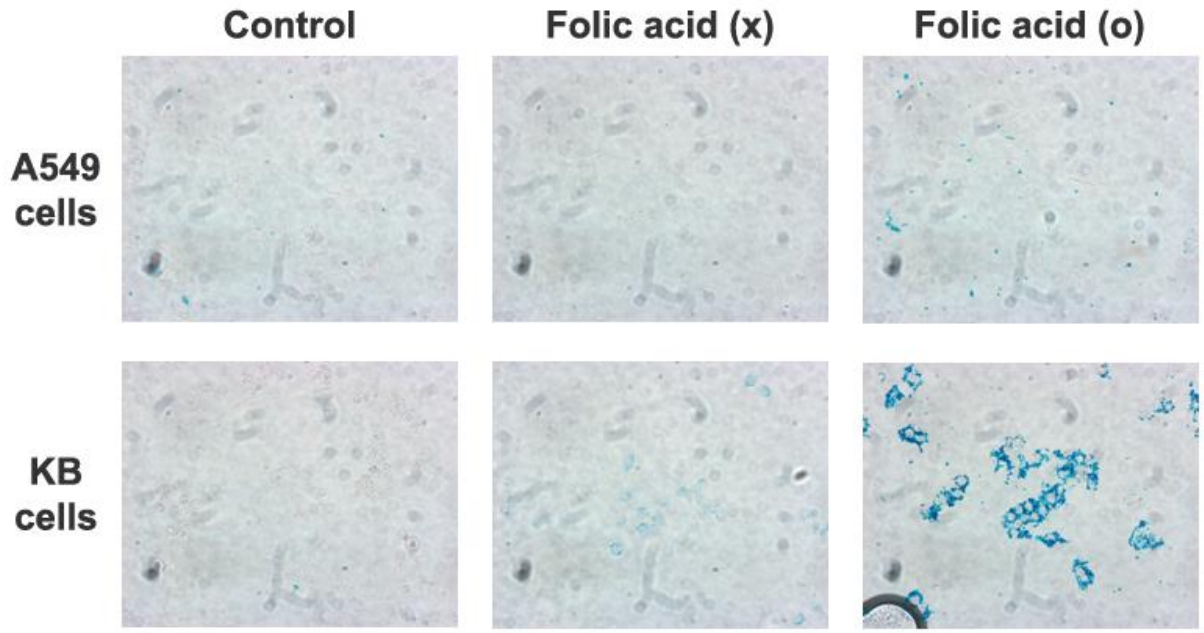

Fig. S12. Prussian blue staining of A549 and KB cells treated with 0.2 mg/mL of F-CLMNPs and CLMNPs.

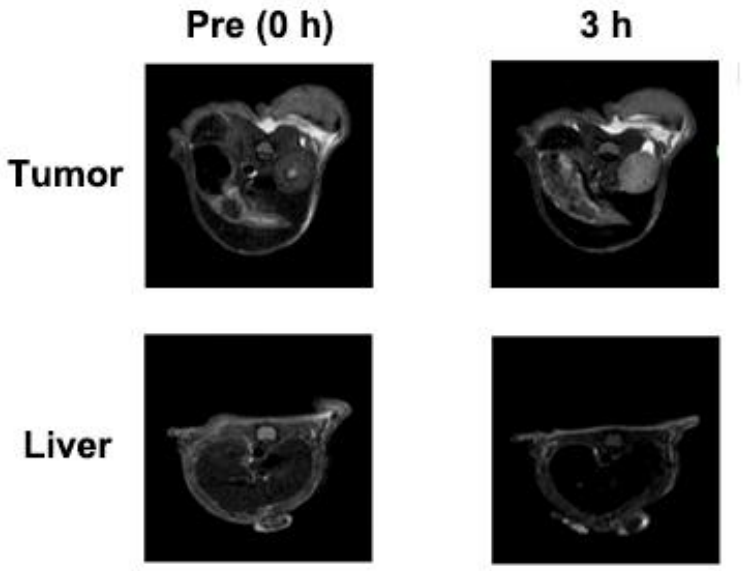

Fig. S13. In vivo T_2-weighted MR images taken at 0 h and 3 h postinjection of CLMNPs to a mouse bearing KB tumor on its back.