Supporting Information

Dual-imaging Enabled Cancer-targeting Nanoparticles

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Surface Modification of MNPs with APTMS or VTMS: MNPs (10 nm diameter) were dispersed in a mixture of water and ethanol (1:99) (Fisher, NJ) by sonication at 50 W. Acetic acid (3 ml, EM Science, NJ) was added after 10 minutes and sonication was continued for another 10 minutes. APTMS or VTMS (0.49 ml) was then added, and the reaction was stirred vigorously for 24 hours at room temperature. The surface modified MNPs were washed thrice with the mixture of water and ethanol (1:99).

Iron Assay: Standard concentrations of bare MNPs (to generate standard curve) and samples of polymer-coated MNPs were incubated in hydrochloric acid (30% v/v, EMD Chemicals Inc, NJ) at 55°C for two hours on an orbital shaker. Ammonium per-sulfate (50 µg) was then added and shaking was continued for 15 minutes, followed by the addition of potassium thiocyanate (50 µl, 0.1 M) and 15 additional minutes of shaking. The samples were then read for absorption at 520 nm using UV-Vis spectrophotometer (Tecan Ltd, NC).

MRI Parameters: MR images were obtained using a Varian unity INOVA 4.7T 40 cm horizontal MR system equipped with actively shielded gradients (Varian, CA) (205 mm with 22 G cm^{-1}). The sample was put into a 35 mm volume radiofrequency coil. Multislice T2-weighted images (TR = 2000 msec; TE = 15 msec; field of view of 30 mm × 30 mm; matrix = 128 × 128; slice thickness = 2 mm) were acquired with spin echo pulse sequence. The MR images were then analyzed in Matlab (Mathworks

Inc., Natick, MA) and percentage drops in the MR signal intensities of the T2-weighted images of samples, compared to that of control, were calculated.

Specimen Preparation for TEM of Cellular Uptake of Nanoparticles: Procedure of cellular uptake of nanoparticles was followed till the incubation of nanoparticles with cell. Later, media containing nanoparticles was removed and cells were washed with PBS. Cells were fixed with 2.5% glutaraldehyde in 0.1 M cacodylate buffer and then cells were removed with a scraper. The cells were gently centrifuged to form a pellet which was then resuspended in a fresh fixative for a minimum of 60 minutes. Cells were gently pelleted, resuspended in 0.1 M cacodylate buffer, again pelleted, and enrobed in low-melt agarose. The cell pellets were then placed in 1% osmium tetroxide in 0.1 M cacodylate buffer for 60 minutes at room temperature. Following water washes, the cell pellets were placed in 2% aqueous uranyl acetate overnight at 4°C. Cells were dehydrated through a graded series of ethanols and a transitional fluid, propylene oxide. Cell pellets were then placed in a 2:1 mixture of propylene oxide:EMbed-812 epoxy resin on a rotator at room temperature for 1 hour. Then, the cell pellets were placed in 1:2 mixture of propylene oxide:EMbed-812 while rotating overnight. Cells were changed into fresh EMbed-812 at least twice during day with rotation. Finally, the cells were embedded, using fresh EMbed-812, in labeled embedding molds and polymerized in a 70°C oven overnight.

Table S1. Physical and surface properties of DICT-NPs

Sample	Nanoparticle Diameter (nm)	Polydispersity Index	Zeta Potential (mV)
MNPs	10[a)]	0.30[c)]	-5.13[c)]
Silane-MNPs	18[b)]	0.28[c)]	-21.00[c)]
Amine-MNPs	17[b)]	0.26[c)]	-21.23[c)]
WBPLP-MNPs	238[c)], 236[d)], 113[e)]	0.21[c)], 0.22[d)], 0.19[e)]	-25.85[c)], -16.19[d)]
BPLP-MNPs	235[c)], 229[d)], 107[e)]	0.15[c)], 0.25[d)], 0.14[e)]	-31.32[c)], -12.09[d)]

[a)]Size provided by the supplier, [b)]Size obtained from TEM analysis (images not shown), [c)]Measurements in DI water, [d)]Measurements in cell culture media containing 10% serum, and [e)]Measurements after filtering nanoparticles (0.2 micron filter) in cell culture media containing 10% serum

Table S2. Iron content and magnetic characterization of DICT-NPs

Sample	Iron Content (%)	Saturation Magnetization (emu/g or M_s)	Remanence (M_r/M_s)	Coercivity (Oe or H_c)
MNPs	100	57.88	6.73	65.23
WBPLP-MNPs	75	51.42	5.14	50.59
BPLP-MNPs	80	52.04	5.77	59.72

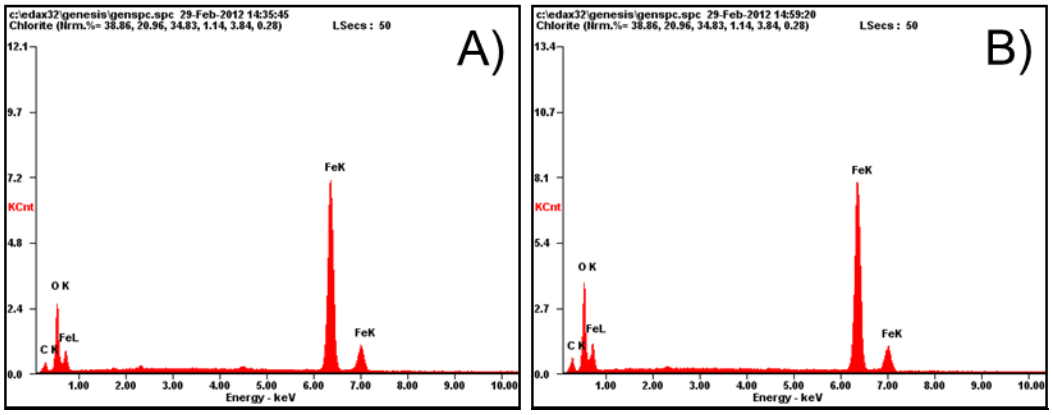

Figure S1. EDS spectrum of (A) WBPLP-MNPs and (B) BPLP-MNPs showing peaks associated to major elements like Fe, O, and C.

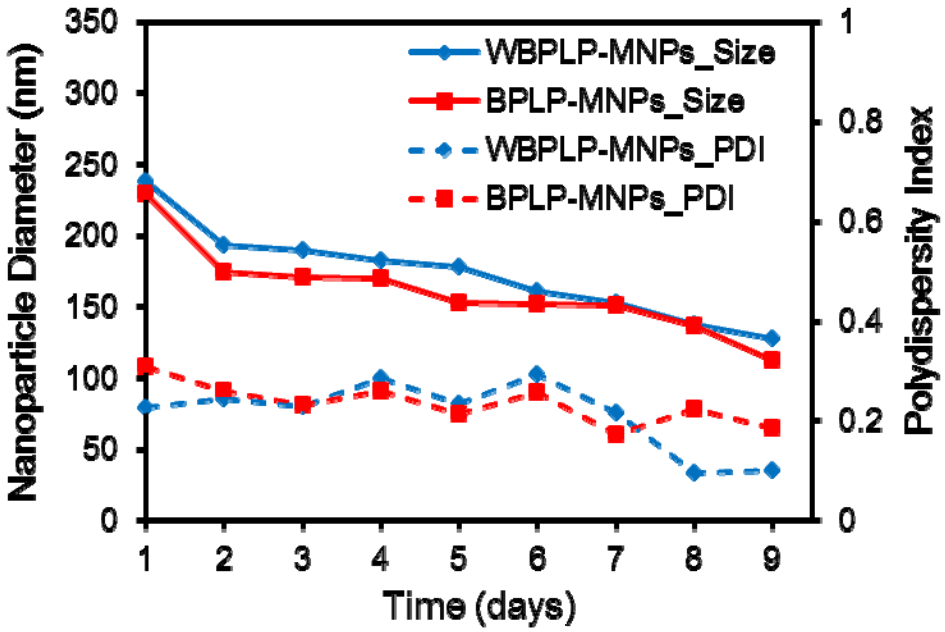

Figure S2. Stability of nanoparticles. Hydrodynamic diameters and polydispersity indices, measured over a period of nine days in cell culture media containing 10% serum, show WBPLP-MNPs and BPLP-MNPs were stable and did not formed aggregates.