Supplementary Information

1. Coomassie blue assay: quantitative analysis of Herceptin on Her-Dye@MSN

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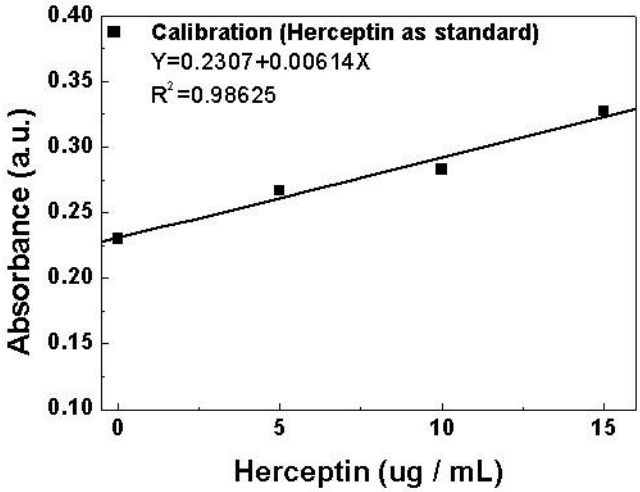

Figure S1. The calibration curve of Herceptin by coomassie blue assay

Table S1. Quantitative analysis of Hrecaptin on Her-Dye@MSN

	Her-Dye@MSN-1	Her-Dye@MSN-4	Her-Dye@MSN-10
Herceptin amount (ug) on 1 mg Dye@MSN-SH	670 ug	250 ug	100 ug

2. Western blot analysis: quantitative analysis of Her2/neu in NIH3T3, MCF-7 and BT-474 cell lysates

NIH3T3, MCF-7 and BT-474 were lysed in RIPA buffer (50 mM Tris-HCl, 150 mM NaCl, 1 % NP-40, 0.5 % Sodium deoxycholate, 0.1 % SDS, 2 mM EDTA, 1 mM PMSF, 10 ug/mL Leupeptin, 10 ug/mL Pepstatin A, 10 ug/mL Aprotinin) at 4℃. After centrifugation at 10,000 g for 5 min, the supernatant was transferred to a new tube. The protein concentrations were measured by protein assay kit (Bio-Rad, US). 50 μg proteins were loaded for eletrophoresis and then the gels were transferred to a PVDF membrane. Membrane was blocked in 5 % non-fat milk and incubated with anti-Her2 antibodies at 4℃ overnight. Before and after incubation with HRP-labeled secondary antibodies, the membrane was washed with PBS three times. Images were taken by UVP system with luminescence.

Figure S2. Western blot of Her2/neu quantitative analysis in NIH3T3, MCF-7 and BT-474 cell lysates.

3. Cell uptake of mesoporous silica nanoparticles modified with PEG (MW=500)

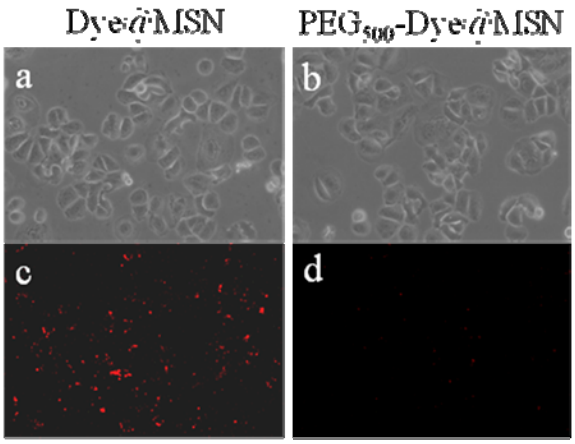

Figure S3. RITC with red fluorescence were used for synthesis of Dye@MSN and PEG_{500}-Dye@MSN. Both nanoparticles were incubated with AU565 cells in serum free medium (DMEM) for 1h. a) and c) were the optical and fluorescence images after AU565 treated with Dye@MSN, and b) and d) treated with PEG_{500}-Dye@MSN.

4. Confocal microscope study

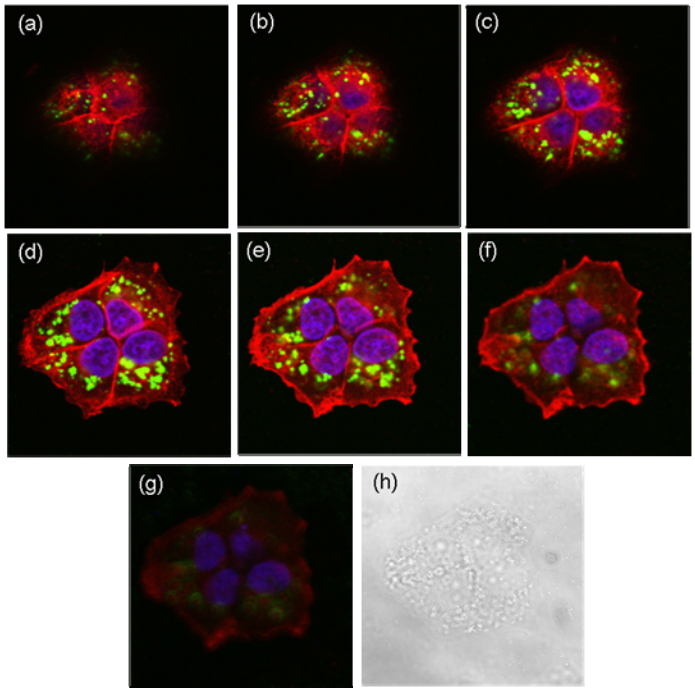

Figure S4. Confocal images of BT-474 incubated with Her-Dye@MSN-1 for 24 h. a) to g) are the horizontal sections of BT-474 from top to bottom, h) The DIC image of BT-474. Green: Her-Dye@MSN-1; red: rhodamine phalloidin stain on actin cytoskeleton; blue: DAPI stain on nucleus

5. Time course study of the targeting of Her-Dye@MSN-1

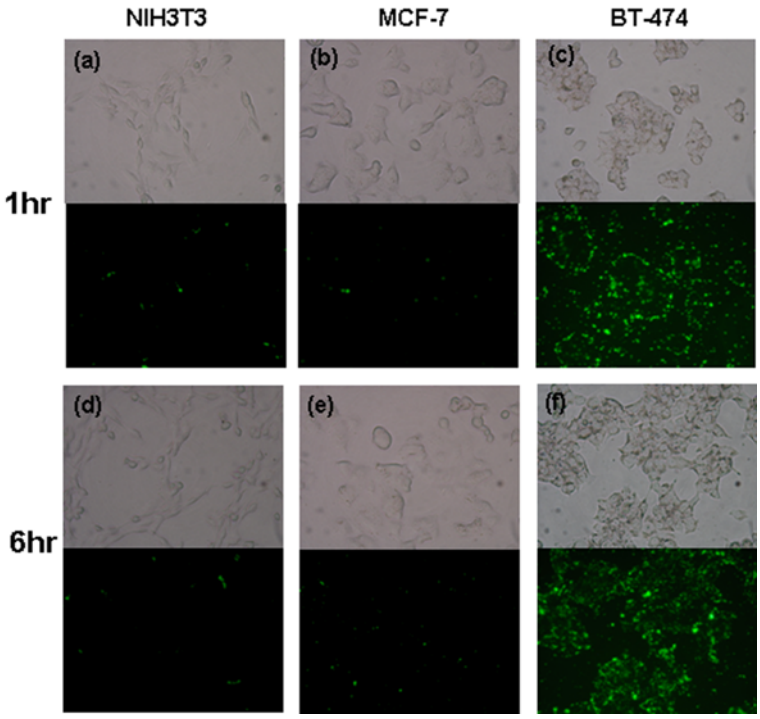

Figure S5. Optical images (top: phase contrast, bottom: fluorescence) of NIH3T3 (a and d), MCF-7 (b and e) and BT-474 (c and f) incubated with Her-Dye@MSN-1 for 1 h (a-c) and 6 h (d-f).

6. Competition for Her2/neu by free Herceptin and Her-Dye@MSN-1

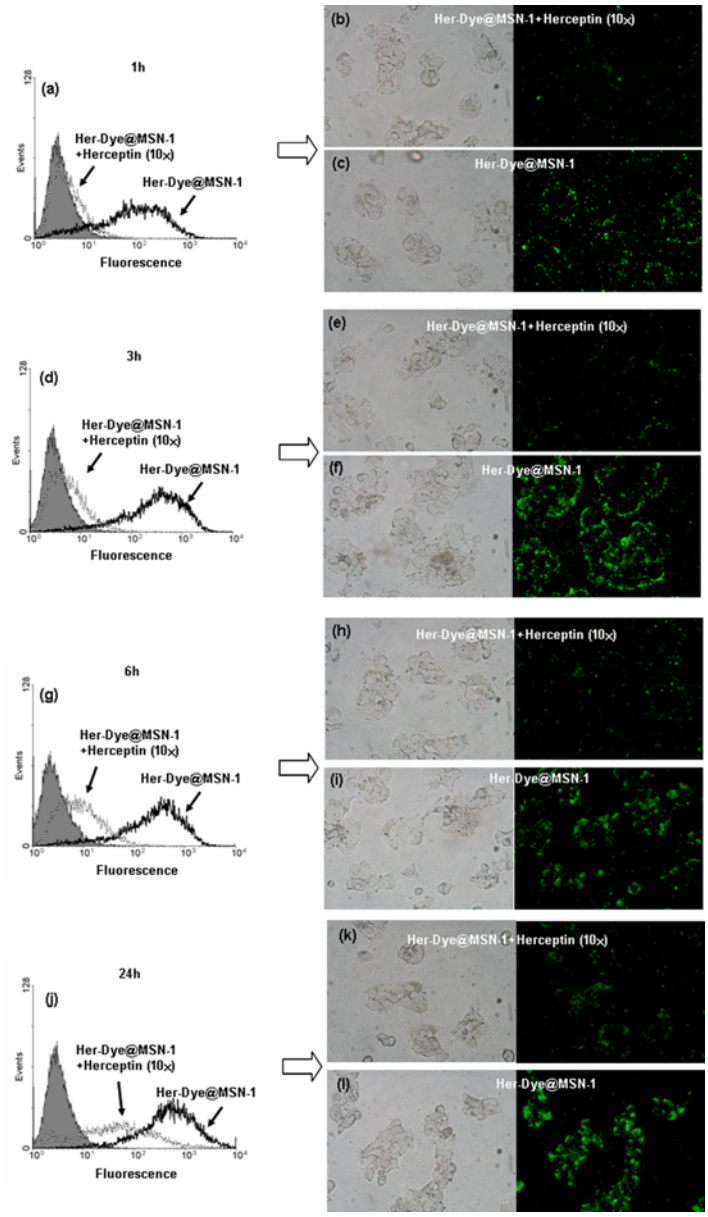

Figure S6. The flow cytometry and optical images of Herceptin and Her-Dye@MSN-1 competing to target BT-474. The black and dash lines are Her-Dye@MSN-1 only and Her-Dye@MSN-1 mixied with Herceptin (10X), respectively.

7. Energy Dispersive Spectroscopy (EDS) results

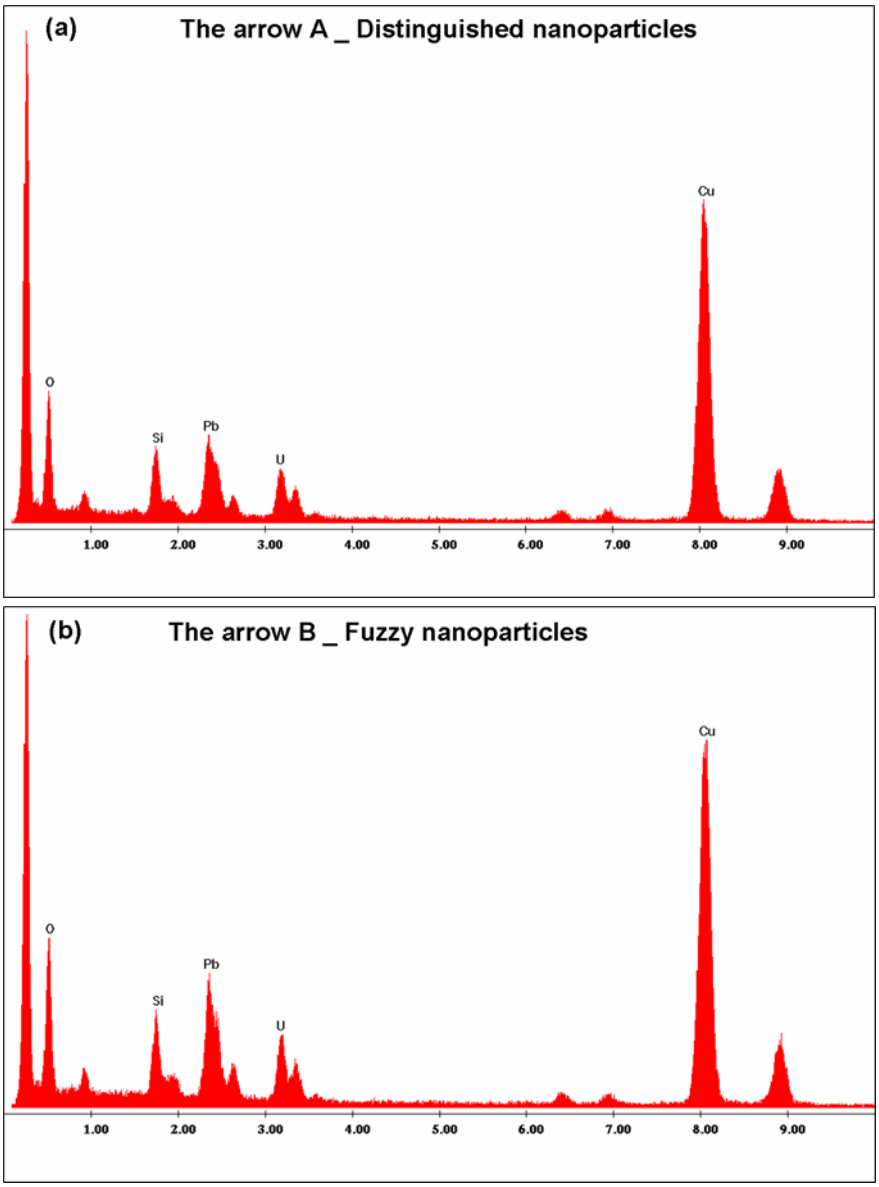

Figure S7. The EDS analyses of Si element in Her-Dye@MSN-1 treated BT-474.

The positions for analyses are at a) arrow A and b) arrow B in Figure 5.