# Supporting Information

# Multifunctional $Fe_3O_4$@Polydopamine Core-Shell Nanocomposites for Intracellular mRNA Detection and Imaging-Guided Photothermal Therapy

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**Table S1.** The sequences employed in this work.

| Name | Sequence |
|---|---|
| FAM-hpDNA | 5’-CCGGGTTTGGTGAAGCTAACGTTGAGGACCCGG-FAM-3’ |
| c-myc target | 5’-CCUCAACGUUAGCUUCACCAA-3’ |
| non-complementary target | 5’-CAAGGAGCUGGAAGGCUGGGA-3’ |
| Cy3-hpDNA | 5’-CCGGGTGCGAGTGTCTTTGGCATACTTACCCGG-Cy3-3’ |

Underline denotes base pairs in the stem.

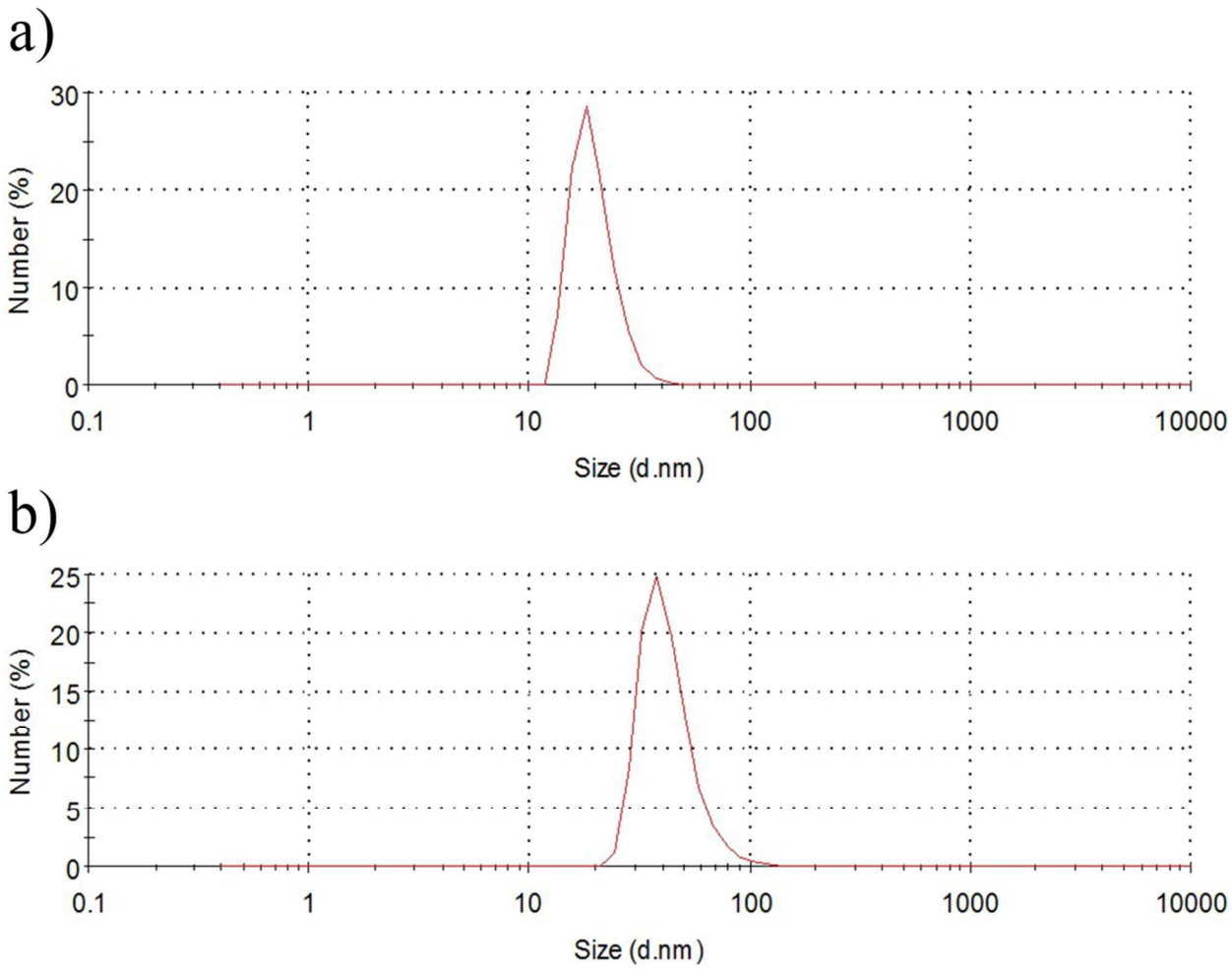


**Figure S1.** Dynamic light scattering (DLS) data of (a) $Fe_3O_4$ NPs and (b) $Fe_3O_4$@PDA NCs in water.

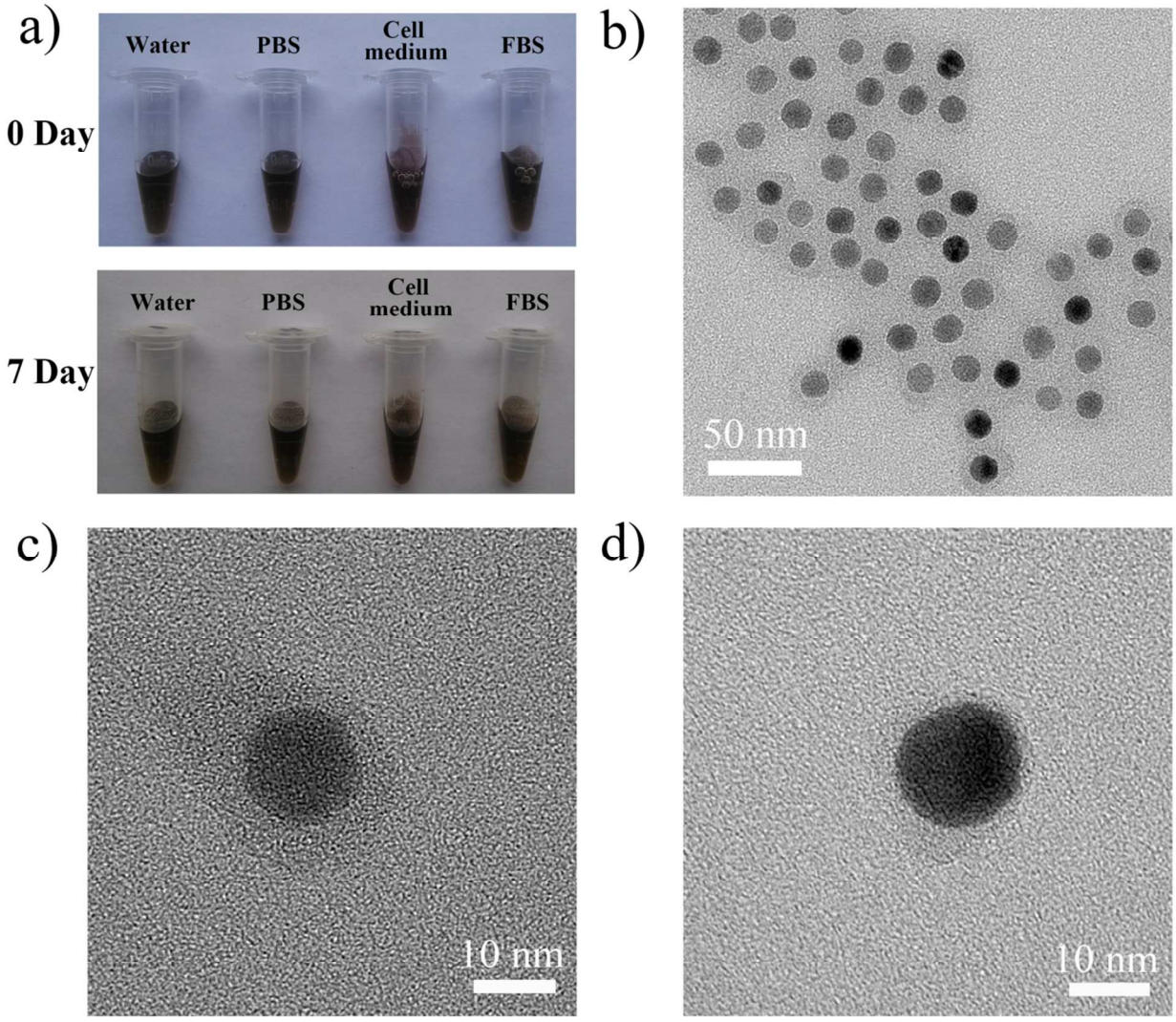


**Figure S2.** (a) Photos of $Fe_3O_4$@PDA NCs in different solutions including water, PBS, RPMI-1640 with 10% fetal bovine serum (FBS) cell culture medium, and FBS. The $Fe_3O_4$@PDA NCs were stable in those solutions for at least one week without showing obvious aggregation. (b,c,d) TEM images of the $Fe_3O_4$@PDA NCs prepared with different polymerization time: 4 h (b,c) and 1 h (d).

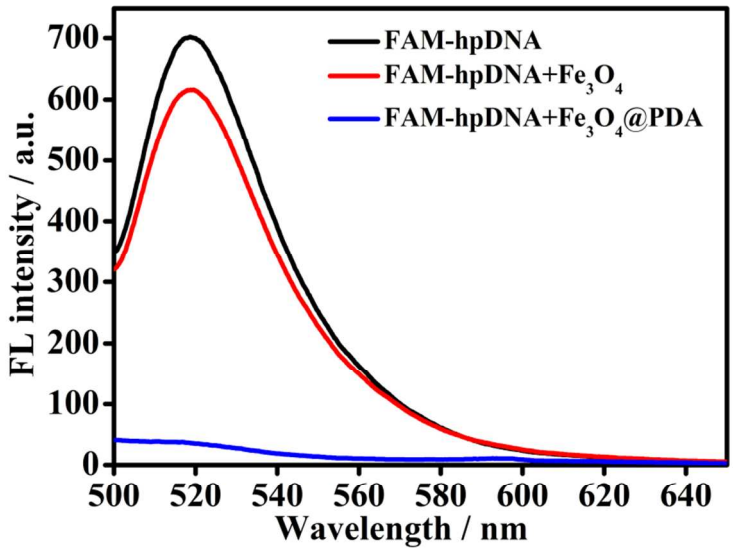


**Figure S3.** Fluorescence quenching of 50 nM FAM-hpDNA in the presence of $Fe_3O_4$ NPs or $Fe_3O_4$@PDA NCs. Excitation: 480 nm, emission: 520 nm.

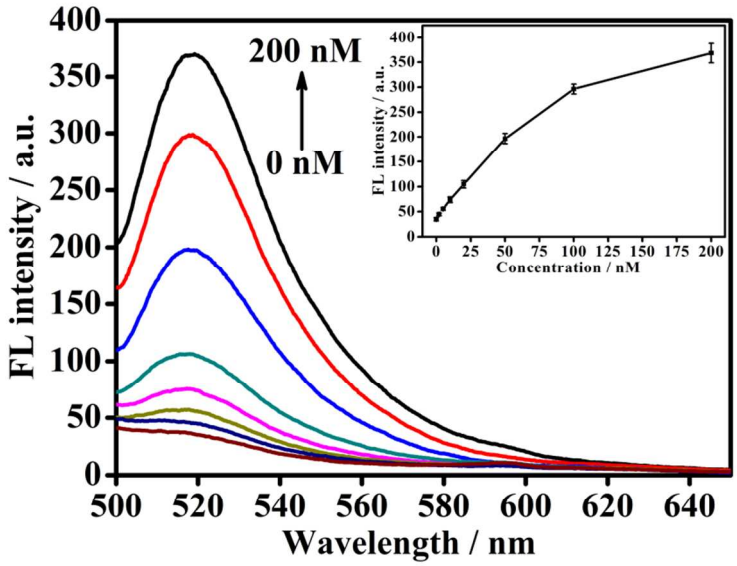


**Figure S4.** Fluorescence emission spectra of $Fe_3O_4$@PDA-DNA nanoprobe treated with various concentrations of RNA target (0, 2, 5, 10, 20, 50, 100 and 200 nM). Excitation: 480 nm, emission: 520 nm.

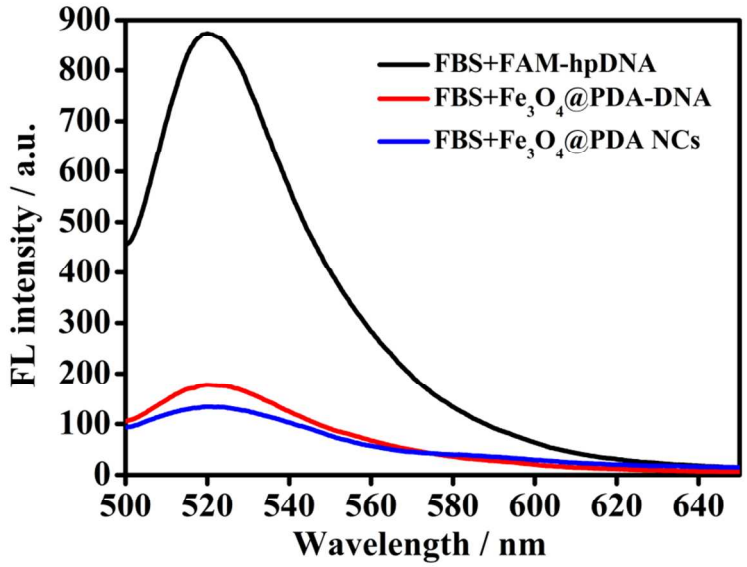


**Figure S5.** Fluorescence emission spectra of 50 nM FAM-hpDNA or $Fe_3O_4$@PDA-DNA nanoprobe (containing 50 nM FAM-hpDNA) dispersed in FBS. Excitation: 480 nm, emission: 520 nm.

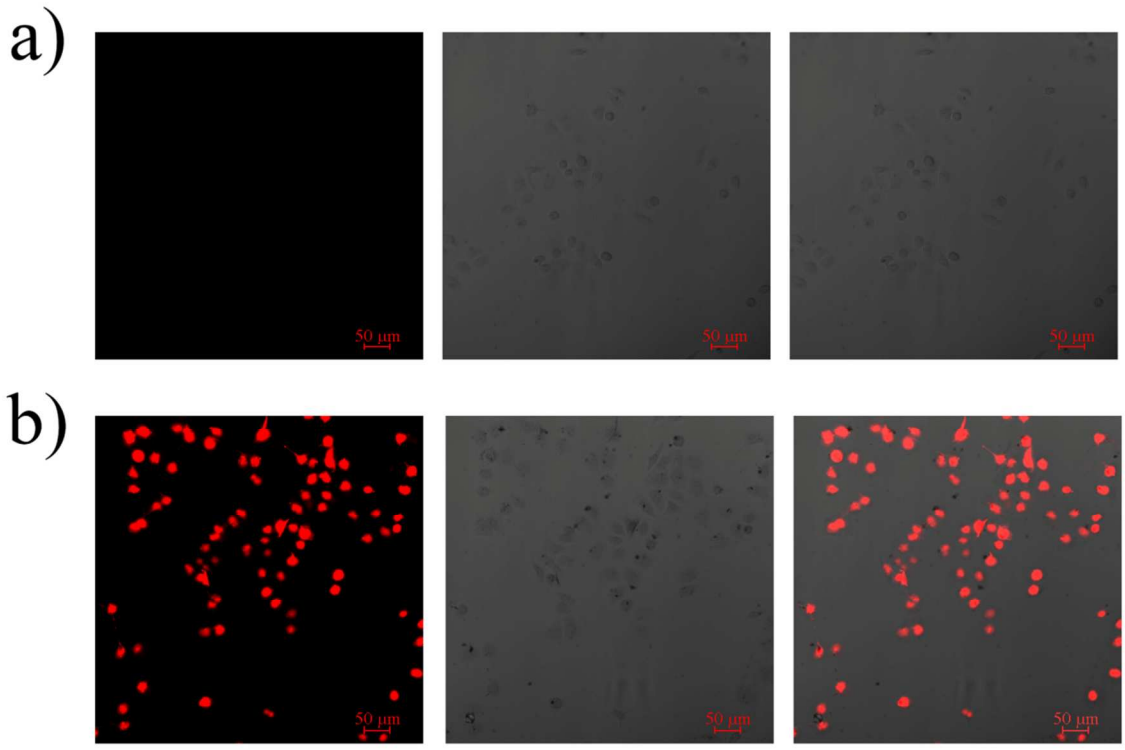


**Figure S6.** Propidium iodide (PI) stained CLSM images of MCF-7 cells incubated with 0.1 mg $mL^{-1}$ $Fe_3O_4$ NPs (a) or $Fe_3O_4$@PDA NCs (b) after laser irradiation for 5 min. Left panels are PI fluorescence corresponding to dead cells, center panels are bright field image of cells, and right panels are the overlay of PI fluorescence and the bright field image. Scale bars are 50 µm.

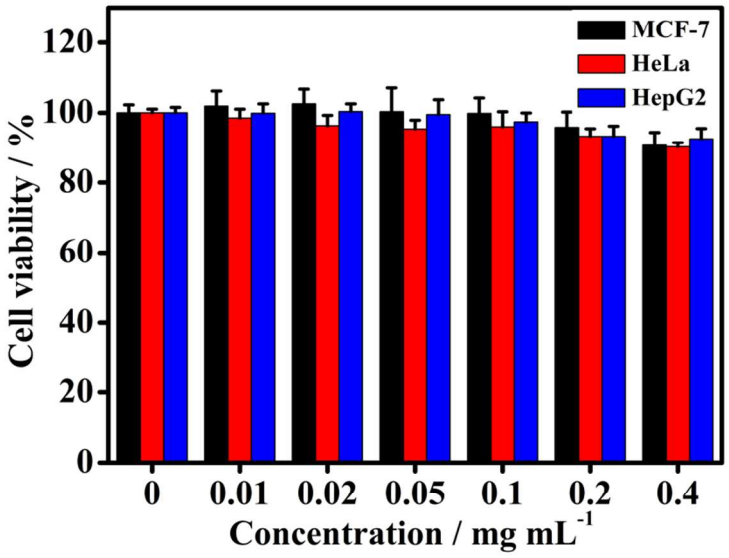


**Figure S7.** Cell viability of MCF-7, HeLa, and HepG2 cells incubated with different concentrations of $Fe_3O_4$@PDA NCs for 24 h.