Supporting Information

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Selective chemotherapy and imaging of colorectal and breast cancer cells by a modified MUC-1 aptamer conjugated to the Poly(ethylene glycol)-dimethacrylate coated Fe_3O_4-AuNCs nanocomposite†

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Characterization of nanocomposite:

FT-IR spectroscopy was employed to confirm the presence of MPS on the surface of AuNCs.

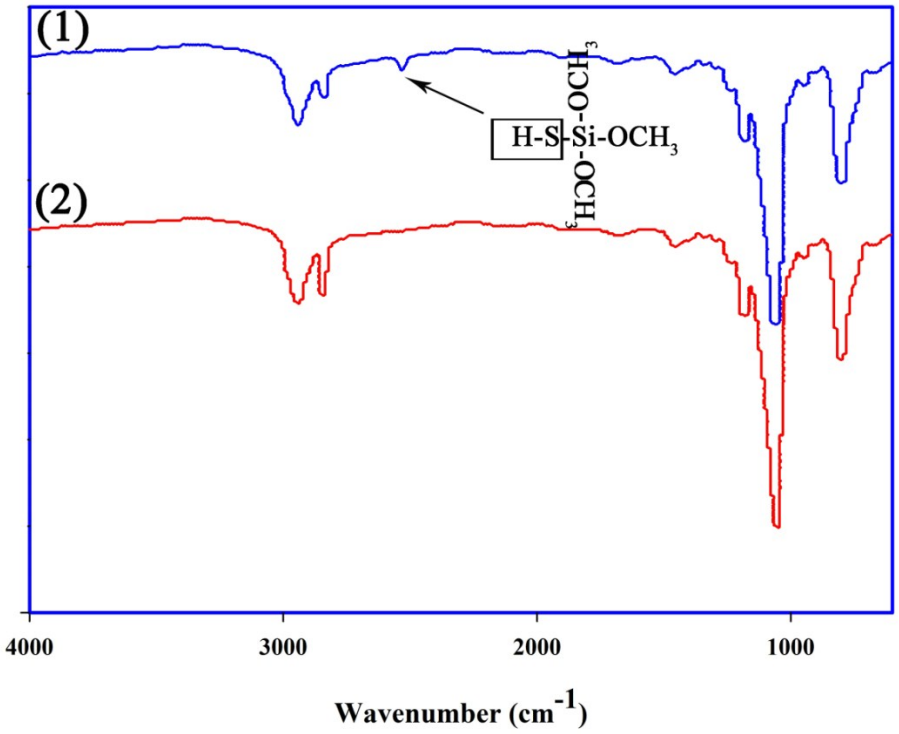

Fig. S1 IR spectra of MPS in the absence (1) and presence (2) of the AuNCs.

The XRD pattern of Fe_3O_4 NPs is adapted with those reported in the literature. In the XRD pattern of the Fe_3O_4@SiO_2, a broad peak from θ = 23.66 to 28.99° can be assigned to the amorphous silica and prove the existence of the silica.

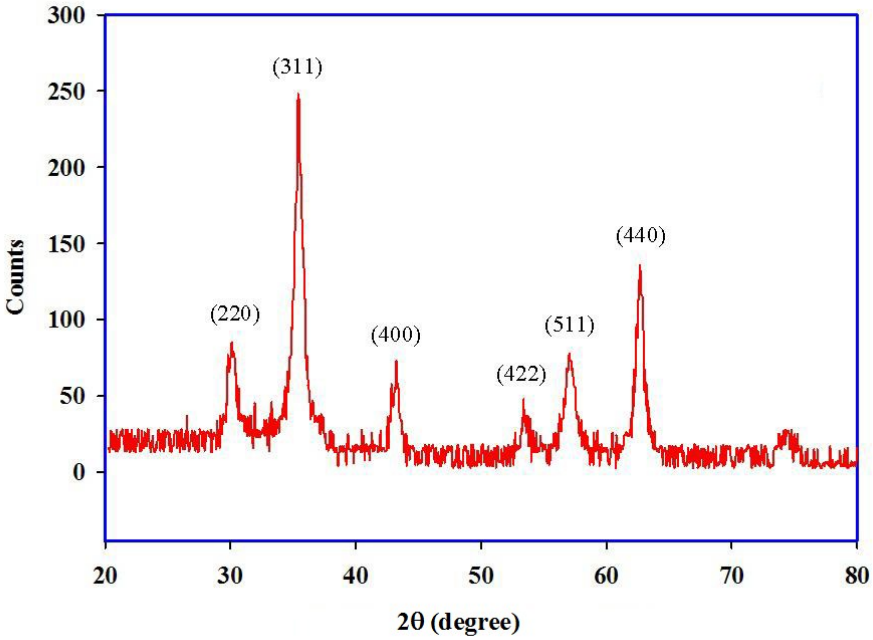

Fig. S2 XRD spectrum of the Fe_3O_4 NPs.

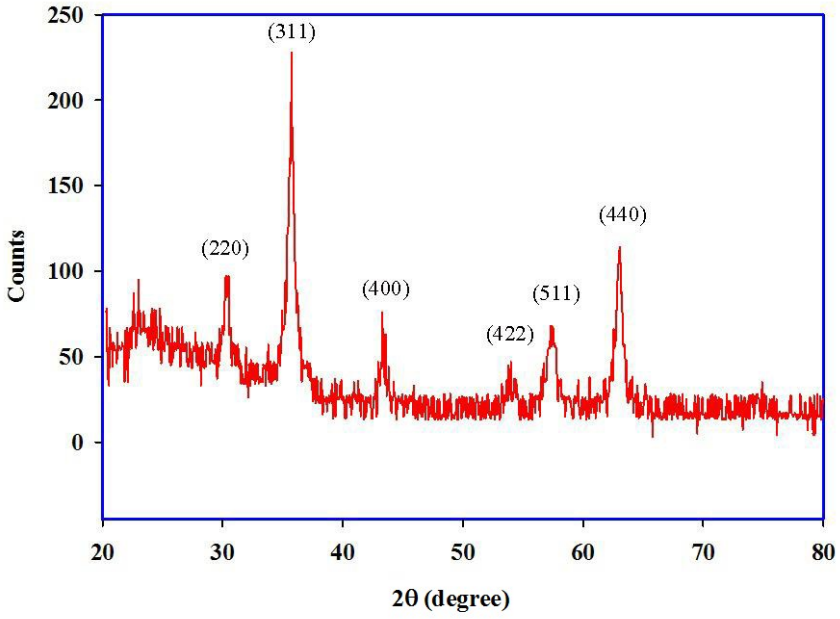

Fig. S3 XRD spectrum of the Fe_3O_4@SiO_2 NPs.

The prepared nanoparticles show high colloidal stability.

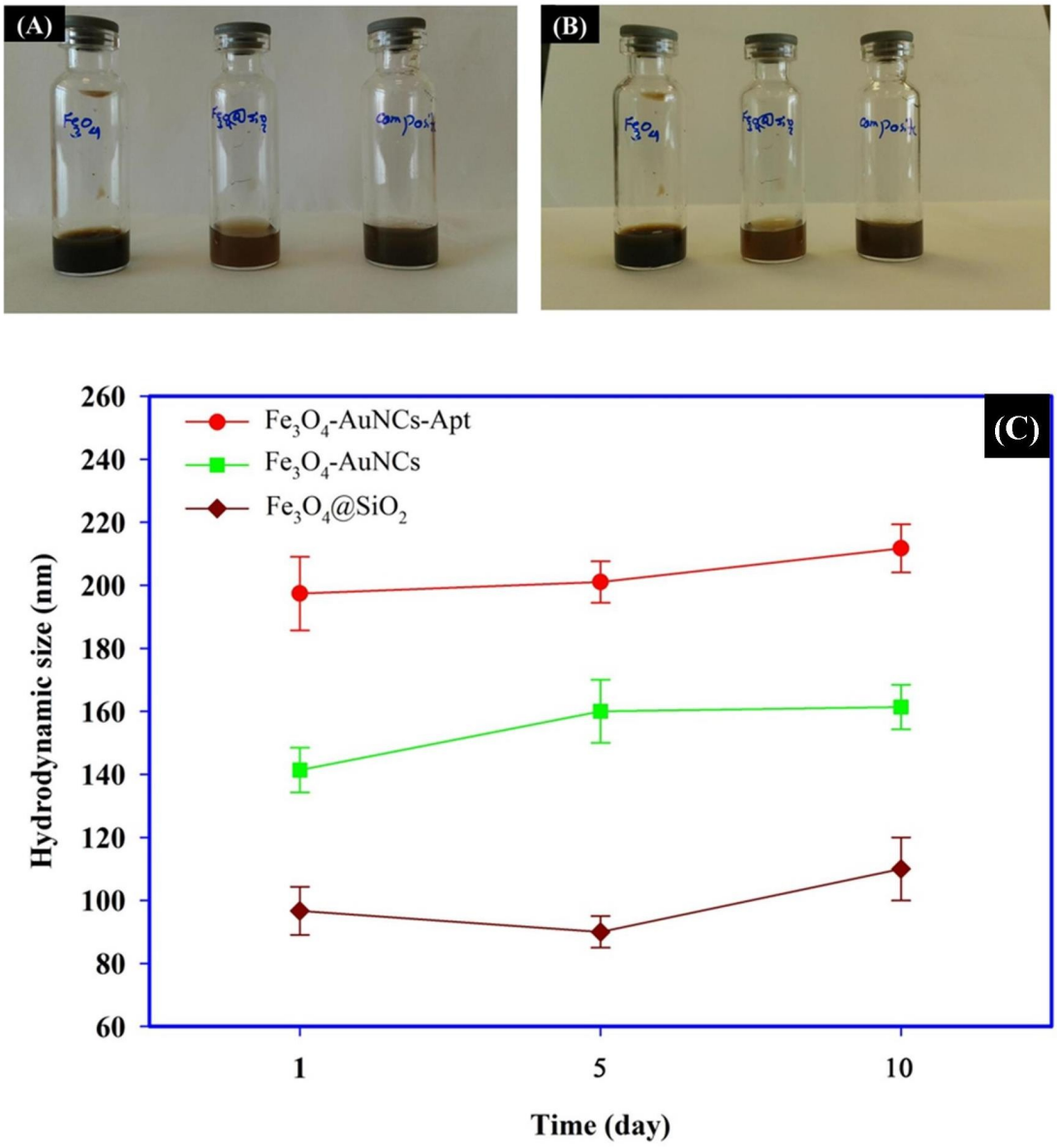

Fig. S4 Photograph of colloidal stability of the freshly prepared nanoparticles (A) and after passing 10 days (B). Hydrodynamic size of the nanoparticles in different storage time periods (C).

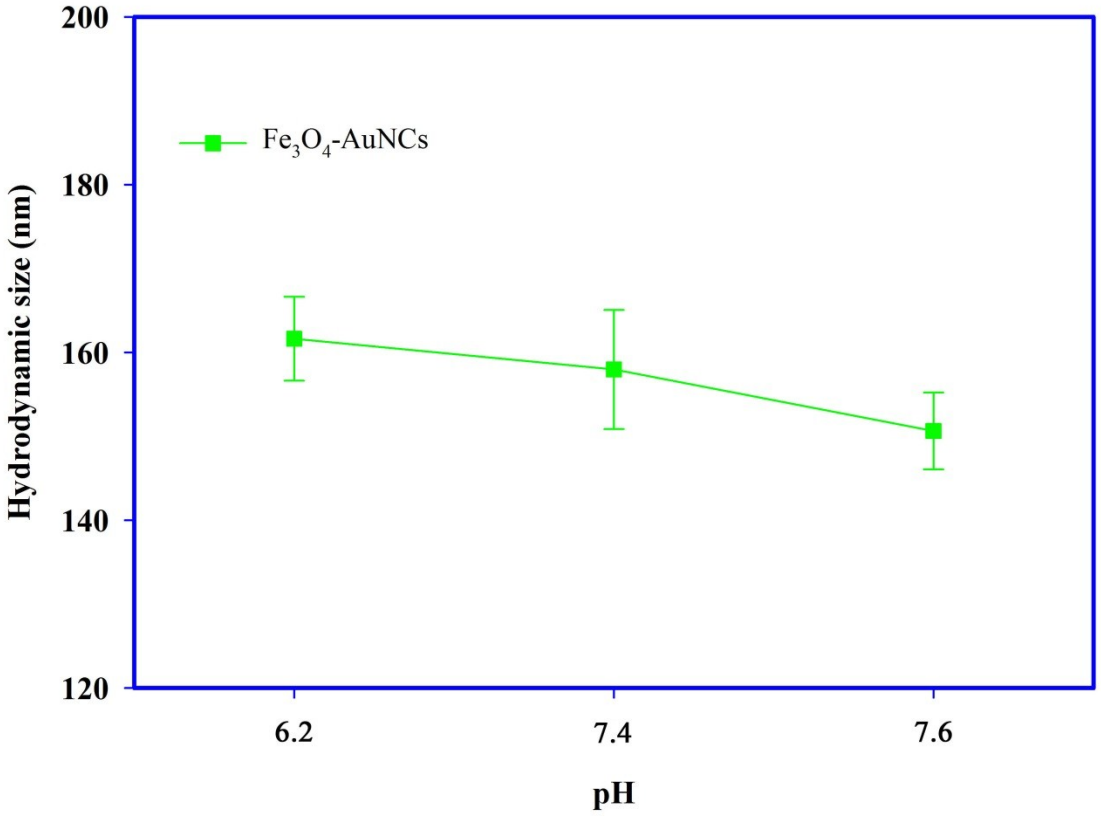

Fig. S5 Hydrodynamic size of the Fe_3O_4-AuNCs at different pH.

The presence of PEGDMA on the surface of the nanocomposite was confirmed by FT-IR spectroscopy.

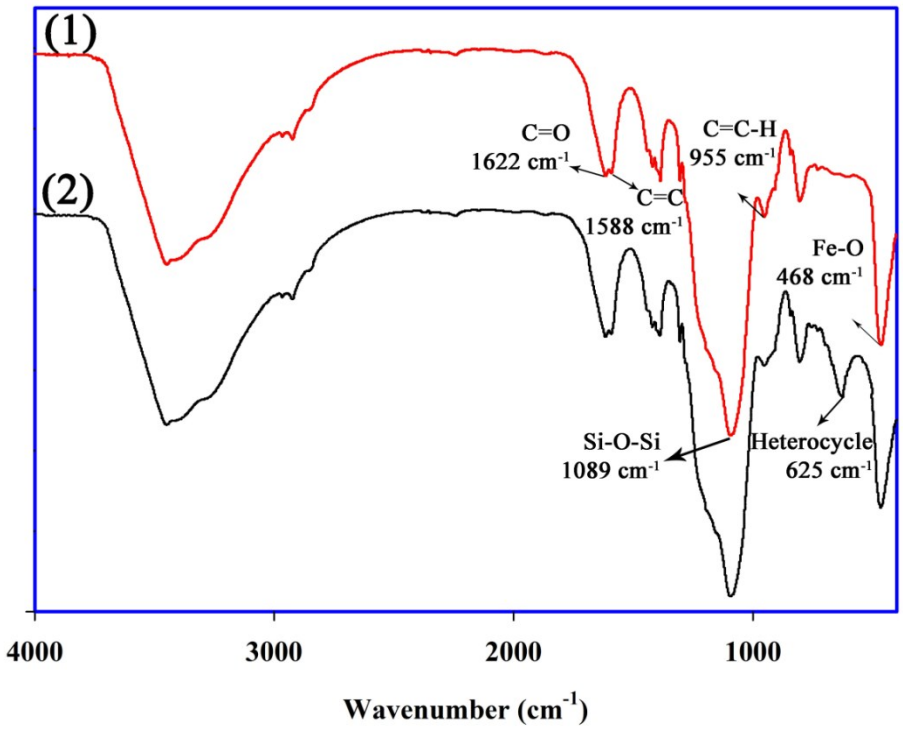

Fig. S6 FT-IR spectra of Fe_3O_4–AuNCs before (1) and after (2) conjugation of MUC-1 aptamer.

Measurement of the Fe_3O_4–AuNCs–Apt nanocomposite uptake

Uptake of the nanocomposite was quantified using ICP-OES. Human breast cancer (MCF-7, MUC-1 positive), human colon cancer (HT-29, MUC-1 positive), and human liver cancer (HepG2, MUC-1 negative) were cultured in DMEM medium supplemented with 10% fetal bovine serum (FBS) and a mixture of penicillin/streptomycin. The cells were grown at 37°C in a humidified atmosphere with 5% of CO_2. Then the cells were seeded in 24-well plates (2×10^4 cells/well) for 24h. Before incubation with the nanocomposite, cells were pre-incubated with the medium for 30 min, followed by incubation with the nanocompostie (60 nM) for 2 h. The cells were washed with PBS^-, trypsinized, centrifuged at 1800 rpm for 7 min and digested in aqua regia (HNO_3 + 3HCl) for ICP-OES analysis

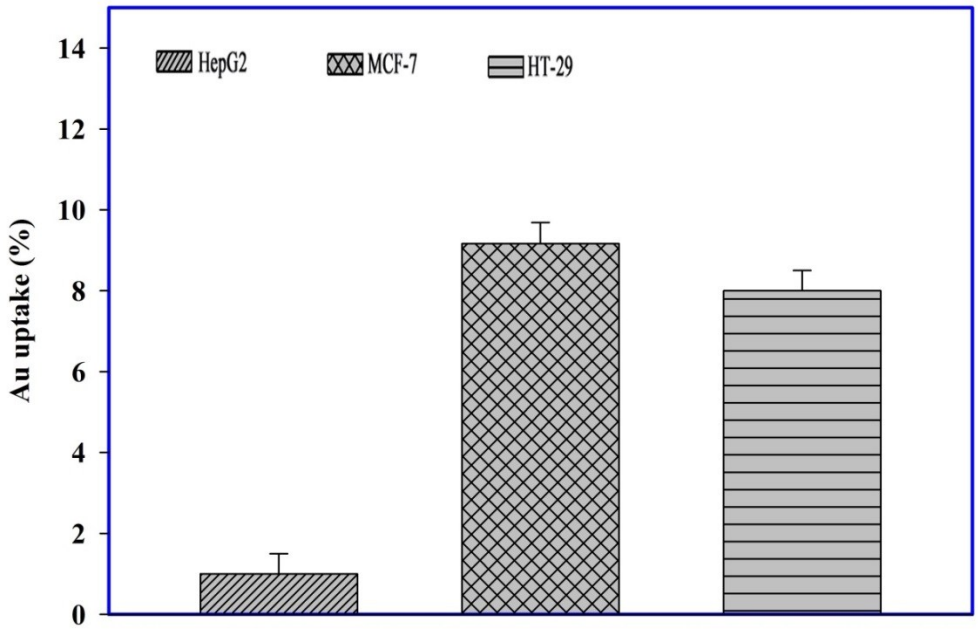

Fig. S7 The amount of Fe_3O_4–AuNCs–Apt taken up by three cell lines measured by ICP-OES and denoted as percentage of Au uptake.

EPI release measurement

The release of EPI from the Fe_3O_4–AuNCs–Apt(EPI) nanocomposite was performed by incubating the nanocomposite in Tris buffer with pH = 7.4. At constant time intervals, the particles were magnetically collected, and the supernatant was decanted for the fluorescence measurement. The fluorescence emission of the supernatant at 588 nm at selected time intervals was used to determine the amount of EPI in supernatant solution.

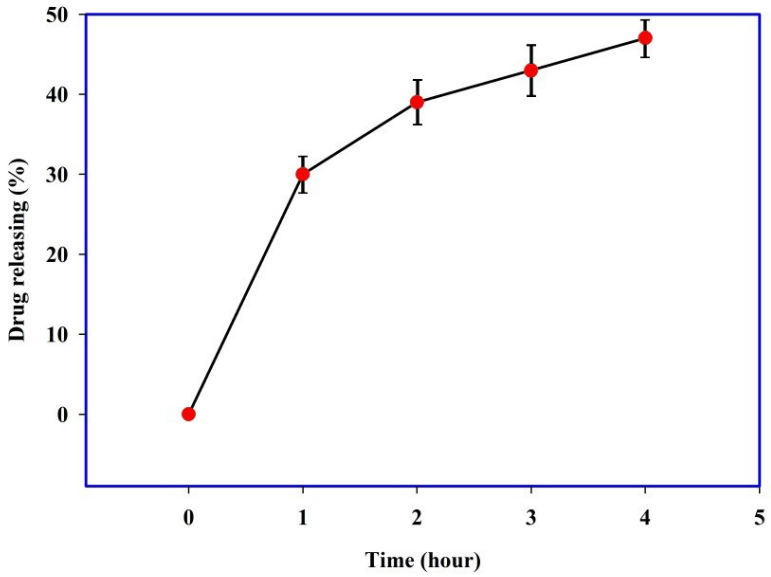

Fig. S8 Profile of EPI releasing from Fe_3O_4–AuNCs–Apt(EPI) nanocomposite depending on time (n = 3).