ADVANCED HEALTHCARE MATERIALS

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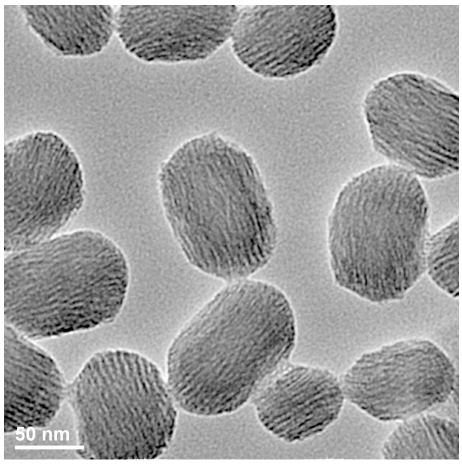

Figure S1. TEM images of the as-synthesized MSN-Pho.

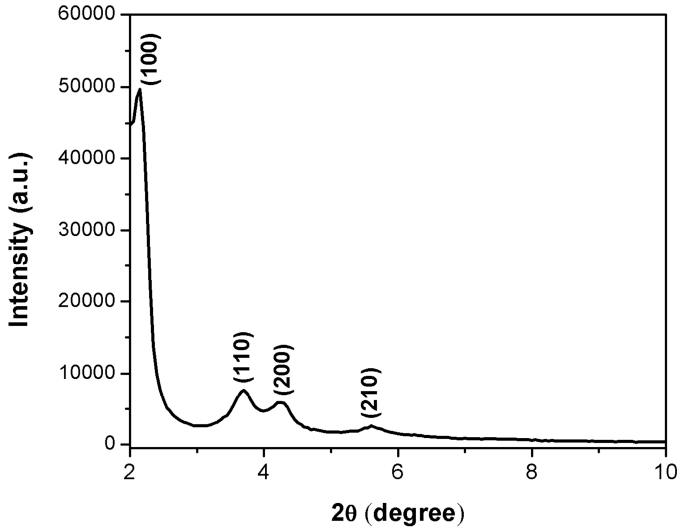

Figure S2. X-ray diffraction pattern of as-synthesized MSN-Pho.

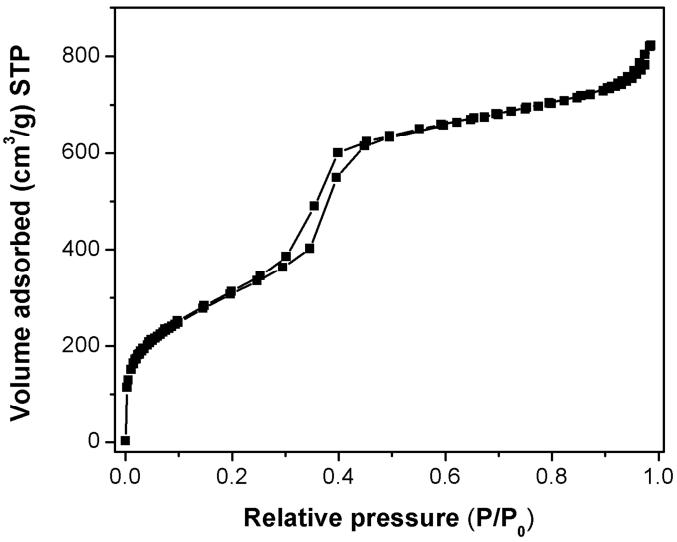

Figure S3. Nitrogen sorption isotherms of MSN-Pho.

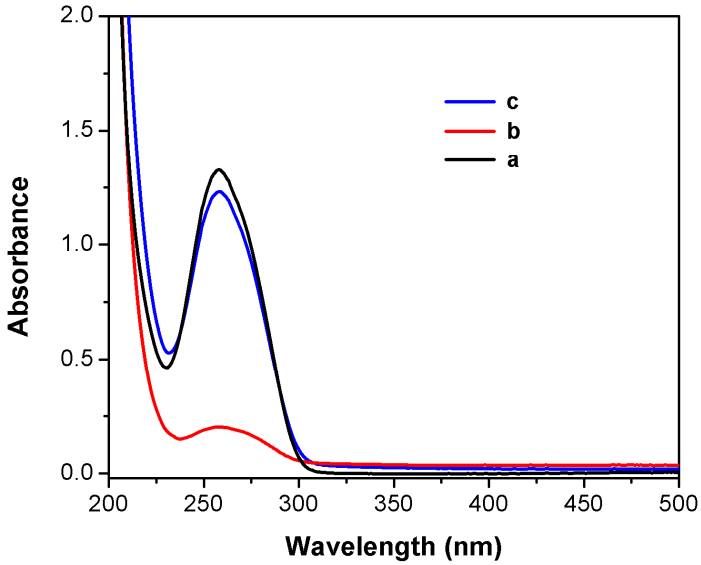

Figure S4. The UV/Vis spectrum of the DNA aptamer solution (a) before reaction, (b) after cleavage by TCEP and then react with maleimide-functionalized MSNs, and (c) after reaction with maleimide-functionalized MSNs (without cleavage by TCEP). The data shows that cleavage of DNA aptamer by TCEP to obtain free sulfhydryl groups is a key for modification of maleimide-functionalized MSNs through the sulfhydryl-maleimide coupling reaction, which further confirm that the aptamer is attached to the MSNs through covalent bond but not via electrostatic interactions.

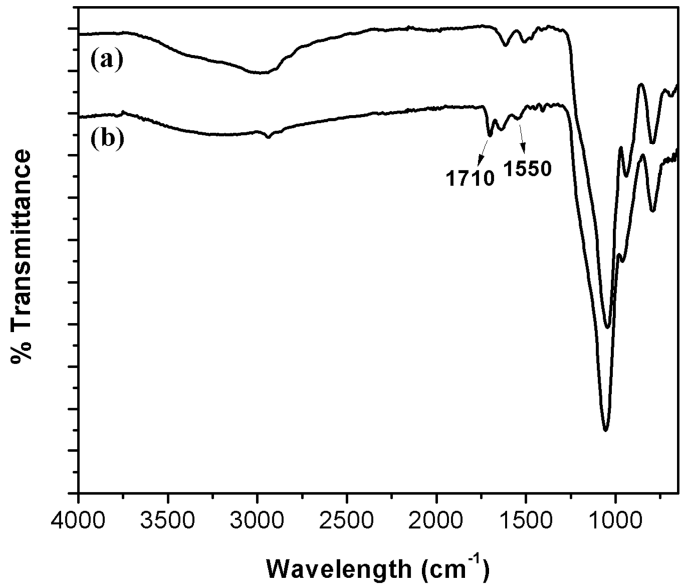

Figure S5. FTIR spectra of the samples (a) MSN-Pho and (b) MSN-Pho-Apt.

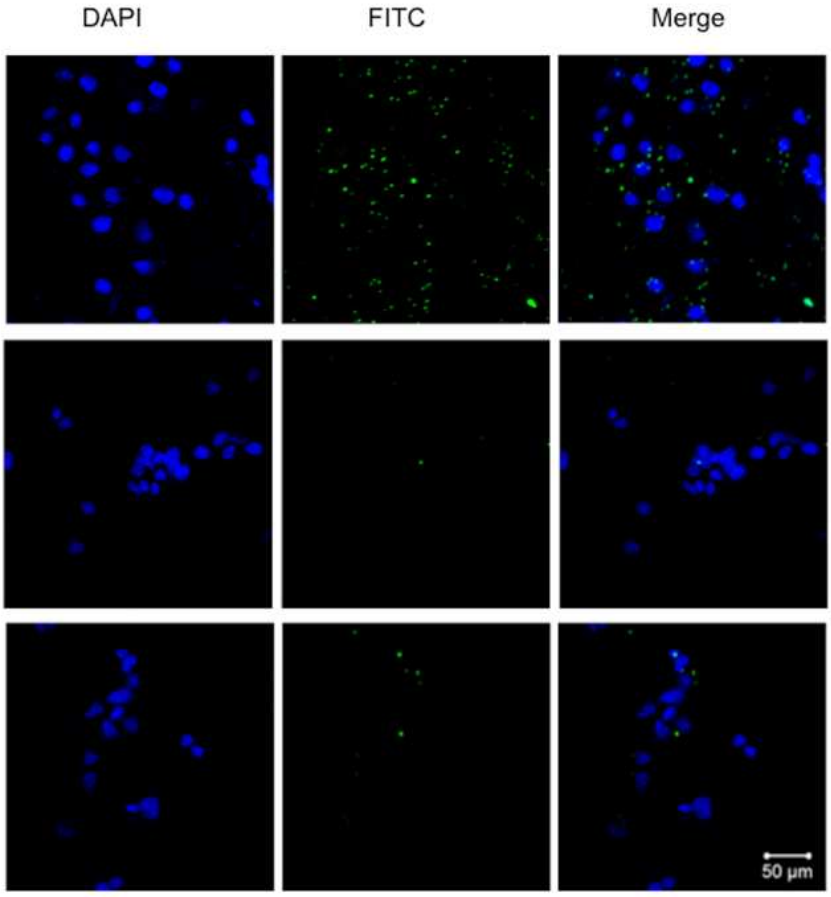

Figure S6. Confocal image of MCF-7 cells (top) and LNCaP cells (middle) treated with aptamer-functionalized MSN-FITC, and LNCaP cells (bottom) treated with MSN-FITC that was modified with a control DNA of a randomized sequence. From left to right: DAPI channel, FITC channel and overlay.

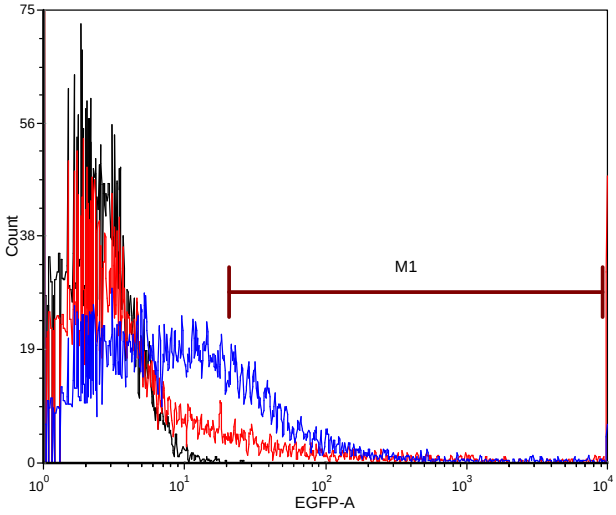

Figure S7. Flow cytometry analysis of untreated LNCaP cells (black line); LNCaP cells treated with MSN-FITC (red line) and MSN-FITC-Apt (blue line).

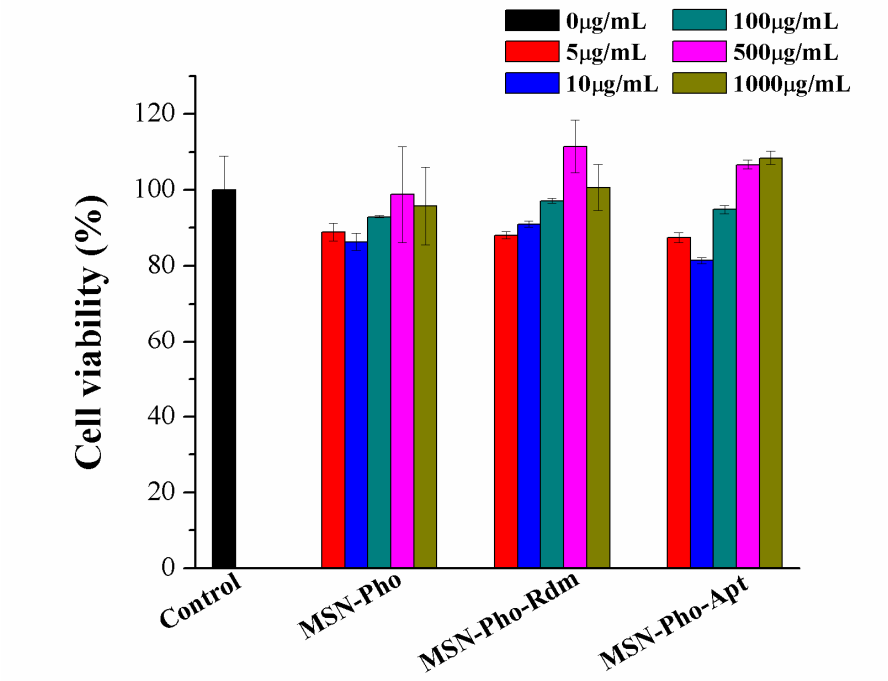

Figure S8. MTT assay to evaluate cytotoxicity of MSN-Pho, random DNA-functionalized MSN (MSN-Pho-Rdm) and aptamer-functionalized MSN (MSN-Pho-Apt) in MCF-7 cells (37 °C, 72h).