Supplementary Information

Targeted multifunctional nanomaterials with MRI, chemotherapy and photothermal therapy for the diagnosis and treatment of bladder cancer

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Figure S1. (a) UV-vis absorption spectra of different concentrations of VCR. (b) The standard absorption curve of VCR according to the concentration.
Figure S2. UV-vis absorption spectra of Fe$_3$O$_4$ SPs and Fe$_3$O$_4$@PDA SPs.
Figure S3. The real-time temperature of Fe$_3$O$_4$ SPs (a) and Fe$_3$O$_4$@PDA SPs (c). Time constants for heat transfer of Fe$_3$O$_4$ SPs and Fe$_3$O$_4$@PDA SPs are determined to be $\tau's = 388.4$ s (b) and 341.3 s (d), respectively, by applying the linear time data from the cooling period versus negative natural logarithm of driving force temperature. The laser power density is 3 W/cm$^2$, and the concentration of Fe$_3$O$_4$ SPs and Fe$_3$O$_4$@PDA SPs is 200 $\mu$g/mL.
Figure S4. (a) Infrared thermal images of 200 µg/mL Fe₃O₄@PDA-VCR-FA SPs aqueous solution under the irradiation of an 808 nm laser at different power density for 15 min. (b) Infrared thermal images of 200 µg/mL Fe₃O₄@PDA-VCR-FA SPs aqueous solution under the irradiation of an 808 nm laser at 2 W/cm² for different time. (c) Infrared thermal images of Fe₃O₄@PDA-VCR-FA SPs aqueous solution at different concentration under the irradiation of an 808 nm laser at 2 W/cm² for 15 min.
Figure S5. Photographs of Fe₃O₄@PDA-VCR-FA SPs in normal saline, PBS, cell culture medium and cell culture medium plus 10% FBS (a) and after incubation for 2 weeks and gently shake (b). (c) The UV-vis-NIR absorption spectra of Fe₃O₄@PDA-VCR-FA SPs solution before and after heating up and cooling down for 5 cycles. The laser power density is 3 W/cm², and the concentration of Fe₃O₄@PDA-VCR-FA SPs is 200 μg/mL.
Figure S6. (a) Concentration-dependent T$_2$-weighted MRI under a 1.5 T magnetic field. The color bar from yellow to black in (a) represents the MRI signal from low to high. (b) r2 for Fe$_3$O$_4$@PDA-VCR-FA SPs.

\[ r_2 = 210.91 \text{ mM}^{-1} \cdot \text{s}^{-1} \]
Figure S7. VCR release from Fe$_3$O$_4$@PDA-VCR-FA SPs at different pH over 48 h and NIR-triggered DOX release from Fe$_3$O$_4$@PDA-VCR-FA SPs. The samples at different pH were irradiated with an 808 nm NIR laser (1 W/cm$^2$) for 15 min.
Figure S8. TEM image of Fe$_3$O$_4$@PDA-VCR-FA SPs under acidic conditions.