Supporting Information

Phenylboronic acid-modified magnetic nanoparticles as a platform for carbon dots conjugation and doxorubicin delivery

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Figure S1. a) HR-TEM image, b) SAED, c) XRD pattern, and d) EDS spectrum of MnFe₂O₄ MNPs. Abbreviations: EDS, energy dispersed X-ray spectroscopy; HR-TEM, high-resolution transmission electron microscopy; MNP, magnetic nanoparticles. SAED, selected area electron diffraction; XRD, X-ray powder diffraction.



Figure S2. a) CLSM images of HeLa Cell after 1 h incubation with CCM at 4 °C. b) Comparison confocal images of HeLa cell after 1 h incubation in CCM at 37 °C in the absence (i) and presence (ii) of free excess CBBA. Abbreviations: CBBA, 4-carboxyphenylboronic acid; CLSM, confocal laser scanning microscopy; CM, CBBA-MNP; CCM, Cdot-CM; Cdot, carbon dot; CLSM, confocal laser scanning microscopy; MNP, magnetic nanoparticles.



Figure S3. CLSM images of sialidase-treatment HeLa cells after incubation with CCM. To cleave sialic acids moiety, HeLa cells were pretreated with 40 mU/mL sialidase for 30 min at 37 °C before the incubation with CCM. (a) Bright field optical microscope imaging; (b) blue fluorescence signals indicate the cell nuclei stained with DAPI; (c) green fluorescence signals shown in illustrate the locations of CCM; (d) the merged fluorescence images of (b) and (c). Scale bars represent 20 μ m



Figure S4. CLSM images of a) CCM and b) DCCM on z-stack sectioning of HeLa cancer cells from top (i) to bottom (vi) after 1 h incubation. Scale bars show 20 µm. Abbreviations: CBBA, 4-carboxyphenylboronic acid; CLSM, confocal laser scanning microscopy; CM, CBBA-MNP; CCM, Cdot-CM; Cdot, carbon dot; CLSM, confocal laser scanning microscopy; MNP, magnetic nanoparticles.



Figure S5. Comparison of cell viability of HeLa cancer cells after 24 h incubation with free Dox (a) and DCCM (b). IC_{50} values can be determined on red fitted curve, which show 2.18 µg/mL and 1.89 µg/mL for each log [Dox], respectively, or 153.3 µg/mL and 78.2 µg/mL for each [Dox], respectively. Abbreviations: CBBA, 4-carboxyphenylboronic acid; CM, CBBA-MNP; CCM, Cdot-CM; Cdot, carbon dot; DCCM, Dox-CCM; Dox, doxorubicin; IC_{50} , half-maximal inhibitory concentration; MNP, magnetic nanoparticles.