

Supplementary Information

## **Surface functionalization of superparamagnetic nanoparticles by an acid-labile polysaccharide-based prodrug for combinatorial monitoring and chemotherapy of liver carcinoma**

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### **Keywords:**

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magnetic resonance imaging

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## Methods

### Cell culture

HepG2 cells, a hepatic cancer cell line that features an over expression of CD44 receptors on the surface, was cultured in Dulbecco's modified Eagle's medium (DMEM) supplemented with 10% of fetal bovine serum (FBS), 100 U/ml of penicillin and 100  $\mu\text{g}/\text{ml}$  of streptomycin at 37°C in a humidified incubator with 5% of CO<sub>2</sub>.

### Figures

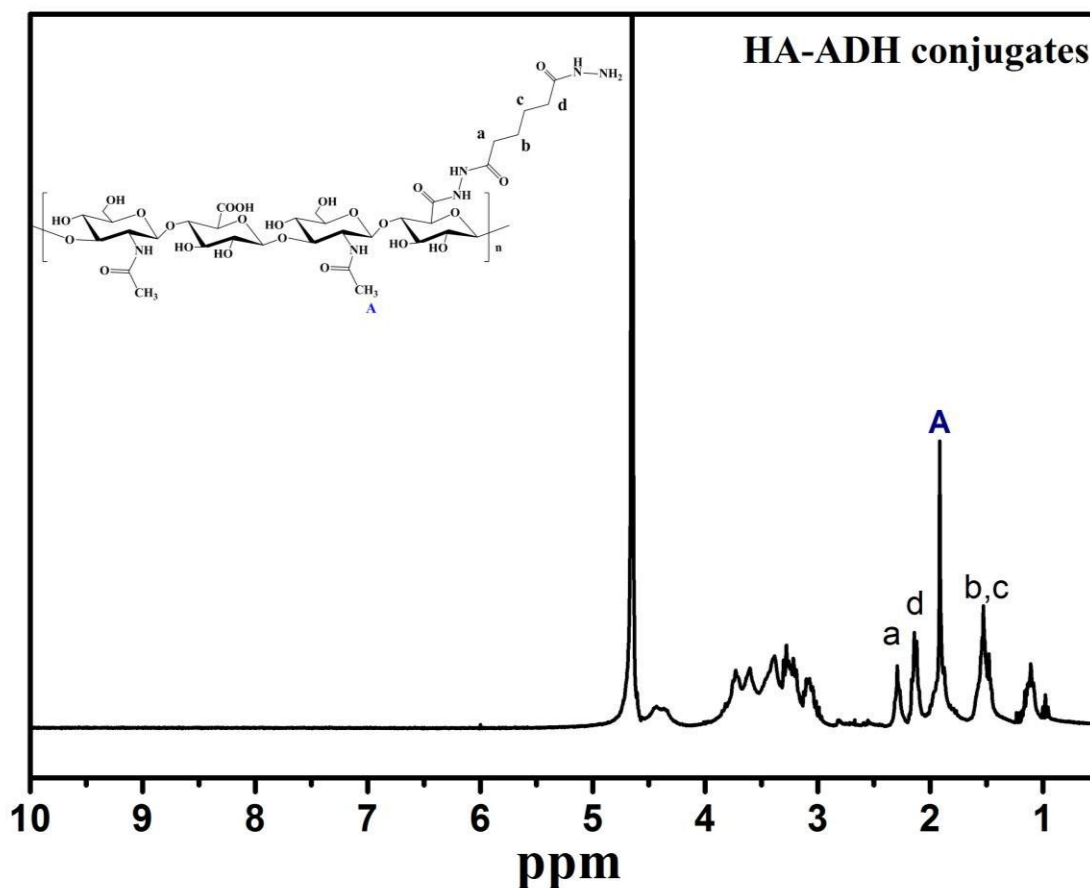


Fig S1. <sup>1</sup>H NMR of HA-ADH conjugates. <sup>1</sup>H NMR (300 MHz, D<sub>2</sub>O):  $\delta$  2.29 (2H, m, -NHNHCOCH<sub>2</sub>-), 2.12 (2H, m, -CH<sub>2</sub>NHNH<sub>2</sub>), 1.90 (15H, bs, CH<sub>3</sub>C(O)), 1.67 – 1.36 (4H, m, -CH<sub>2</sub>CH<sub>2</sub>-), 3.2 – 3.9 ( protons of HA disaccharide unit (H-2, H-3, H-4, H-5, H-6)), 4.55 (H-1 from N-acetylglucosamine unit), 4.35 (H-1 from glucuronic acid). The degree of substitution by ADH was about 24% determined by digital integration of the NMR signals arising from the anomeric protons of HA and methylene protons of ADH.

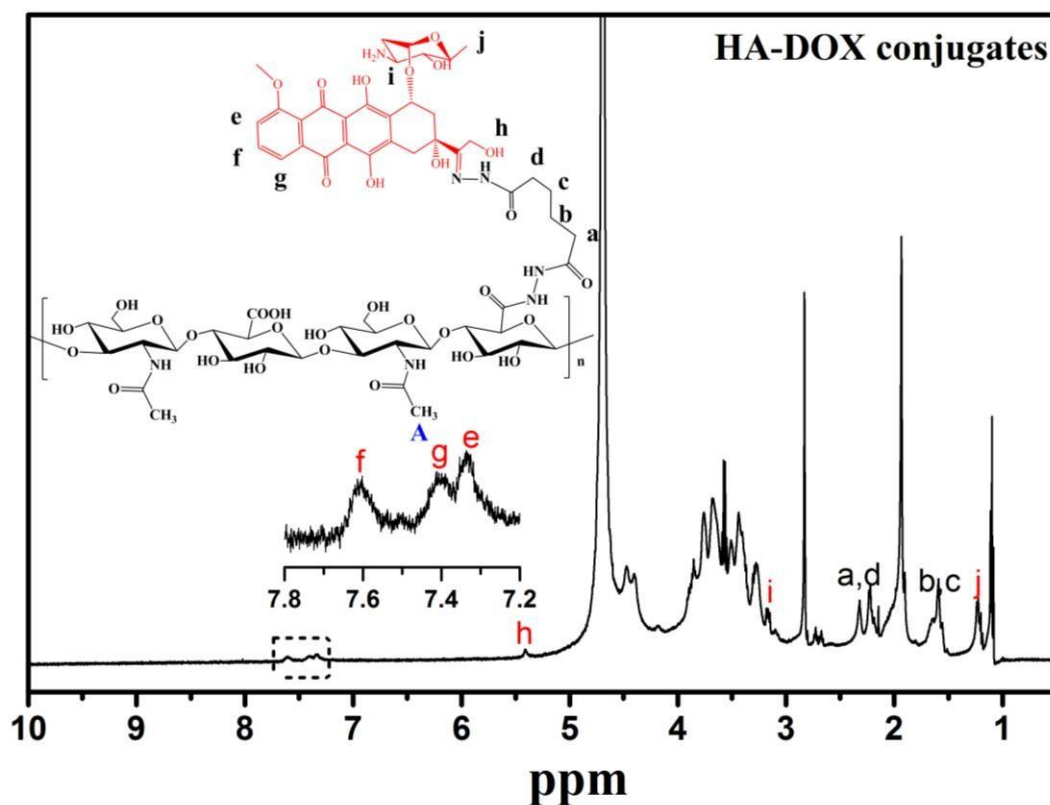


Fig S2.  $^1\text{H}$  NMR of HA-DOX conjugates.  $^1\text{H}$  NMR (500 MHz,  $\text{D}_2\text{O}$ )  $\delta$  8.2 (1H,  $-\text{N}-\text{NH}-\text{CO}-$ ); 7.8–7.4 (3H, m, phenyl H), 5.41 (1H, s,  $-\text{CH}_2\text{OH}$ ), 4.18 (5H, s,  $-\text{CH}-$  of sugar ring and 3H,  $\text{CH}_3\text{OAr}$ ), 2.29 (6H, m,  $-\text{NHNHCOCH}_2-$ ), 2.16 (6H, m,  $-\text{CH}_2\text{NHNH}_2$ ), 1.90 (36H, bs,  $\text{CH}_3\text{C(O)}$ ), 1.67 – 1.36 (12H, m,  $-\text{CH}_2\text{CH}_2-$ ), 1.1 (3H, m,  $-\text{CH}_3$  of sugar ring), 3.2 – 3.9 (protons of HA disaccharide unit (H-2, H-3, H-4, H-5, H-6)), 4.55 (H-1 from N-actylglucosamine unit), 4.35 (H-1 from glucuronic acid).

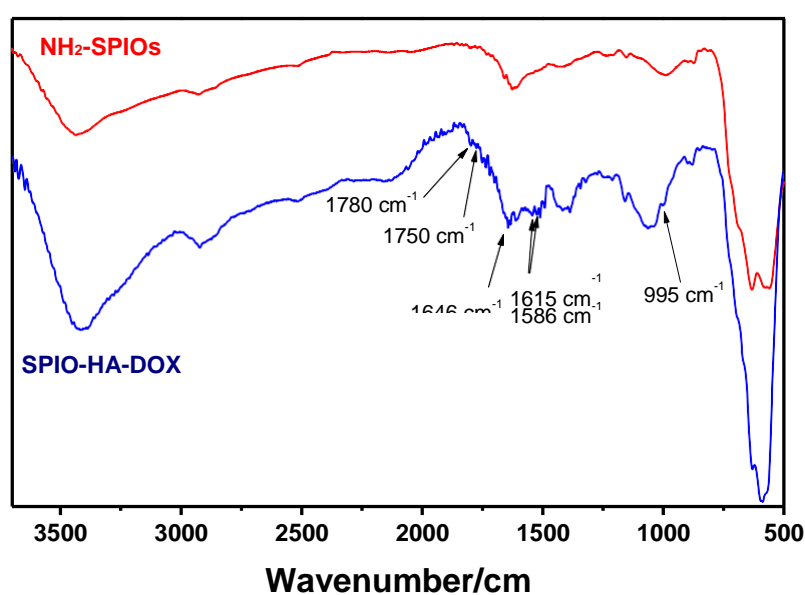


Fig S3. FTIR spectra of DOX,  $\text{NH}_2\text{-SPIOs}$  and  $\text{SPIO-HA-DOX}$ .

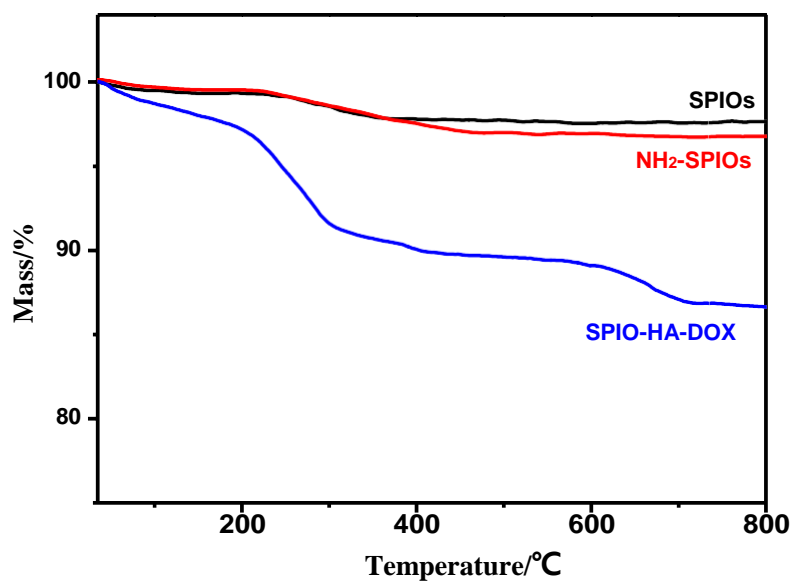


Fig S4. Thermogravimetric analysis of SPIO-HA-DOX.

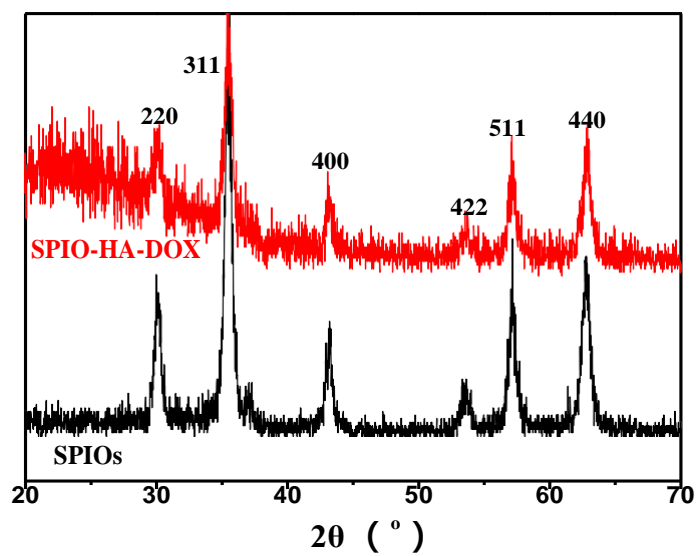


Fig S5. The XRD patterns of SPIOs and SPIO-HA-DOX.

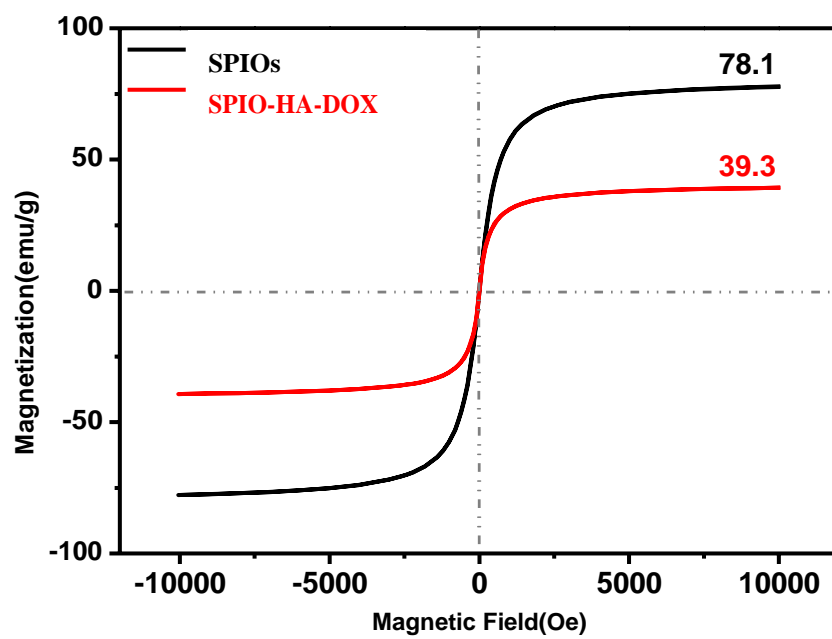


Fig S6. Magnetization curves of SPIOs and SPIO-HA-DOX.