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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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 μg /ml of streptomycin at 37°C in a humidified incubator with 5% of CO₂.

Figures

Fig S1. ¹H NMR of HA-ADH conjugates. ¹H NMR (300 MHz, D₂O): δ 2.29 (2H, m, –NHNHCOCH₂–), 2.12 (2H, m, –CH₂NHNH₂), 1.90 (15H, bs, CH₃C(O), 1.67 – 1.36 (4H, m, –CH₂CH₂–), 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. $^1$H NMR of HA-DOX conjugates. $^1$H NMR (500 MHz, D$_2$O) δ 8.2 (1H, -N–NH–CO–); 7.8–7.4 (3H, m, phenyl H), 5.41 (1H, s, –CH$_2$OH), 4.18 (5H, s, –CH– of sugar ring and 3H, CH$_3$OAr), 2.29 (6H, m, –NHNHCOCH$_2$–), 2.16 (6H, m, –CH$_2$NH$_2$), 1.90 (36H, bs, CH$_3$C(O), 1.67 – 1.36 (12H, m, –CH$_2$CH$_2$–), 1.1 (3H, m, –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-acetylglucosamine unit), 4.35 (H-1 from glucuronic acid).

Fig S3. FTIR spectra of DOX, NH$_2$-SPIOs and 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.