Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Design and Application of a Smart Nanodevice by Combining Cationic Drug Delivery and Hyperthermia for Cancer Apoptosis

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Magnetic property measurements

The magnetic properties of MFNPs and MSMFNPs were investigated by measuring magnetization as a function of the applied field at 300 K. Both nanoparticles exhibited superparamagnetic behavior with no coercivity or remanence (Figure S1). MFNPs yielded a high saturation magnetization value (93.87 emu/g), while the MSMFNPs exhibited a relatively low magnetization value (14.9 emu/g). The reduction in ma)gnetization of MSMFNPs can be explained by the effect of the nonmagnetic silica shells [1]. The results indicate that both MFNPs and MSMFNPs have the potential for generating heat under an alternating magnetic field.

AMF-Induced Heat Generation Properties and calculation of SAR

The magnetic field-dependent heating ability of MSMFNPs was measured at various concentrations and found that 8 mg/ml of MSMFNPs was exhibited a hyperthermic temperature of ~ 42 0C upon applying an AMF in 1200 sec with a comparable SAR value (Figure S2).

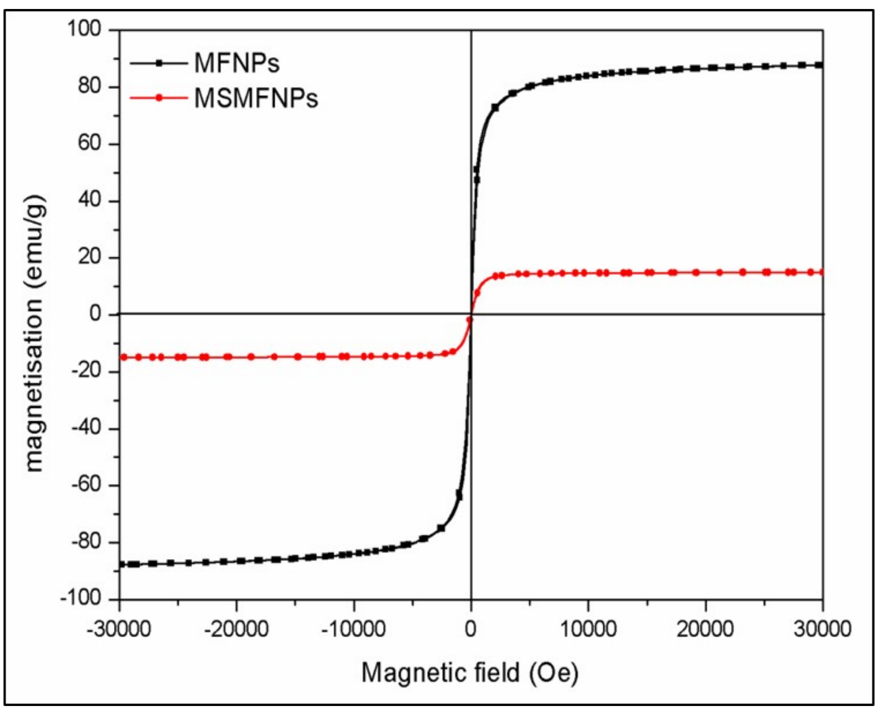

Figure S1. Field-dependent magnetization of MFNPs and MSMFNPs

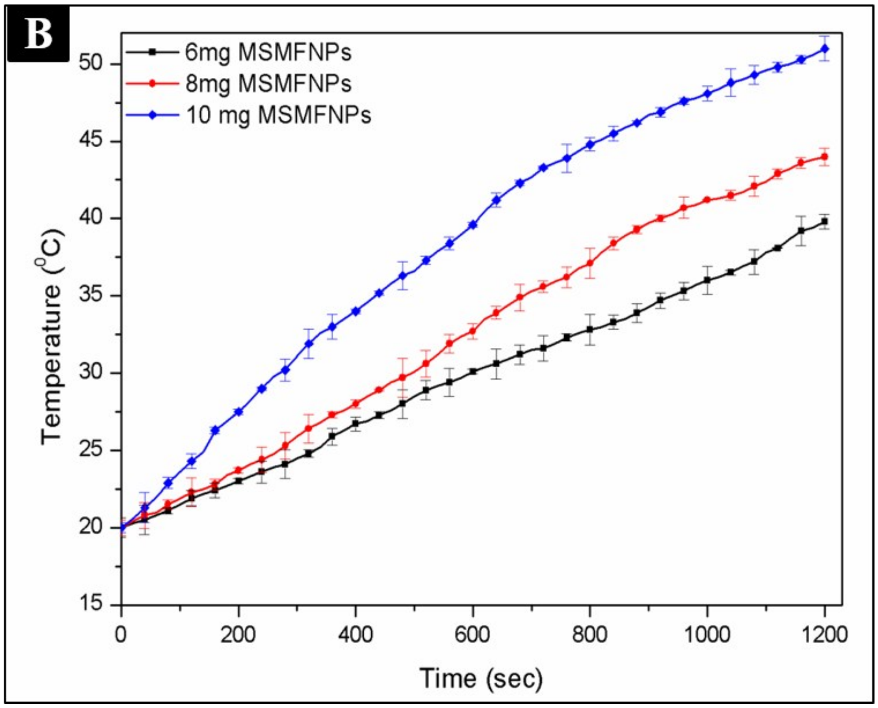

Figure S2. AMF-induced heating ability of MSMFNPs at varying concentrations

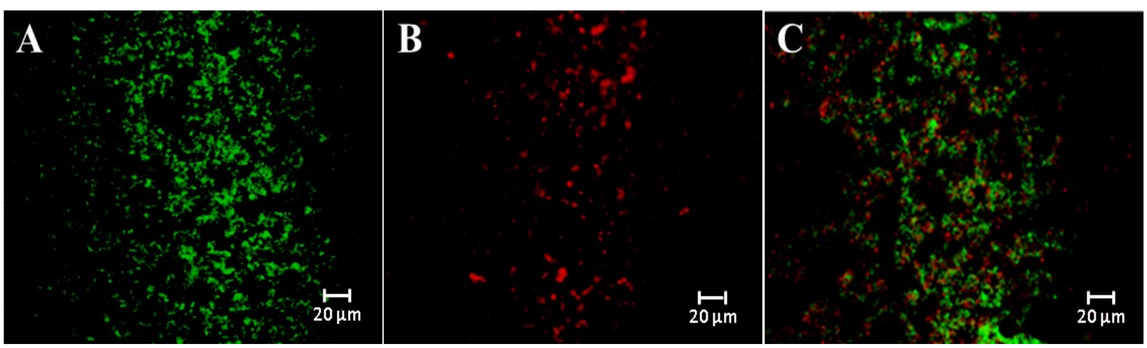

Figure S3. Live/dead assay showing the anticancer effect of DOX alone

Figure S4. Zeta potential spectra of (A) MSMFNPs-CDA (-8.10 mV) and (B) MSMFNPs-CDA-DOX (17.1mV) respectively

Reference

1. Y. F. Zhu, T. Ikoma, N. Hanagata and S. Kaskel, *Small*, 2010, **6**, 471-478.