SUPPORTING INFORMATION

In vitro Evaluation of PEGylated Mesoporous MgFe$_2$O$_4$ Magnetic Nano assemblies (MMNs) for Chemo-thermal Therapy

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Fig S1. Effect of sodium borohydride (NaBH₄) addition on the morphology of MMNs. TEM images of the MMNs prepared by polyol method with 1 g FeCl₃·6H₂O, MgCl₂·6H₂O, 3 g NaAc, 3.5 g PEG-diacid in 20 mL EG at 200°C for 8 h. (a) without sodium borohydride (NaBH₄, size > 200nm), (b) with addition of sodium borohydride (0.05 g, size < 100 nm), (c) 0.1 g NaBH₄ results in small size flower like morphology of MMNs.
**Fig S2.** (a) XRD patterns of as-synthesized MMNs with the JCPDS Card No- (i) 19-0629 for Fe$_3$O$_4$ and (ii) 73-1960 for MgFe$_2$O$_4$. (b) EDX analysis confirm the composition of MMNs.
**Fig S3.** (a) Thermo gravimetric (TG) curves of the MMNs coated with (black line) and without (red line) PEG-diacid. (b) Pictures showing colloidal stability of MMNs in PBS (5mg/mL) due to PEG-diacid and its attraction towards magnetic field.
**Fig S4.** $M$-$H$ loops of as-synthesized MMNs with the applied field of 2T and measured at 300 K. Inset: ZFC-FC curves measured in the temperature range of 5-300 K with an applied field of 500 Oe.
Fig S5. *In vitro* biocompatibility of MMNs using L929 cells: (a) Graphical representation of % cell viability after 24 and 48 h incubation of Bare MMNs with indicated concentration. Results were quantified by subtracting the blank value from each value then normalizing against the control values. Data shown are mean ± SD from n=3. (b) Representative photographs of L929 cells showing morphology before and after treatment with MMNs.
**Fig S6.** *In-vitro* antitumor efficacy of DOX-MMNs. Graphs show doxorubicin concentration response on cell survival after treatment with free doxorubicin and DOX-MMNs for (a) 24 and (b) 48 h. The concentration of DOX-MMNs which corresponds to DOX was 10, 20, 40, 60, 80, 100 and 150 µg/mL. Absorbance of the bio-reduced soluble formazan product was measured at 490 nm. Results were quantified by subtracting the blank value from each value then normalizing against the control values. Data shown are mean ± SD from n= 3.
**Fig S7.** Uptake study of MMNs for *in-vitro* hyperthermia: (a-i) only DMEM media and (a-ii) HeLa cells treated with MMNs. Fig. (b-iii) and (b-iv) show the magnetic response of only DMEM and DMEM media with cell and MMNs, respectively. Fig. (b-iv) shows a brownish pellet indicating higher uptake of MMNs by HeLa cells.