Electronic Supplementary Material (ESI) for Dalton Transactions.
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# Electronic Supplementary Information (ESI)

## Folic acid Conjugated $Fe_3O_4$ Magnetic Nanoparticles for Targeted Delivery of Doxorubicin

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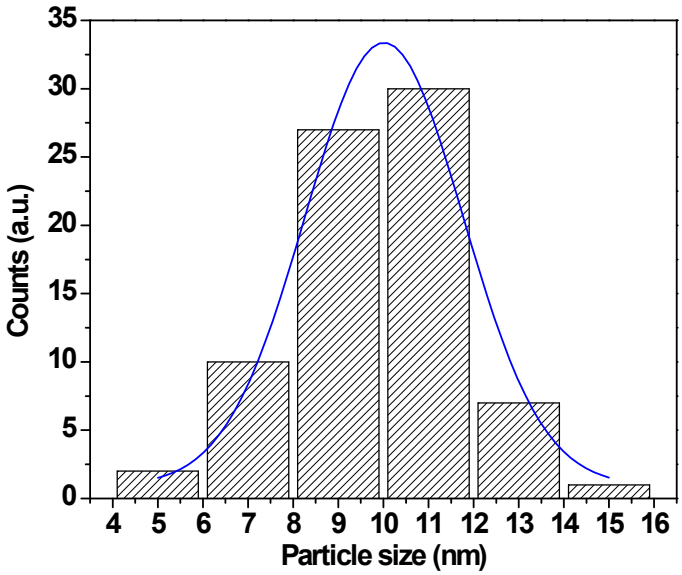


Fig. S1. Particle size distribution of FBMNPs (obtained from TEM image shown in Fig. 1b). The fitted Gaussian curve (blue line) shows the average size of $Fe_3O_4$ nanoparticles is ~10 nm.

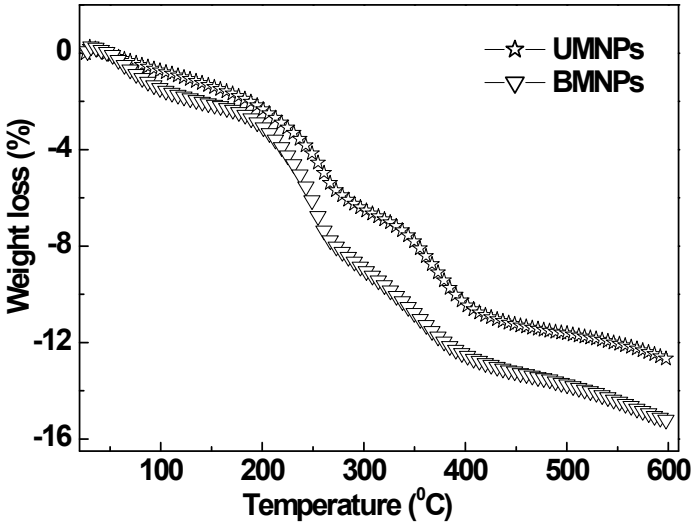


Fig. S2. TGA plots of UMNPs and BMNPs.

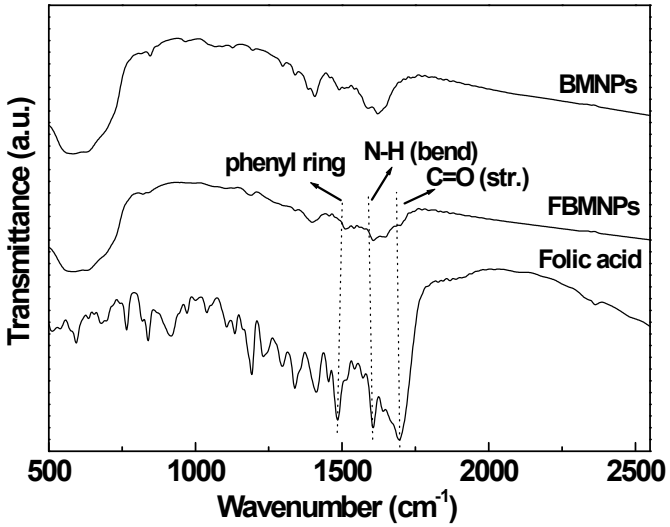


Fig. S3. FTIR spectra of BMNPs, folic acid and FBMNPs. The characteristic IR absorption peaks at 1605, 1693 and 1485 $cm^{-1}$ are observed in the spectrum of free folic acid due to N-H bending vibration of CONH group, C=O amide stretching of the α- carboxyl group and absorption band of phenyl ring respectively.[1] Folic acid itself contains amide bonds. The increase and broadening of amide bands in the FTIR spectrum of FBMNPs can be attributed to linkage between BMNPs and FA via an amide bond. The bands appeared at around 1550 and 1670 $cm^{-1}$ in FBMNPs (absent in BMNPs) correspond to the vibration of N-H (2° amide) II band and C=O (amide I band).[2] The appearance of these modes suggests the conjugation of folic acid onto the surface of BMNPs.

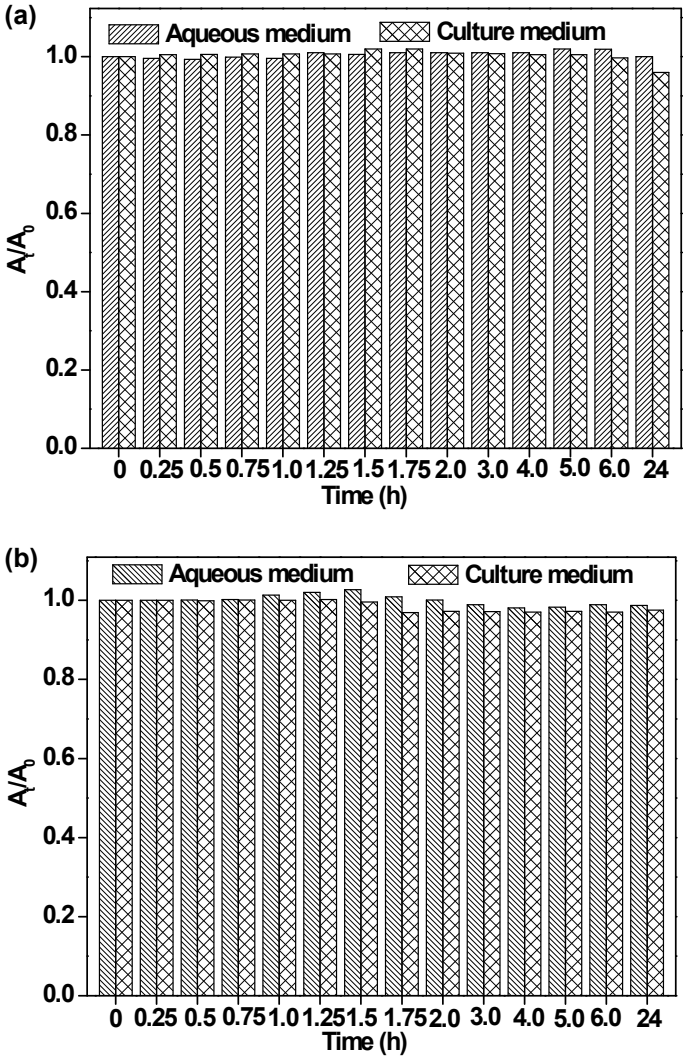


Fig. S4. Normalized UV absorbance ($A_t/A_0$) vs. time plots of (a) BMNPs and (b) FBMNPs in aqueous and culture medium at a wavelength of 350 nm in different mediums ($A_t$ = absorbance at time 't' and $A_0$ = Absorbance at t=0).

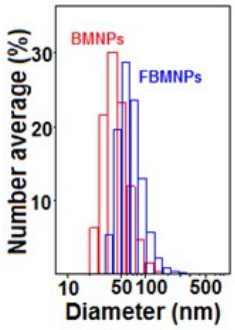


Fig. S5. Number weighted hydrodynamic diameter of BMNPs and FBMNPs.

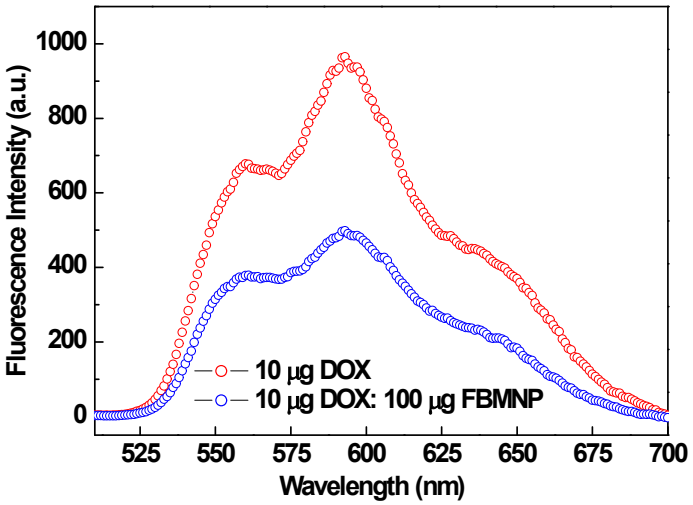


Fig. S6. Normalized fluorescence spectra of 1 ml of DOX (10 μg) upon reacted with 100 μg of FBMNPs.

Table S1. Zeta-potential (in mV) of FBMNPs incubated with BSA.

| Time (h) | 0.02 mg/ml FBMNPs in 0.025 mg/ml BSA in 0.01 M PBS |
|---|---|
| 0 | -34.7 |
| 0.5 | -34.4 |
| 1.0 | -34.2 |
| 2.0 | -32.4 |

**References**

1. Y. Zhang, N. Kohler and M. Zhang, *Biomater.*, 2002 **23**, 1553.

2. N. Andhariya, R. Upadhyay, R. Mehta and B. Chudasam, *J. Nanopart. Res.*, 2013, **15**, 1416.