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Sequential release of drugs from Hollow Manganese Ferrate nanocarriers for Breast cancer therapy

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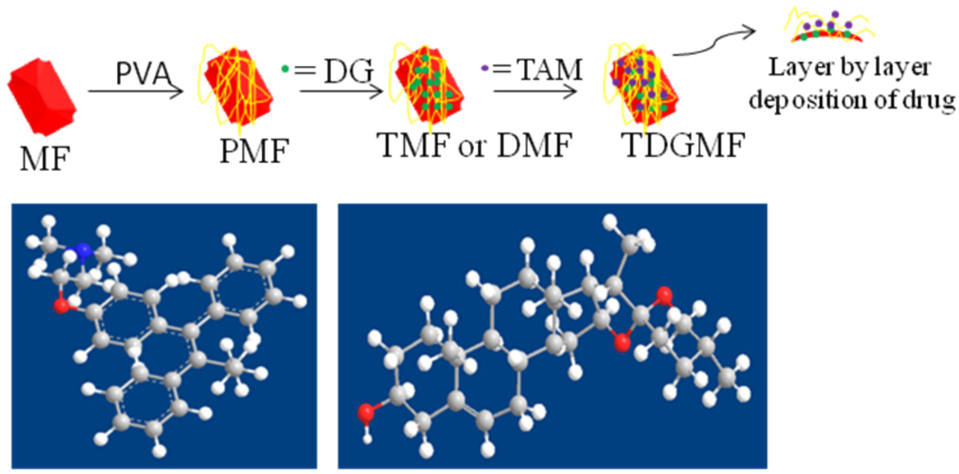
Tables

Table 1: List of some representative tamoxifen and diosgenin based nanocarriers

Nanoparticles	Morphology	Drugs	Findings	References
Magnetite nanoparticles (Fe3O4)/ poly(l-lactic acid) composite	Spherical (200 nm)	Tamoxifen	Enhanced cellular uptake and induced cytotoxic effects	[60]
Nanogels Crosslinked by Functional Superparamagnetic Maghemite Nanoparticles	Spherical (80 nm)	Tamoxifen	Thermo responsive mediated drug delivery	[61]
Manganese superoxide dismutase	Spherical (130 nm)	Tamoxifen	Reactive oxygen species induced apoptosis	[62]
Graphene	Multi walled enlogated shapes (50-150 nm)	Tamoxifen	Induced apoptosis	[63]
Cyclodextrin-based nanosponges	Nanosponges (400-600 nm)	Tamoxifen	Oral delivery, Cytotoxic effects	[64]
Diacyllipid-Polymer Micelles	Nanomicells (10 to 40 nm)	Tamoxifen	Drug delivery occurs through enhanced permeability and retention effect	[65]
PEGylated magnetic nanoparticles	Spherical (40 nm)	Tamoxifen	Improved anticancer activity	[66]
Chitosan nanoparticles	Spherical (30-60 nm)	Diosgenin	Drug release studies	[67]
Silica nanoparticles	Spherical (180 nm)	Diosgenin	Extraction of Diosgenin from crude*	[68]
Hollow MnFe2O4 nanocarriers	Octahedron shape (110-220 nm)	Tamoxifen and diosgenin	Increased magnetic saturation along with apoptosis	This study

*Not employed in cancer therapy.

Synthesis of hollow $MnFe_2O_4$ nanocarriers



Scheme1: Schematic representation for the MF surface coated with PVA followed by encapsulation of TAM or DG or both are deposited by layer by layer and corresponding TAM and DG structures

XRD and FTIR Analysis

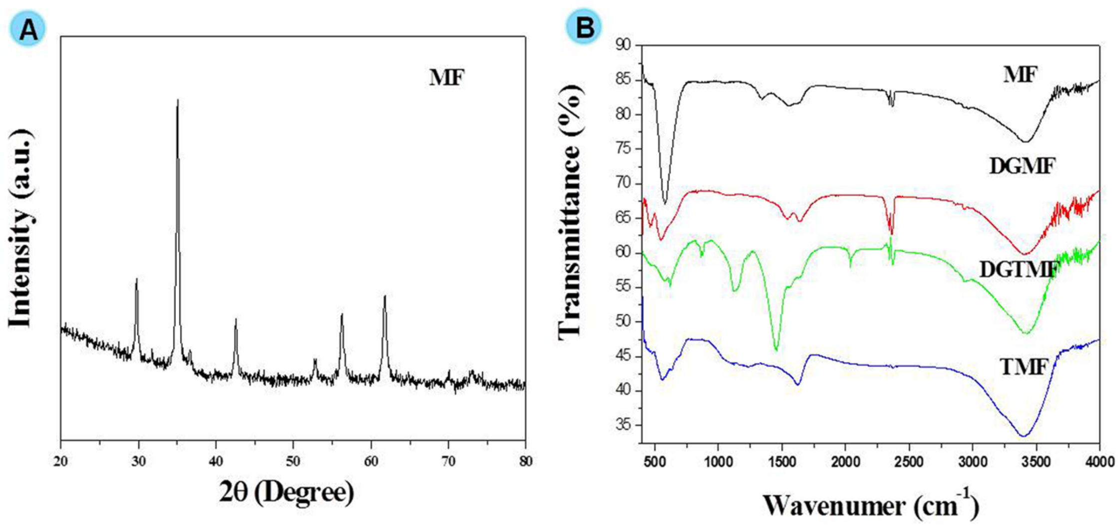


Figure S1: (A)XRD Pattern of hollow MF (B) FTIR spectra of MF, DGMF, DGTMF and TMF.

Drug release studies

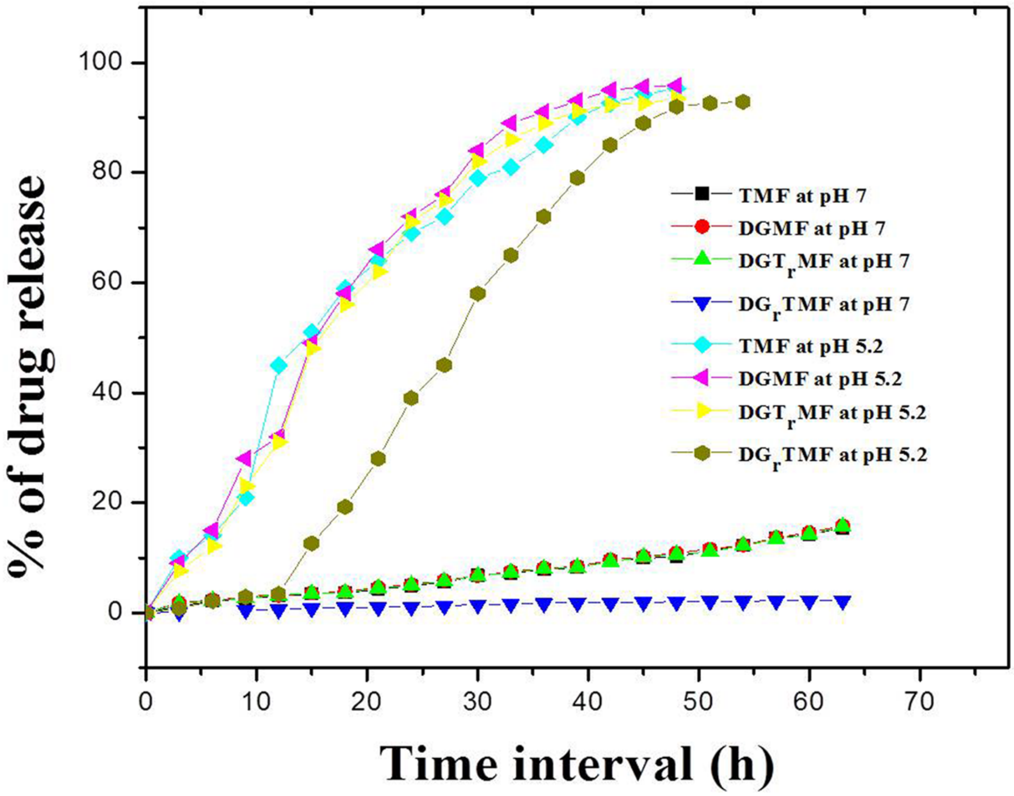


Figure S2: Drug release from samples at pH 7 and 5.2 for TMF, DGMF, DGTMF(Where T_r and DG_r corresponds to TAM and DG release from DGTMF sample, respectively).

Cellular uptake of drug loaded nanocarriers

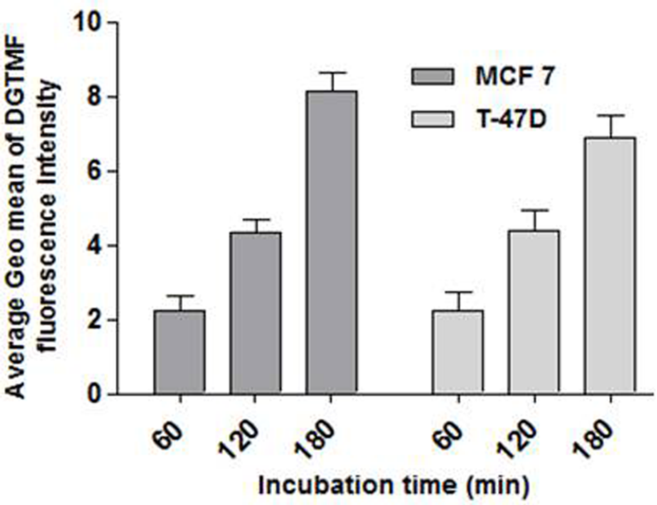


Figure S3: Geometric mean analysis of DGTMF cellular uptake through flow cytometry in MCF 7 and T-47D cells. Mean±SD are shown.

Cell cycle analysis

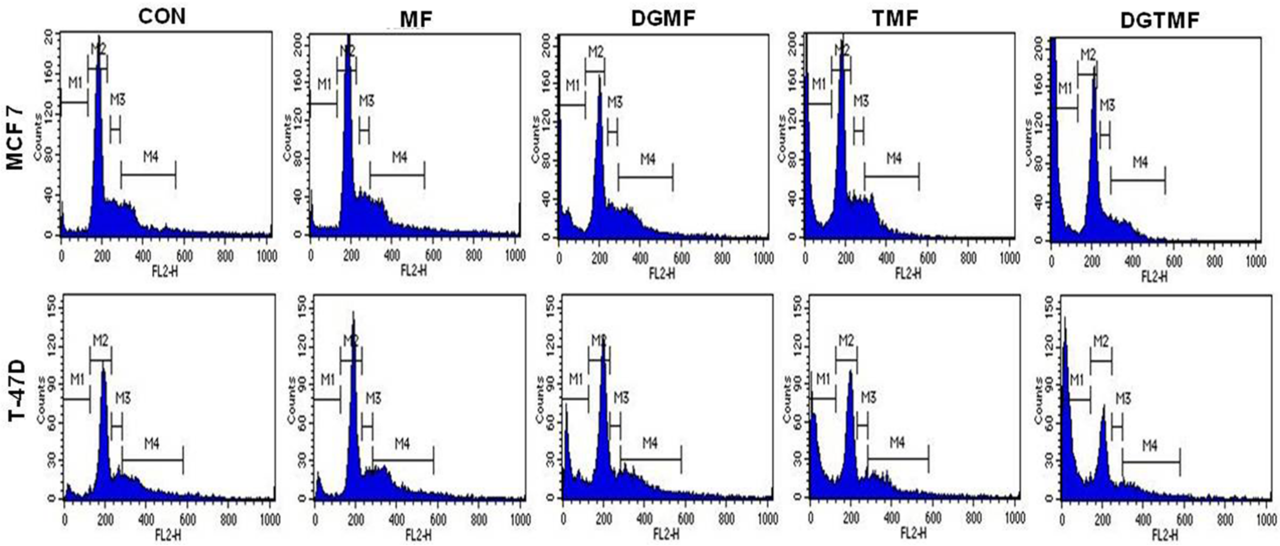


Figure S4: Apoptotic activity of different drug loaded nanoparticles on MCF 7 and T-47D cells by flow cytometry phase distribution study

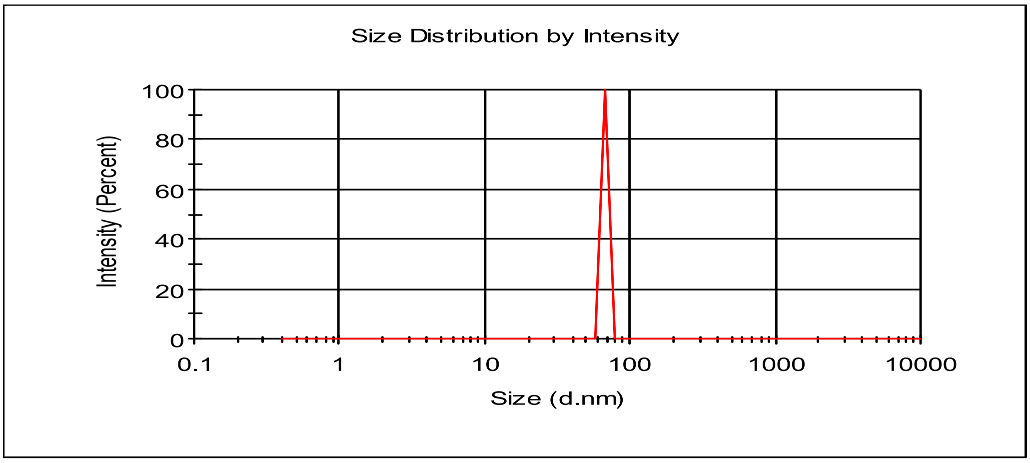


Figure S5: DLS measurement of TDGMF sample in cyclohexane (~ 62 nm)

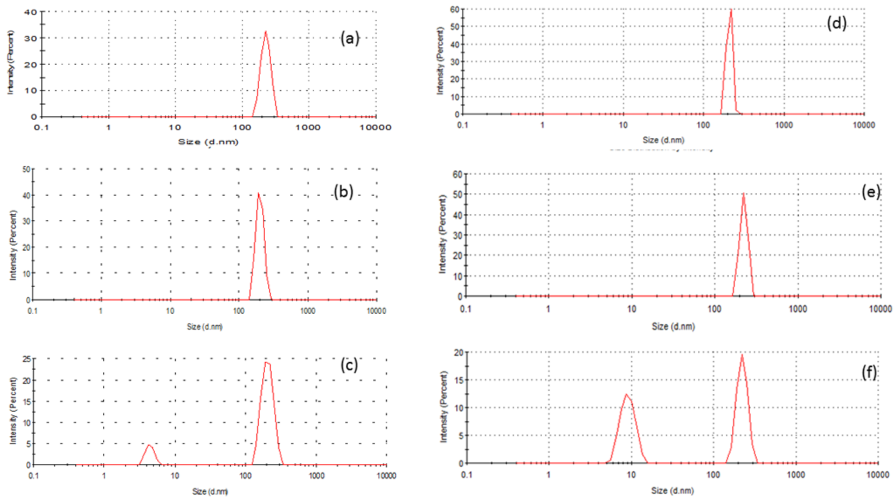


Figure S6: DLS measurement of TDGMF sample in flow mode (a-c) and normal mode (e-f). where (a & d) measured in PBS solution, (b and e) cell culture media and (c and f) protein media (less than 10 nm peak in c and f are due to presence of protein molecules).

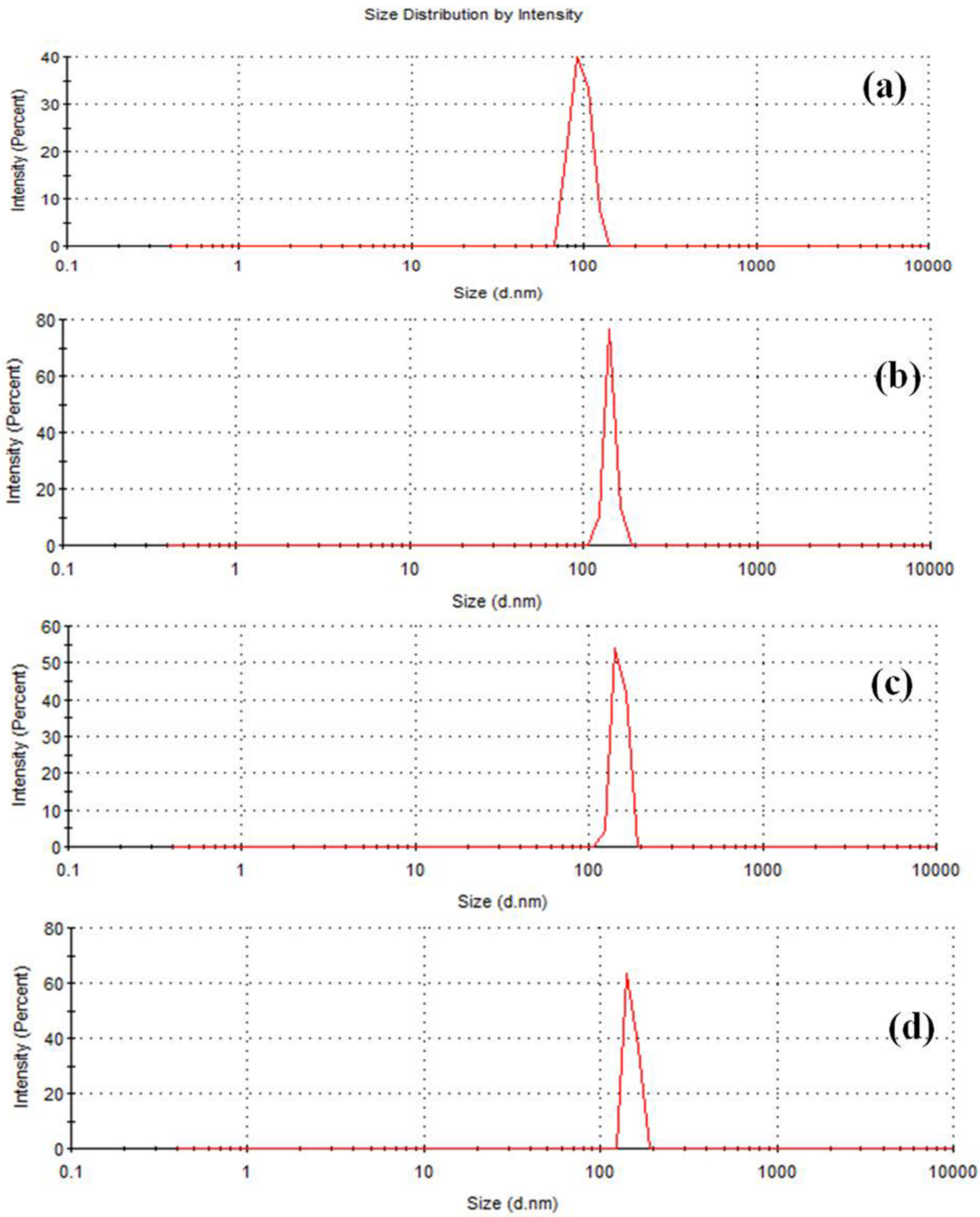


Figure S7: DLS measurement of (a) MF, (b) DGMF, (c) TMF and (d)DGTMF through flow cell method.