Supporting information

Magnetic Nanoparticles Functionalized Reduced Graphene Oxide-Based Drug Carrier System for Chemo-Photodynamic Cancer Therapy

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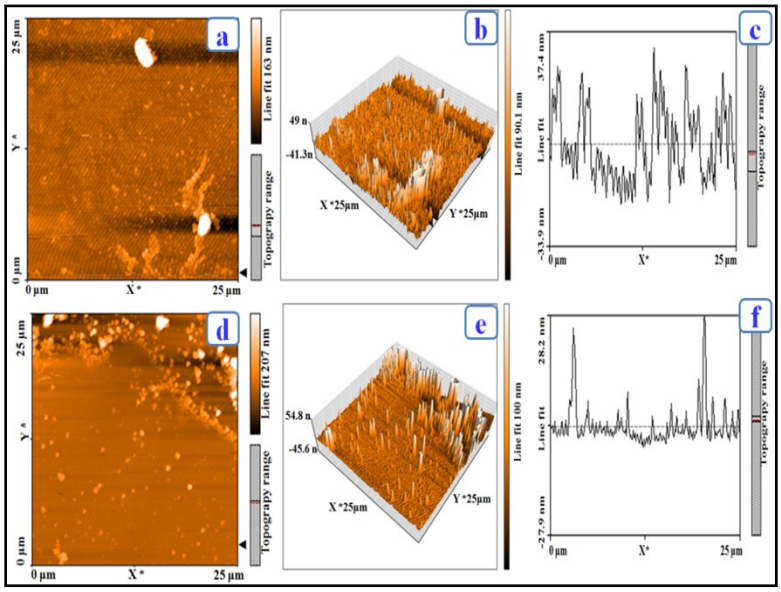
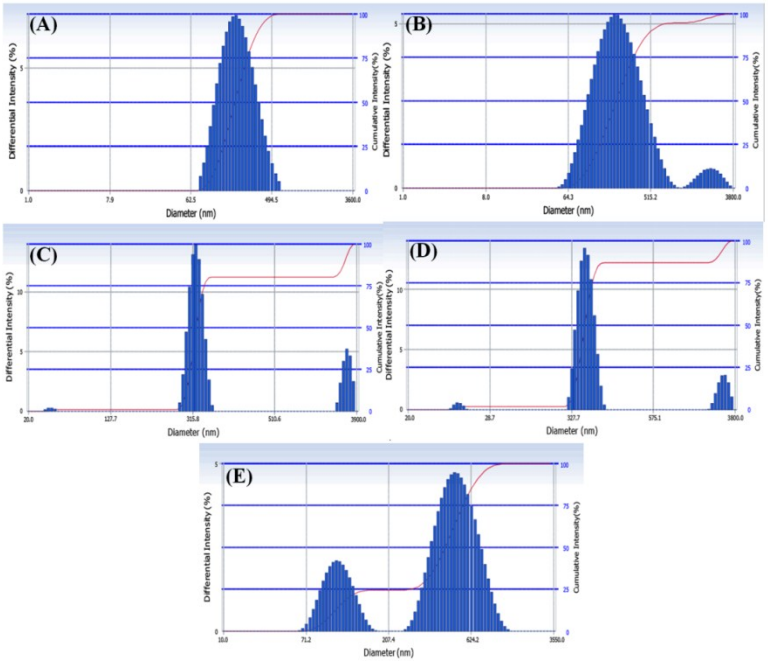
Supporting information

1. *Atomic Force Microscopy*

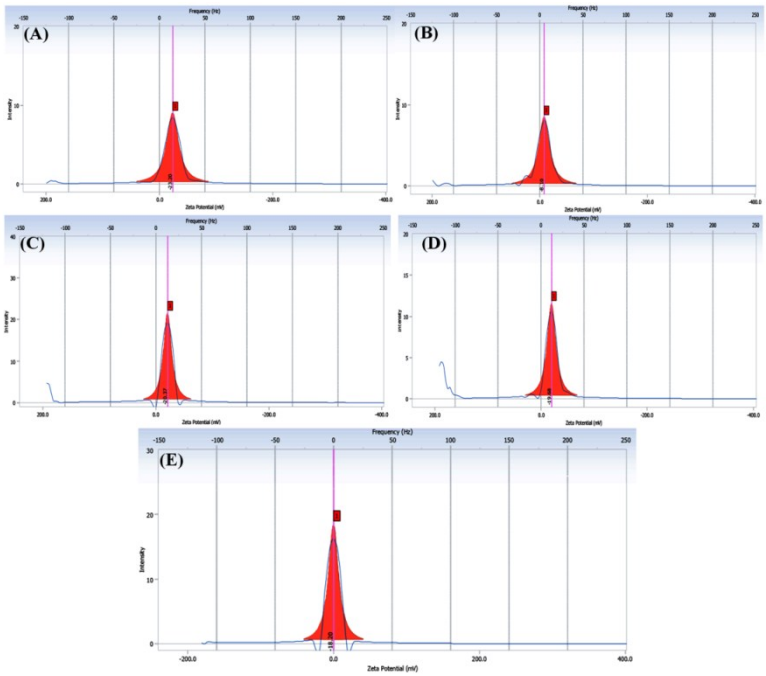


S.Figure1. AFM images for morphological study of (a-c) MrGO-AA-*g*-4-HC and (d-f) CPT-loaded MrGO-AA-*g*-4-HC nanocarrier.

2. Particle size and zeta potential analysis

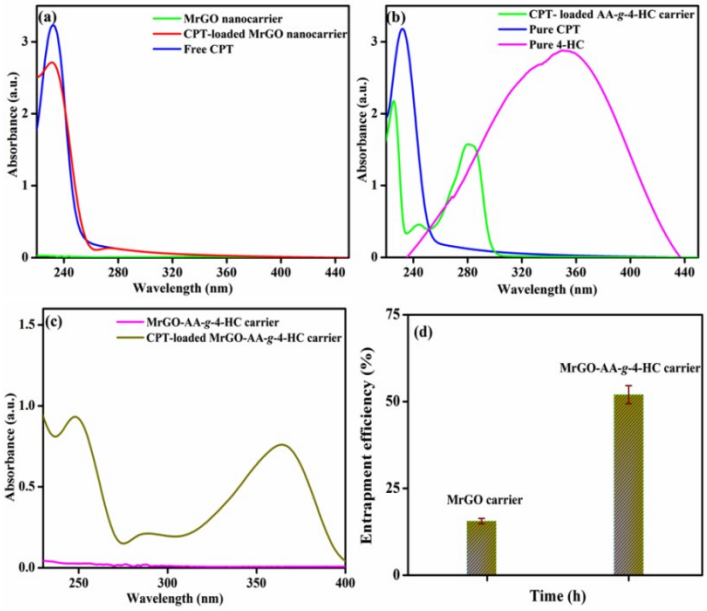


S.Figure2(A). Particle size of (A) MrGO-AA-*g*-4-HC and (B,C,D& E) CPT-loaded MrGO-AA-*g*-4-HC system in different medium water, PBS, FBS and DMEM respectively after 24 h.

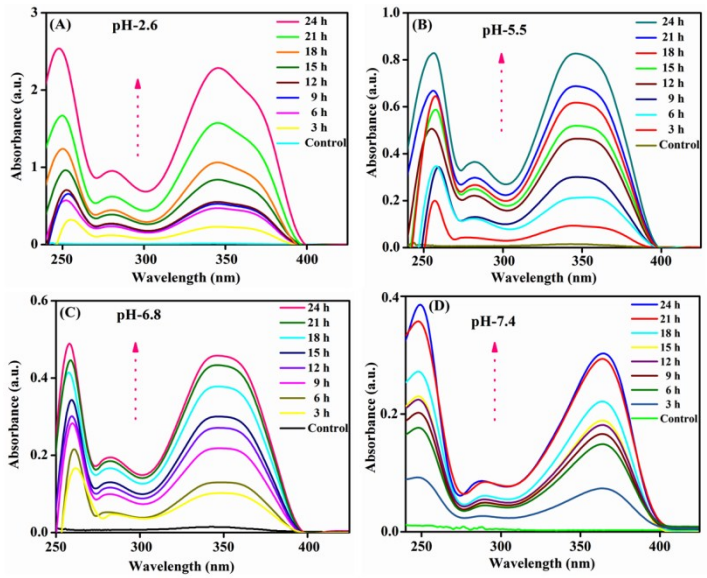


S.Figure2(B). Zeta-potential images of (A) MrGO-AA-*g*-4-HC and (B,C,D& E) CPT-loaded MrGO-AA-*g*-4-HC nanocarrier in different medium water, PBS, FBS and DMEM respectively after 24 h.

3. Drug entrapment efficiency, loading capacity and in-vitro drug release profiles

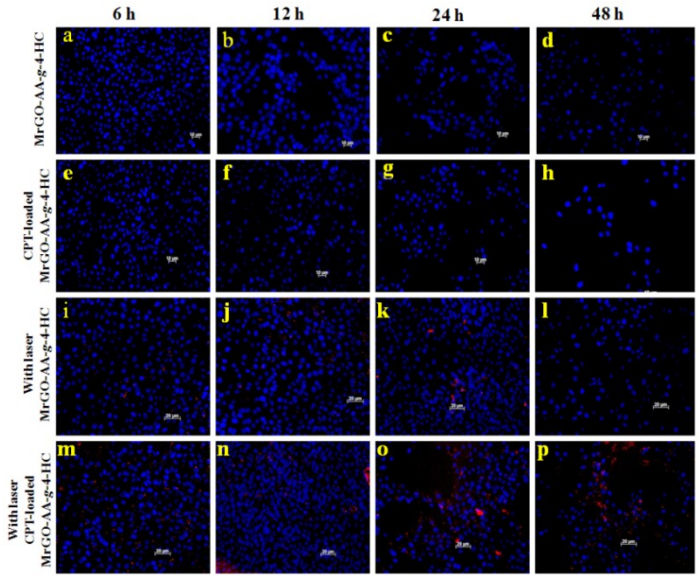


S.Figure3.(a) Entrapment efficiency of CPT loaded MrGO nanocarrier, (b) entrapment efficiency of CPT loaded MrGO-AA-*g*-4-HC nanocarrier at UV-Vis spectrum of pure camptothecin λ_{max}-263 nm, pure 4-hydroxy coumarin λ_{max}-353 nm and CPT-loaded MrGO-AA-*g*-4-HC nanocarrier. (c) Loading capacity of CPT-loaded MrGO-AA-*g*-4-HC nanocarrier, and (d) CPT entrapment effcapacity profile of CPT on MrGO and MrGO-AA-*g*-4-HC nanocarriers in 24 h time periods respectively.



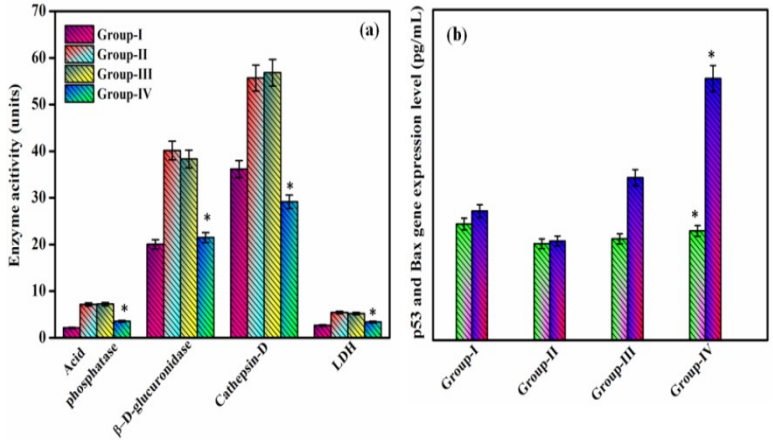
S.Figure4. *In-vitro* drug release profiles of CPT and 4-HC from MrGO-AA-g-4-HC/CPT nanocarrier in various PBS solutions at (a) pH-2.6, (b) 5.5, (c) 6.8 and (d) 7.4 at time dependent manner.

***4.*Inracellular photodynamic effect and nuclear damage**



S.Figure5. Fluorescence microscopy images of human breast cancer MCF-7 cell lines treated with MrGO-AA-*g*-4-HC and CPT-loaded MrGO-AA-*g*-4-HC nanocarriers with and without laser irradiation (365 nm for 20 mW/cm^2 for 3 min) with various time manner at 6h, 12 h, 24 h, and 48 h respectively. Scale bar: ~20μm.

5. Analysis of Biomarker enzymes and P53 and Bax



S.Figure6 (a) Effect of CPT unloaded, and CPT loaded nanocarrier on marker enzymes in control and experimental rats.Group I- Control; Group II -Cancer Induced; Group III- CPT unloaded treated; Group IV- CPT loaded nanocarrier. Each value is expressed as mean ±SD for six rats in each group. * P< 0.05 group II vs. group I; * P< 0.05 group III vs. group I; **P < 0.01 group IV vs. group I. **Figure6 (b).**Gene expression of p53 and Bax level of Group I- Control; Group II -Cancer Induced; Group III- MrGO-AA-*g*-4-HCtreated; Group IV- CPT loadedMrGO-AA-*g*-4-HCnanocarrier. Each value is expressed as mean ±SD for six rats in each group.* P< 0.05 group II vs. group I; * P< 0.05 group III vs. group I; **P < 0.01 group IV vs. group I.