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

Ternary Graphene Quantum Dot-Polydopamine-Mn_3O_4 Nanoparticles for Optical Imaging Guided Photodynamic Therapy and T_1-Weighted Magnetic Resonance Imaging

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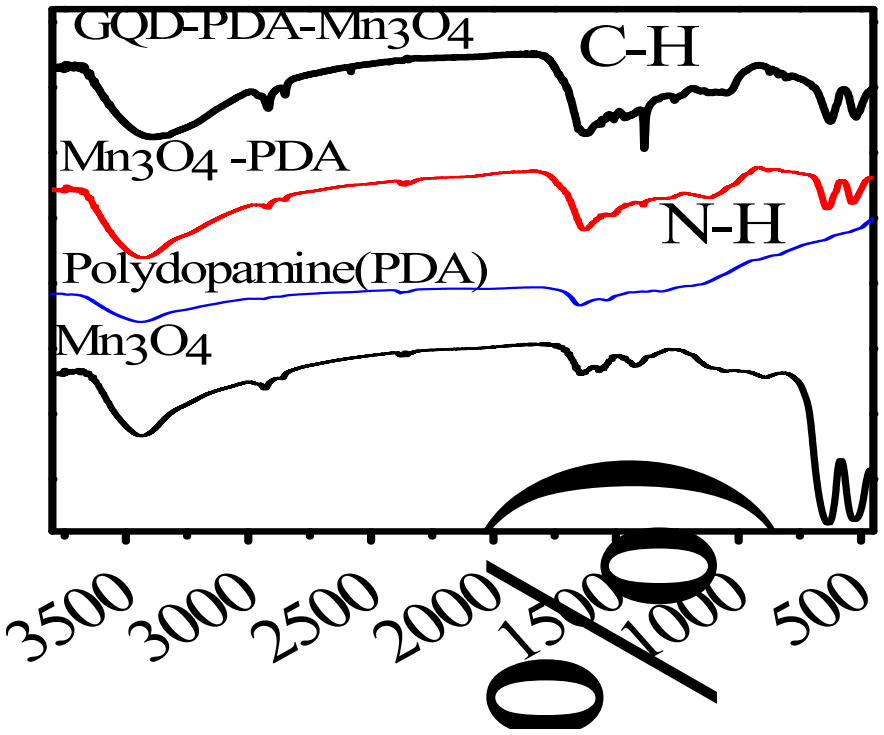

Figure S1 FTIR spectra of of Mn_3O_4, PDA, Mn_3O_4–PDA and GQD-PDA-Mn_3O_4 nanoparticles.

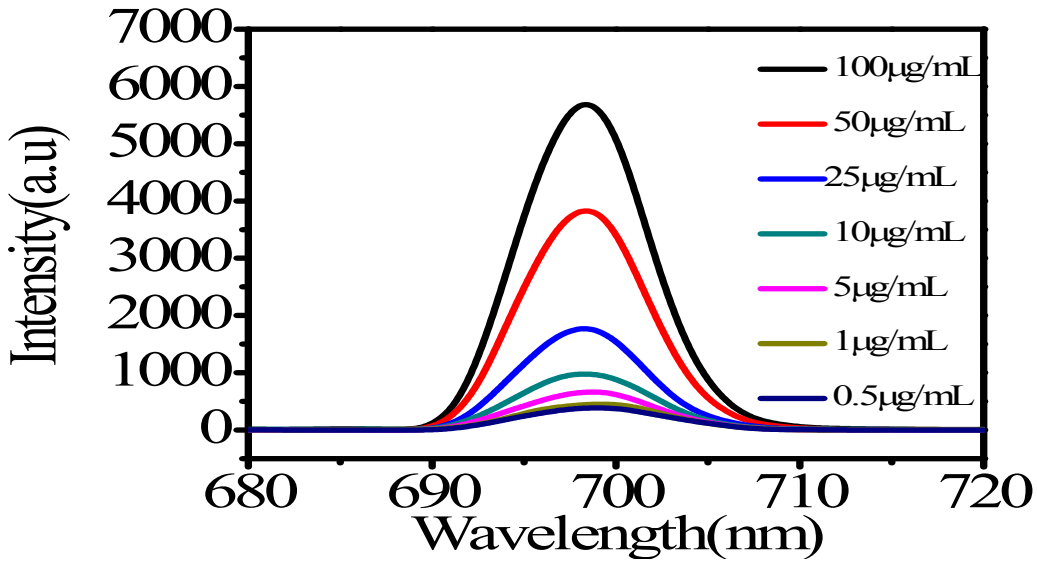

Figure S2 Fluorescent intensity of GQD-PDA-Mn_3O_4 nanoparticles in aqueous solutions at different concentrations.

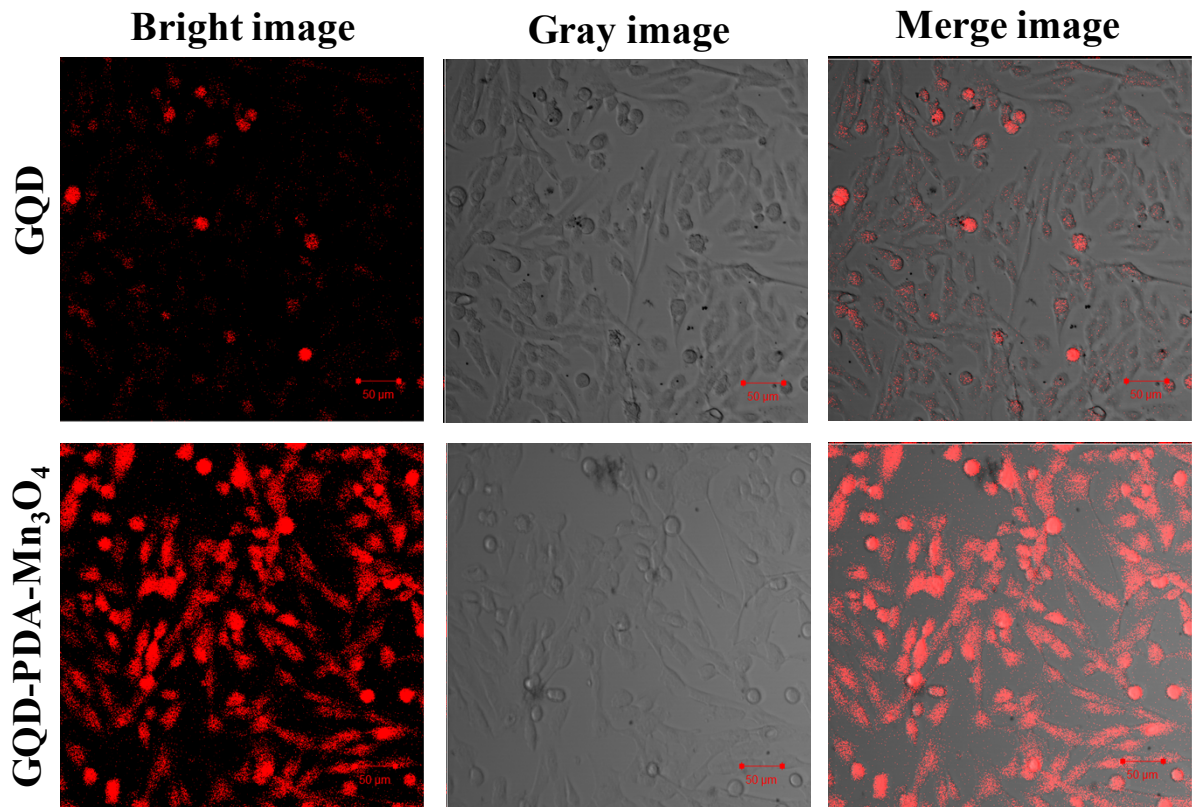

Figure S3 *In vitro* cellular uptake of MDCK cells incubated with GQD-PDA-Mn_3O_4 nanoparticles and GQD at 50 μg/mL concentrations for 4 h at 37 °C.

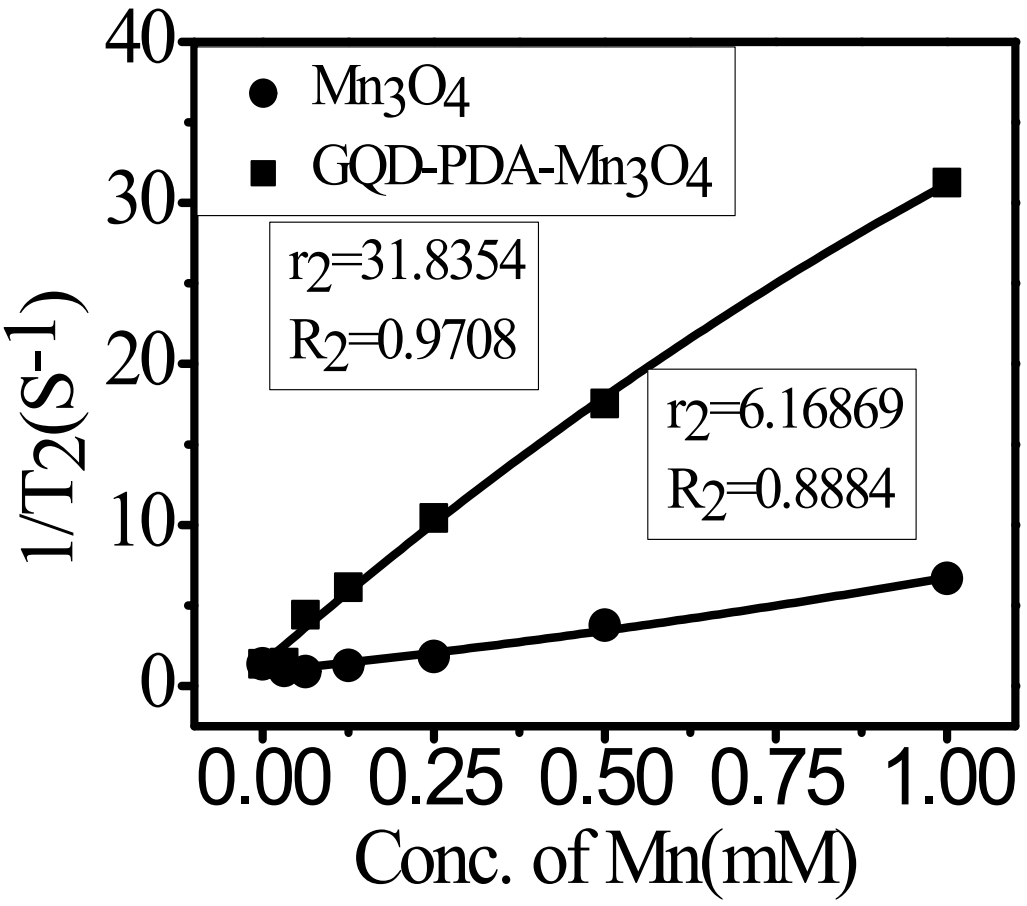

Figure S4 T_2 relaxivity plot of Mn_3O_4 and GQD-PDA-Mn_3O_4 nanoparticles in aqueous solution. Paramagnetic nanoaprticles shows both T1 and T2 weighted MRI.

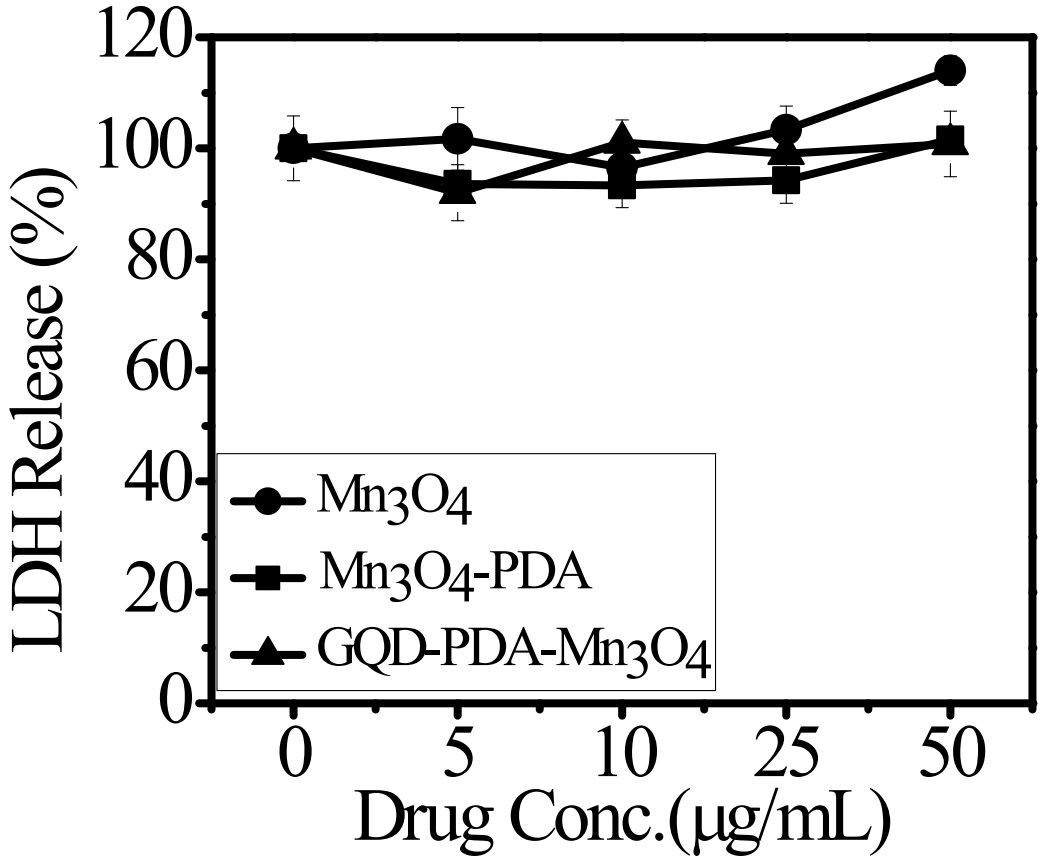

Figure S5. *In vitro* LDH release (%) of A-549 cells incubated with Mn_3O_4, Mn_3O_4–PDA and GQD-PDA-Mn_3O_4 nanoparticles at different concentrations (0 to 50 μg/mL) for 24 h at 37°C. No significanttoxicityfound in concentration (0 to 50 μg/mL) of Mn_3O_4, Mn_3O_4–PDA and GQD-PDA-Mn_3O_4 nanoparticles without laser irradiation.

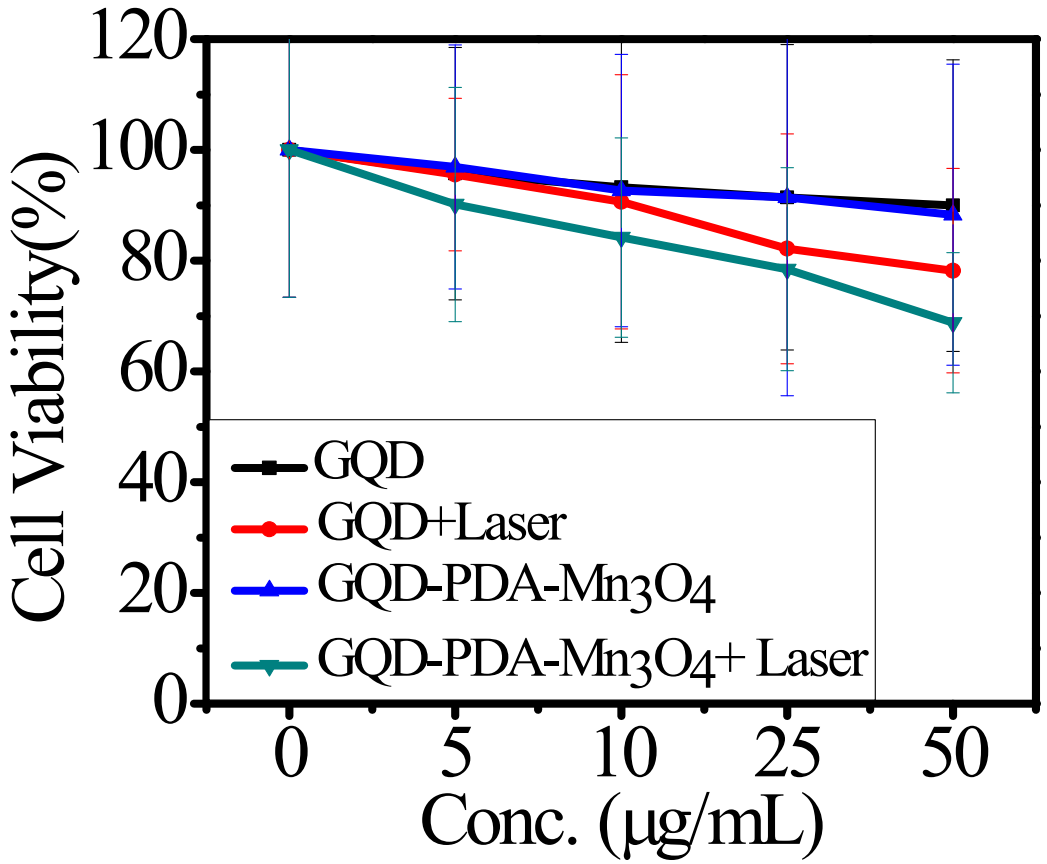

Figure S6. *In vitro* cell viability of MDCK cells incubated with GQD with laser and GQD-PDA-Mn_3O_4 nanoparticles with laser for 24 h at 37 °C.

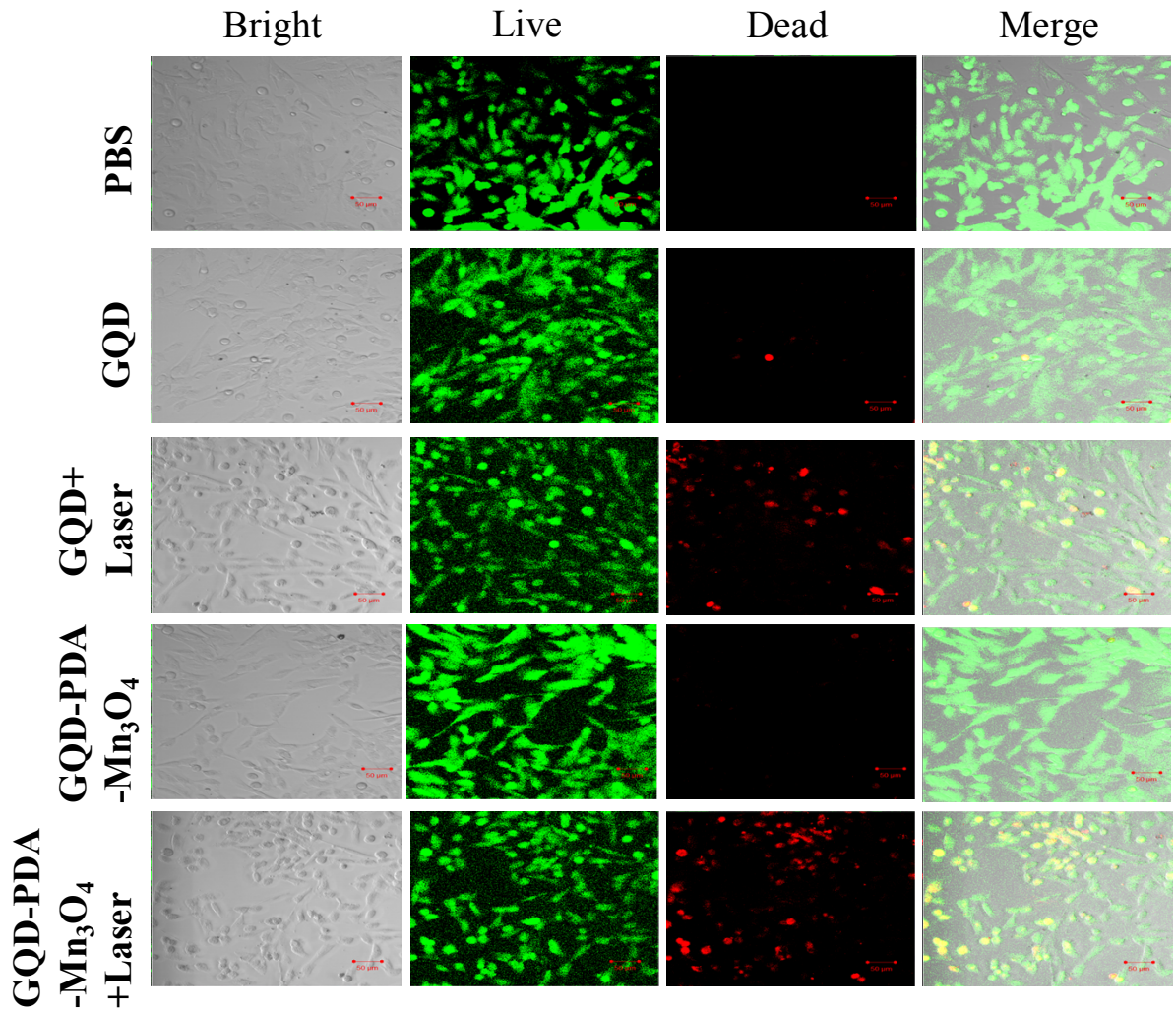

Figure S7. Cellular toxicity of GQD-PDA-Mn_3O_4 nanoparticles. Fluorescence images of calcein AM and Propodium iodide co-staining MDCK cells incubated 50 μg/mL of GQD and GQD-PDA-Mn_3O_4 nanoparticles with/without laser for 24 h at 37 °C.

Materials and Methods

T2 relaxivity analysis

A 3 T clinical MRI instrument (MagnetomSkyra, Siemens AG, Wittelsbacherplatz 2, 80333 Muenchen, Germany) was used for the measurement of relaxivity. A T2-weighted fast spin echo sequence with an echo train length of 32 was set as follows: [TR(repetition

time)/TE(echo time): 3000 / various echo time including 8.9, 17.8, 26.7, 35.6, 44.5, 53.4, 62.3, 71.2, 80.1, 89.0, 97.9, 6.8,115.7,124.6,133.5,142.4,151.3,160.2,169.1,178.0,186.9,195.8 and 204.7ms], flip angle: 180°, field of view: 240x240 mm, slice thickness: 4 mm, interslice gap : 4.4 mm , NEX : 1, and matrix : 256 x 256.

References

1. M. J. Baek, J. Y. Park, W. Xu, K. Kattel, H. G. Kim, E. J. Lee, A. K. Patel, J. J. Lee, Y. Chang, T. J. Kim, J. E. Bae, K. S. Chae and G. H. Lee, *ACS Appl. Mater. Interfaces* 2010, **2 (10),** 2949–2955.