Electronic Supplementary Material (ESI) for RSC Advances.
This journal is © The Royal Society of Chemistry 2017

Electronic Supporting Information

for

Cyto-toxicity, Biocompatibility and Cellular Response of Carbon Dots – Plasmonic Based Nano-hybrids for Bioimaging

A. N. Emam,[a,b]† Samah A. Loutfy,[c] A. A. Mostafa,[a,b] H. Awad[d] and M. B. Mohamed [e, f]

[a)] *Ceramics and Building Materials Department, National Research Centre, Cairo, Egypt*
[b)] *Nanomedicine and Tissue Engineering Laboratory, Medical Research Centre of Excellence, National Research Centre (NRC), Cairo, Egypt*
[c)] *Virology and Immunology Unit, Cancer Biology Department, National Cancer Institute, Cairo University, Cairo, Egypt*
[d)] *Tanning Materials and Leather Technology Department, National Research Centre, Cairo, Egypt*
[e)] *National Institute of Laser Enhanced Sciences (NILES), Cairo University, Cairo, Egypt*
[f)] *Egyptian Nanotechnology Center (EGNC), Cairo University, Zayed City, Giza, Egypt*

Figures

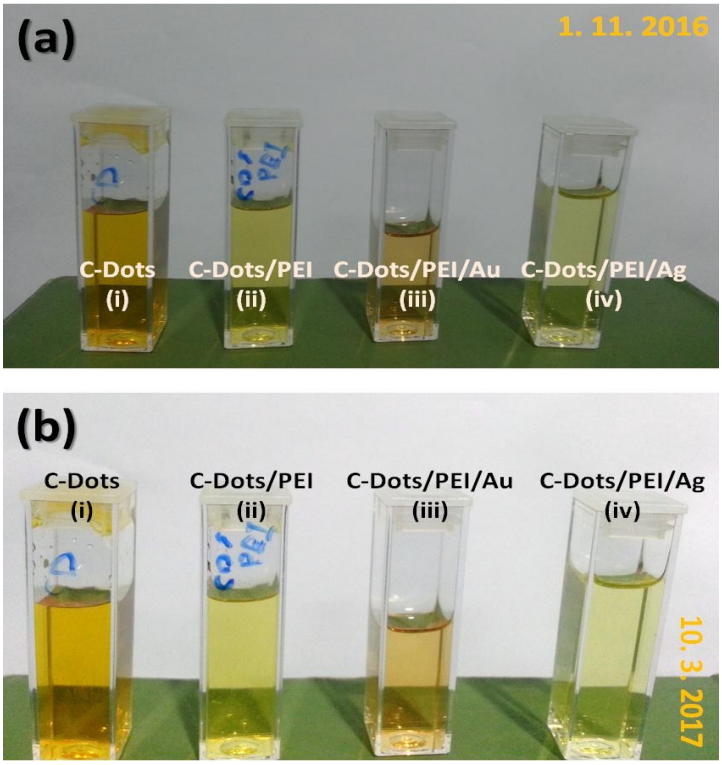

Fig. S1 Photographs of PEI/C-Dots Hybrid Nanocomposites with both Au NPs and Ag NPs solutions at zero time (a), and after 3 months of preparation (b).

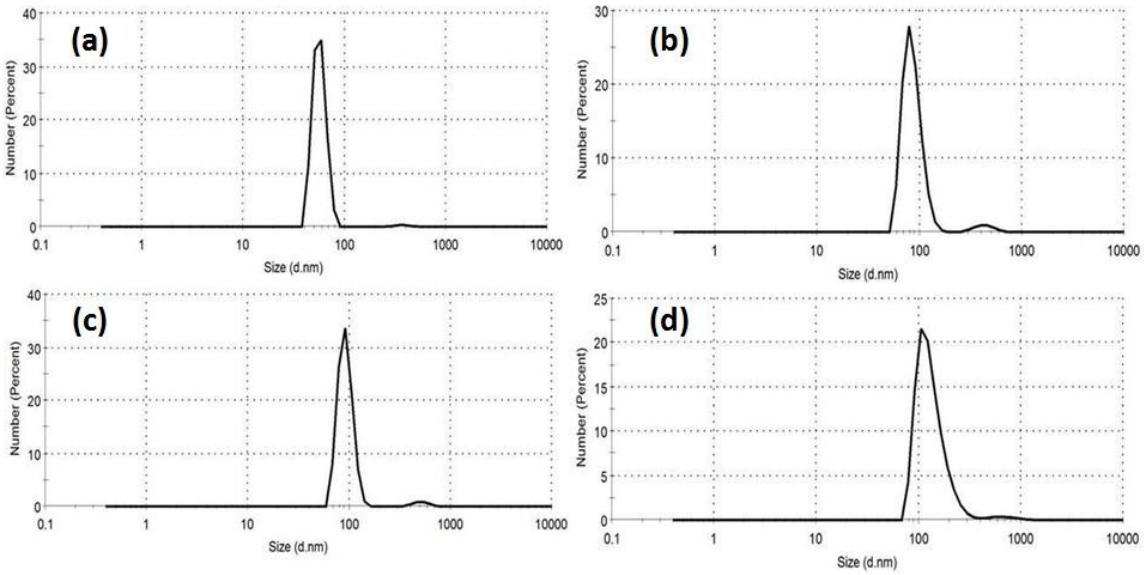

Fig. S2 Hydrodynamic diameter estimated by DLS technique for (a) C-Dots, (b) C-Dots/PEI, (c) C-Dots/PEI/Au and (d) C-Dots/PEI/Ag NanoHybrids.

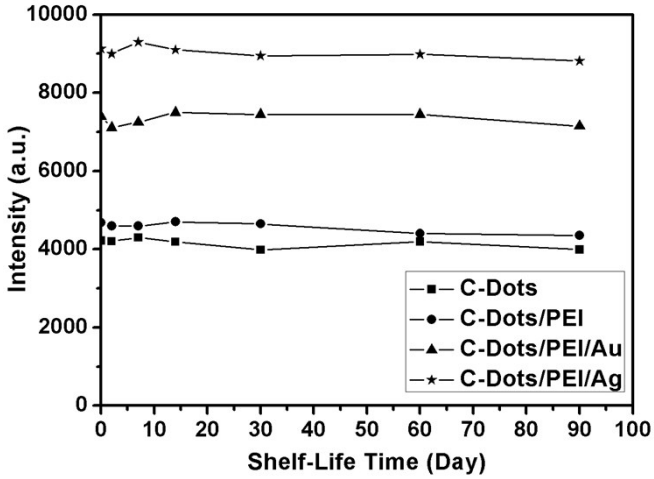

Fig. S3 The long-term Photoluminescence Stability for C-Dots, C-Dots/PEI, C-Dots/PEI/Au and C-Dots/PEI/Ag hybrid nanocomposites after shelf-life storage up to 3 months.

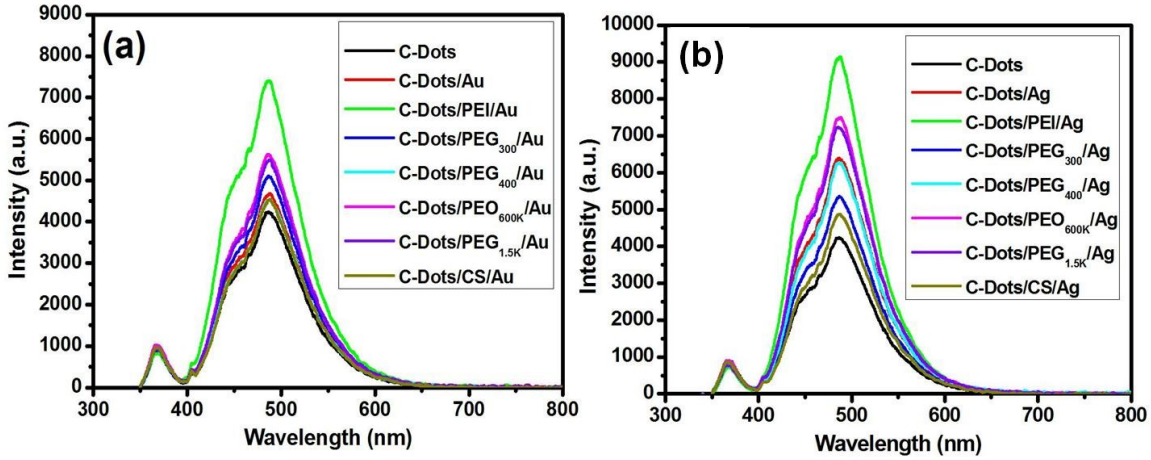

Fig. S4 The Plasmonic Effect on the PLE Properties of C-Dots in Presence of different polymeric spacers upon excitation at steady-state condition (λ_{ex} ~ 366 nm) for (a) C-Dots/Spacer/Au and (b) C-Dots/Spacer/Ag hybrid nanocomposites.

Table S1. Influence of Plasmonic nanoparticles (e.g. Au and AgNPs) on the PLE properties of C-Dots in presence of different spacers

Polymeric Spacer	Au NPs				Ag NPs			
	λ_{ex}[a] 366 nm		QY/QY_{Dye} [d] Steady-State λ_{ex} ~ 366 nm	FWHM [e] Steady-State λ_{ex} ~ 366 nm	λ_{ex}[a] 366 nm		QY/QY_{Dye} [d] Steady-State λ_{ex} ~ 366 nm	FWHM [e] Steady-State λ_{ex} ~ 366 nm
	I[b]	I/I_0[c]			I[b]	I/I_0[c]		
Pure	**(I_0) 4223.69**	-	**22.468**	33.60484	**(I_0) 4223.69**	-	22.468	33.60484
No Spacer	4683.54	**1.11**	**49.669**	86.74477	6397.74	1.51	70.876	87.98712
PEI 1.2 K	7403.64	**1.75**	**55.52**	30.56937	9134.23	2.16	77.213	17.44447
PEG 300	5103.11	**1.21**	**42.385**	28.74657	5358.99	1.27	55.683	86.61188
PEG 400	4541.93	**1.08**	**37.196**	27.70977	6271.99	1.49	52.505	27.20729
PEO 600 K	5633.71	**1.33**	**46.31**	28.92912	7499.62	1.78	64.795	23.93524
PEG 1.5 K	5490.96	**1.30**	**28.69**	48.32572	7236.54	1.71	60.569	27.67129
CS Low M.wt.	4539.02	**1.07**	**37.054**	28.27469	4875.24	1.15	37.929	27.93471

[a] **λ_{ex}**: excitation wavelength. [b] **λ_{em}**: PLE wavelength. [c] **I/I_0**: Relative Enhancement Factor. [d]**QY/QY_{Dye}:** Relative quantum yield. [e] **FWHM**: Full width at half-maximum

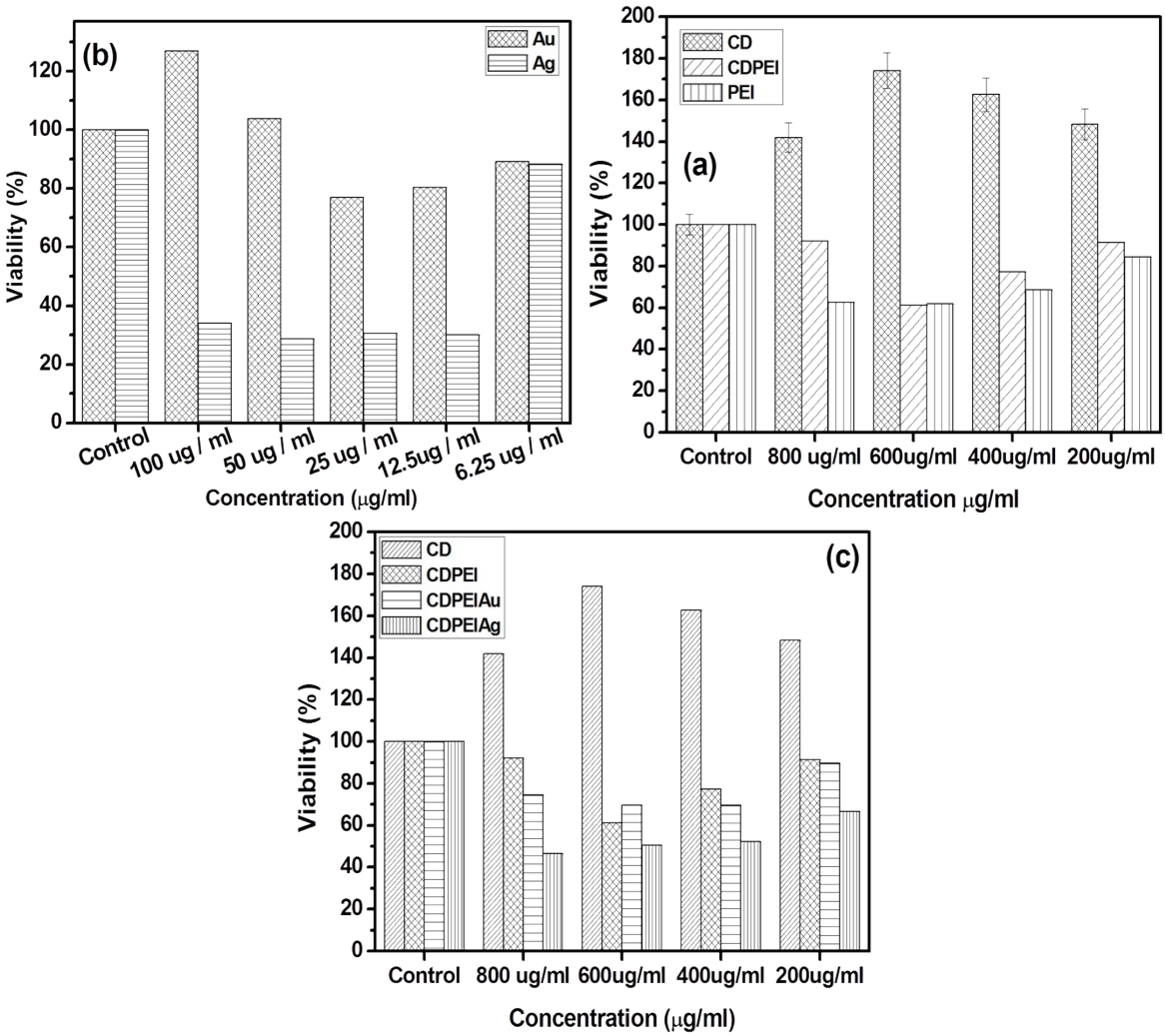

Fig. S5 Cyto-toxicity of (a) C-Dots, (b) Plasmonic nanostructures (Au and Ag NPs) and (c) C-Dots hybrid nanocomposites (i.e. CD-PEI, CD/PEI/Au and CD/PEI/Ag) against Vero normal cells by using MTT assays, illustrating percentage cell viability when compared to non-treated cells being arbitrarily assigned 100% viability upon exposing the cells to different concentration for 48 h.

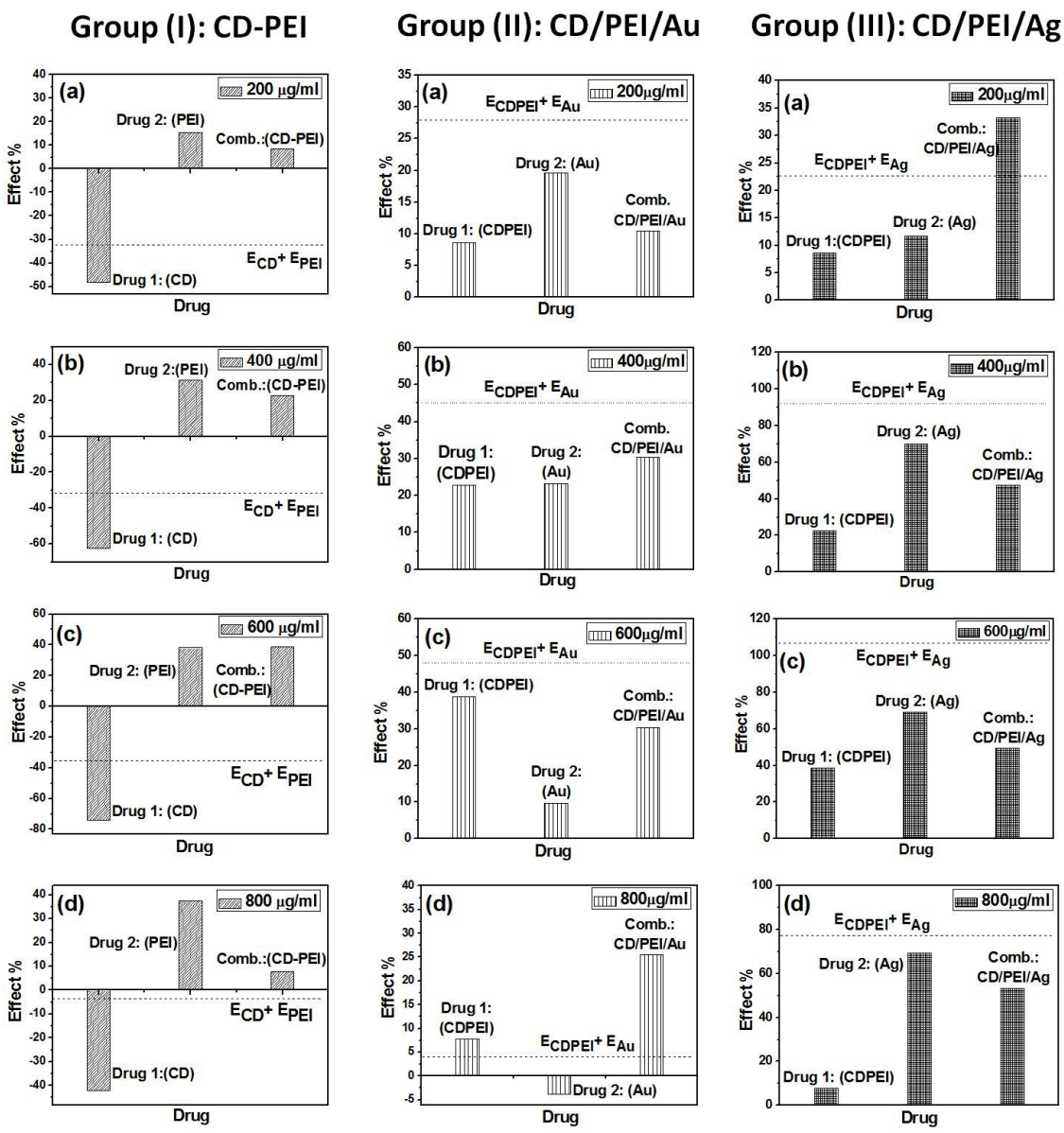

Fig. S6 Cellular response of *Vero Cells*, and the combination approach effect based-on combination index (CI) calculations of the as-prepared hybrid nanocomposites based-on C-Dots including PEI coated C-Dots (Group I), C-Dots/PEI/Au (Group II) and C-Dots/PEI/Ag (Group III) Nanohybrids. *This calculation based on based on Response Additivity model.*

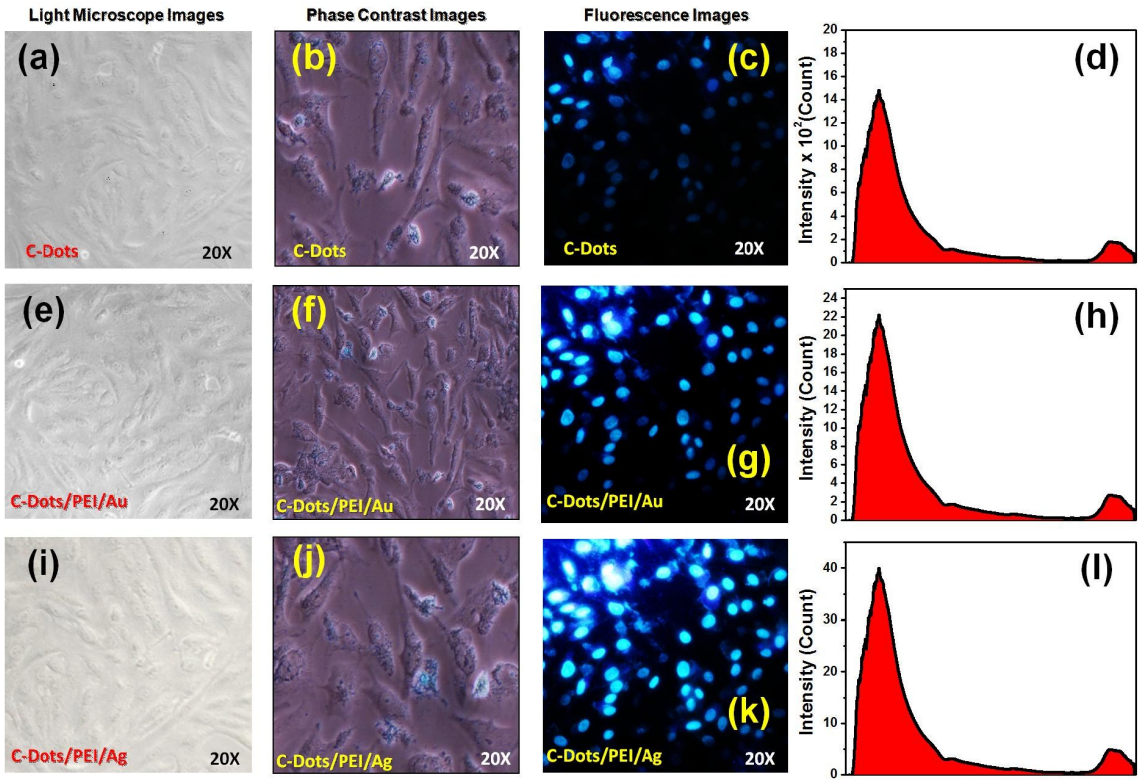

Fig. S7 Bright field (a, e and i), Phase contrast (b, f and j) and fluorescence images (c, g and k) of HepG-2 cells after 24 hr incubation, and the intensity histogram (d, h and l) of fluorescence images. (a, b and c) for C-Dots. (e, f and g) for C-Dots/PEI/Au NanoHybrids. (i, j and k) for C-Dots/PEI/Ag NanoHybrids.

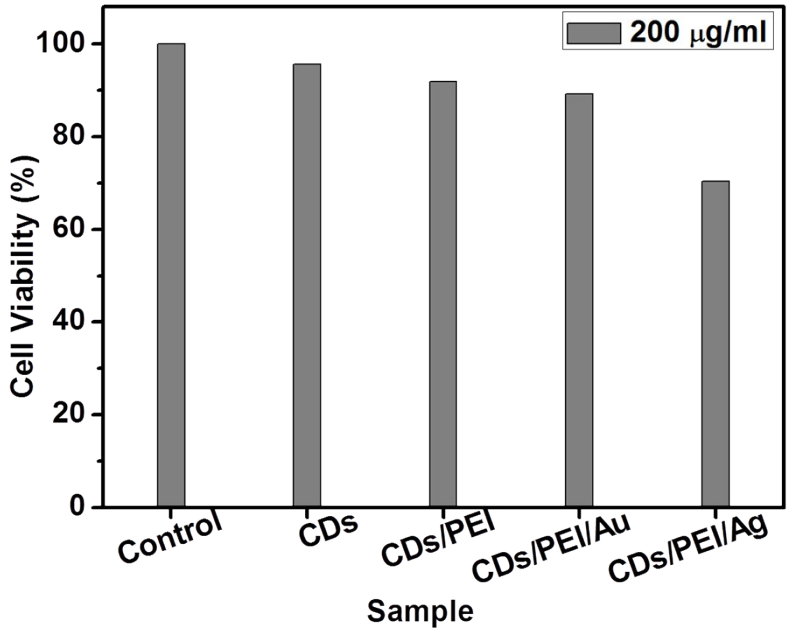

Fig. S8 Cyto-toxicity for each of C-Dots, PEI coated C-Dots, C-Dots/PEI/Au and C-Dots/PEI/Ag NanoHybrids against human liver carcinoma (HepG-2) cell lines based-on MTT assay after exposure to the dose of 200 µg/ml.