**Supporting Information**

# dGTP Templated Luminescent Gold Nanocluster Based Composite Nanoparticles for Cancer Theranostics

*Bandhan Chatterjee,*[a] *Archita Ghoshal,*[b] *Arun Chattopadhyay,*[c] *and Siddhartha Sankar Ghosh,*[b]*

[a] Centre for Nanotechnology, Indian Institute of Technology Guwahati, Guwahati – 781039, Assam, India.

[b] Department of Biosciences and Bioengineering, Indian Institute of Technology Guwahati, Guwahati, Assam, India. Email: sghosh@iitg.ernet.in

[c] Department of Chemistry, Indian Institute of Technology Guwahati – 781039, Guwahati, Assam, India.

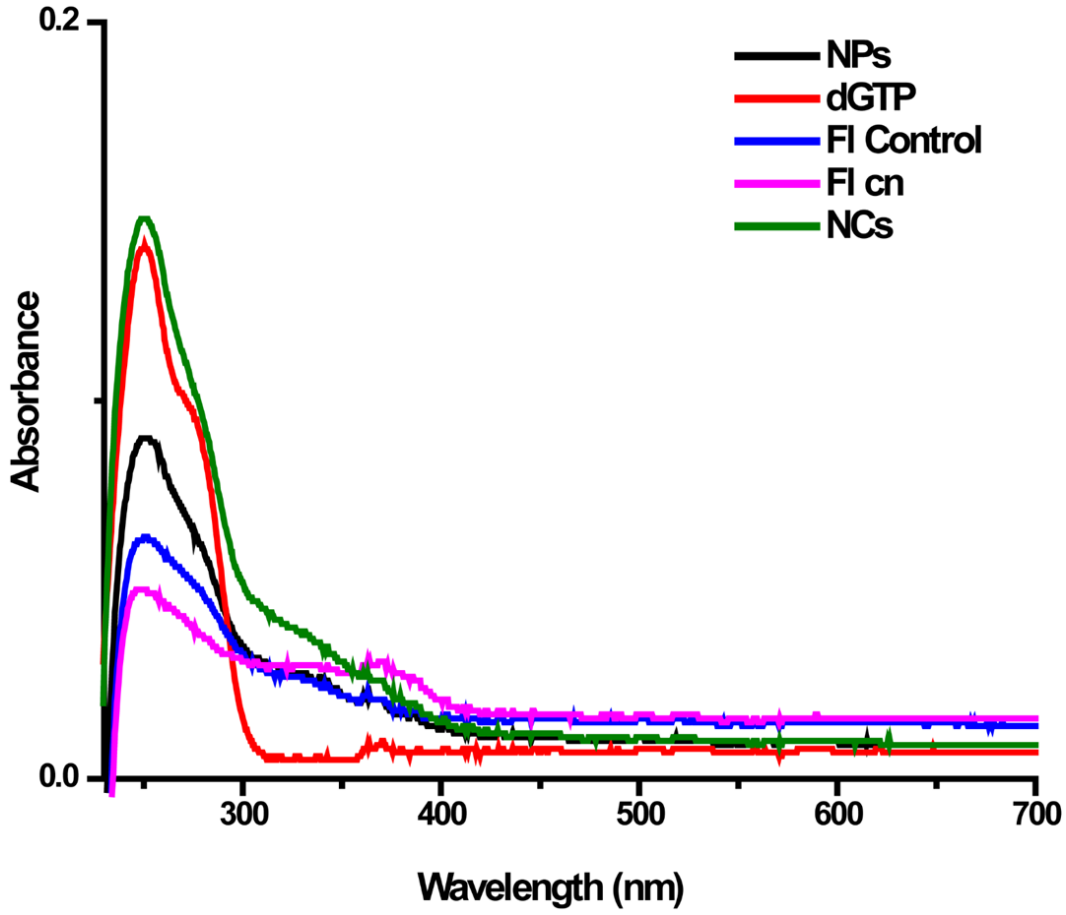


**Figure S 1**: UV-Vis spectra of NCs, NPs, dGTP, Fl Control and Fl cn (concentration used: $HAuCl_4$ = 14.44 µM, MPA = 53.33 µM, dGTP = 1.38 µM).

Here the UV-Vis spectrum clearly depict the absence of any peaks in the visible region (400-700 nm) thus discounting the generation of any SPR active component during the synthesis. However, there is a hump around 325 nm in NCs and composite NPs, this peak is also found in controls spectrum (Fl. Control {gold and MPA mixture, no heating} and Fl cn in {Gold and MPA mixture + heat}) but the intensity is very less. However, the peak is completely absent in the dGTP absorption profile thus confirming the absorption peak is due to absorption by (mixture of) gold-MPA adduct. Similarly, the peak around 280 nm is present in dGTP, NCs and NPs (all having dGTP) but is absent from controls (no dGTP) suggests the peak around 280 nm can be attributed to dGTP and is supported by the existing literature.

The hump around 370 nm is due to change in the filter from UV to visible range and is an aberration of the instrument.

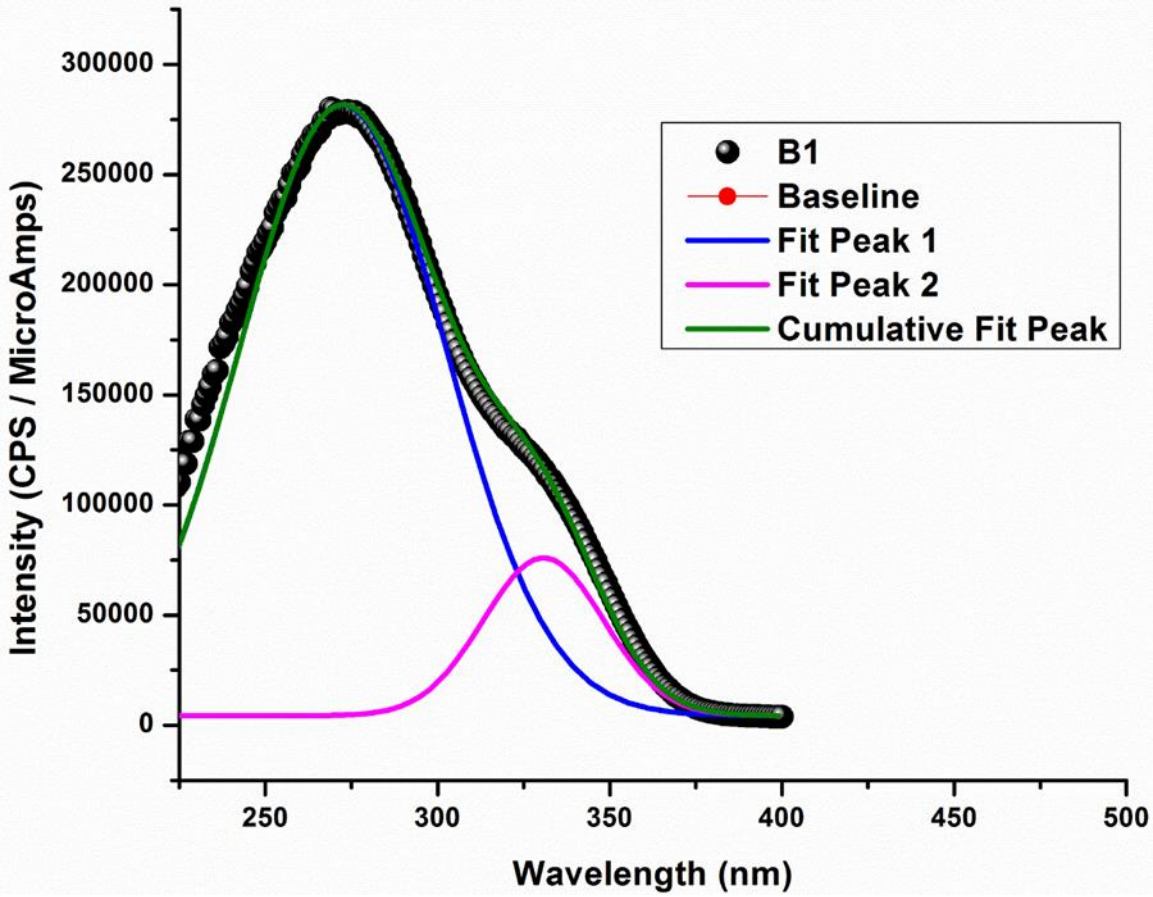


**Figure S 2:** Deconvoluted excitation spectrum confirming the presence of a wide absorption spectrum (have both 320 and 355 in range, concentrations used: $HAuCl_4$ = 14.44 µM, MPA = 53.33 µM, dGTP = 1.38 µM).

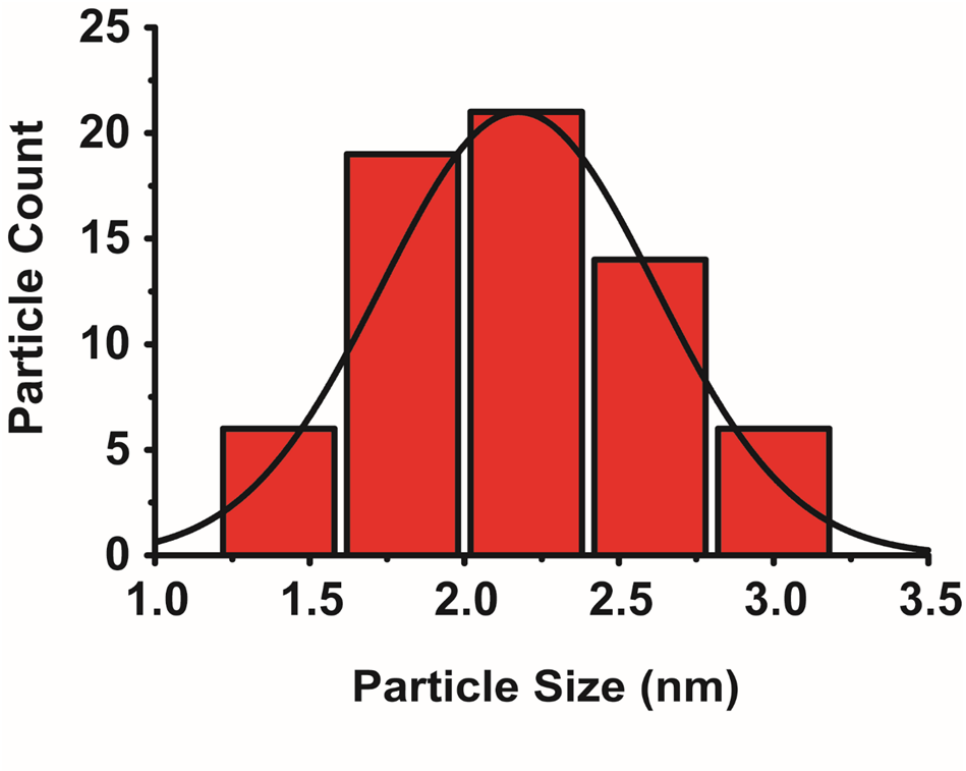


**Figure S 3:** TEM based size distribution of the synthesized dGTP templated fluorescent Au NCs. The average size of the particle was calculated to be 2.05±0.43 nm in the TEM analysis (Concentration of chemicals in the dilution, from which 7 µL was used for TEM study: $HAuCl_4$ = 20 µM, MPA = 73.84 µM, dGTP = 1.92 µM).

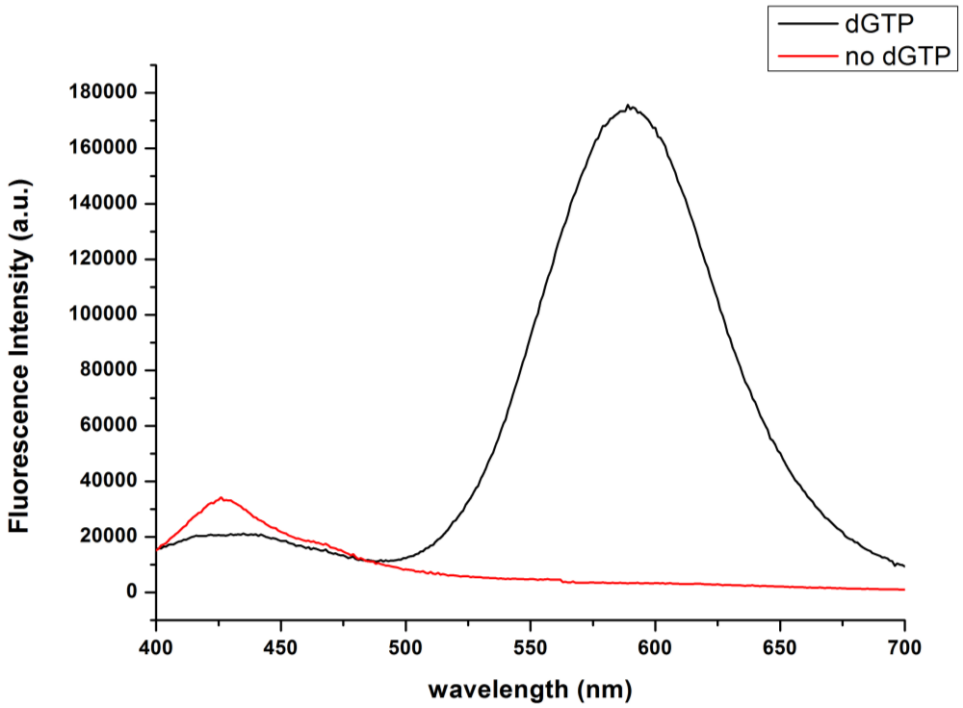


**Figure S 4**: Fluorescence emission of the synthesized luminescent NCs. The current method of synthesis generated fluorescence only in presence of the template i.e. dGTP and in absence of dGTP, it did not generate any fluorescent Au NCs (Concentration used: $HAuCl_4$ = 21.36 µM, MPA = 78.90 µM, dGTP = 2.05 µM).

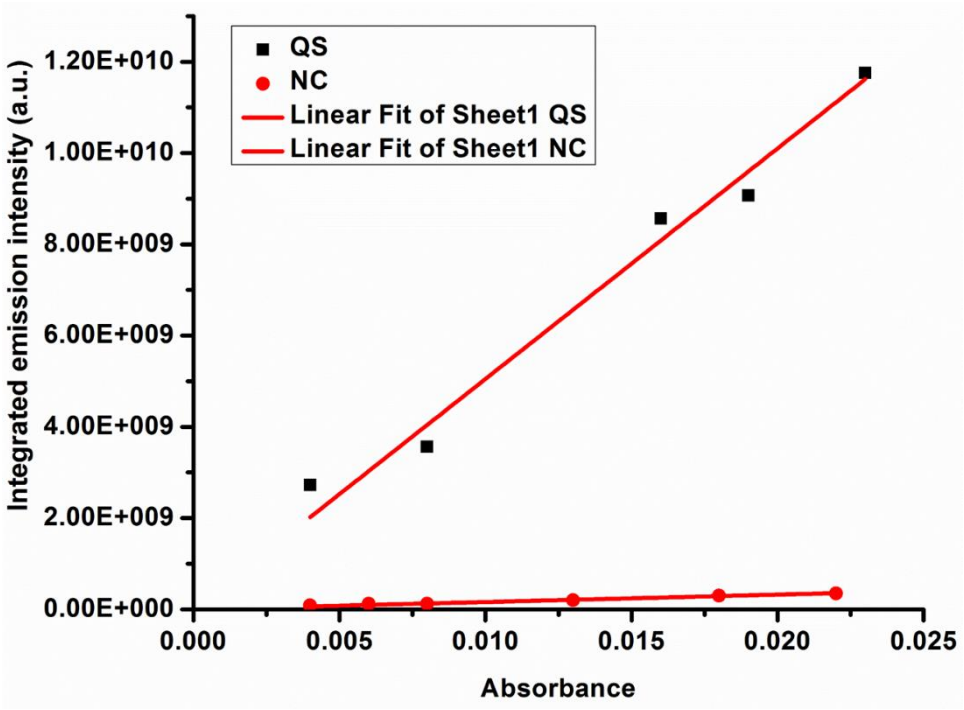

**Figure S 5.** Integrated fluorescence intensity vs absorbance plot of NCs and quinine sulphate. Quinine sulphate was used here as a standard and quantum yield of NCs was 2.16%.

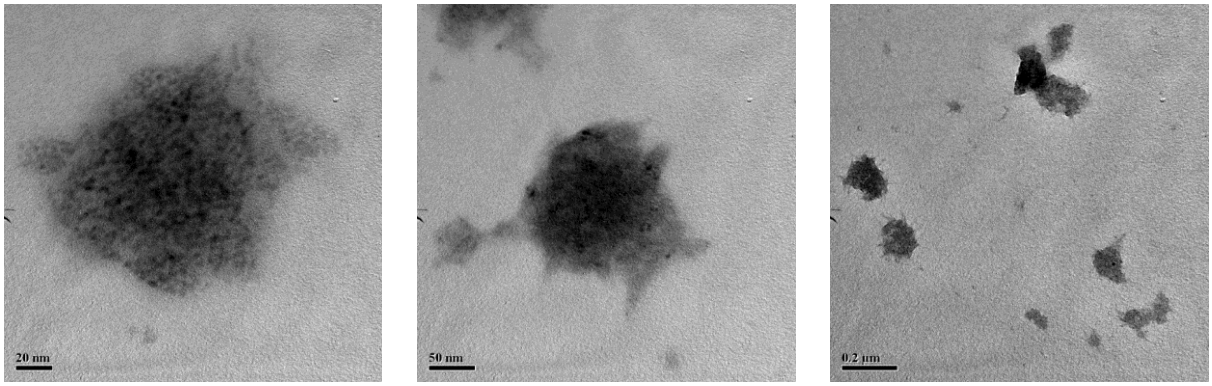


**Figure S 6.** TEM images of the NC-Cisplatin conjugates, depicting a roughly spherical morphology.

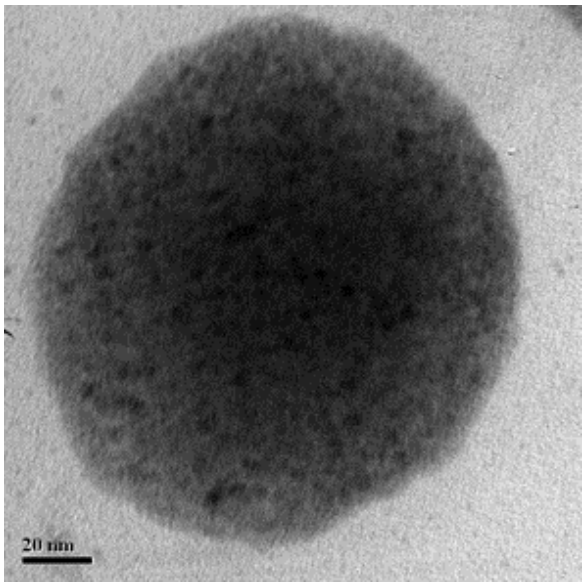


**Figure S 7.** A magnified image of the composite NPs, here the dark spots represents the NCs and the outer line of the particle represents the PEG coating.

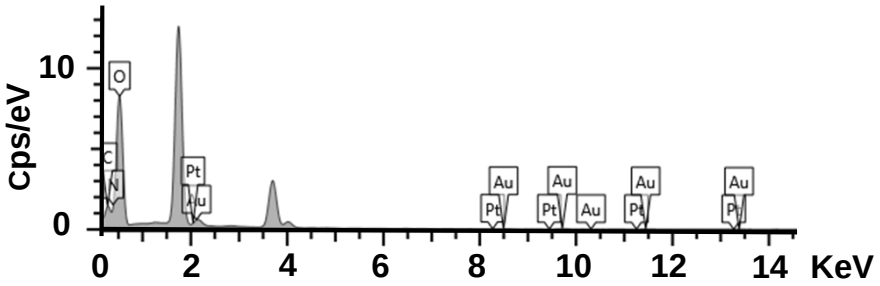

**Figure S 8.** Energy Dispersive X-ray (EDX) spectrum of the composite NPs conforms the inclusion of both gold and platinum composite NPs.

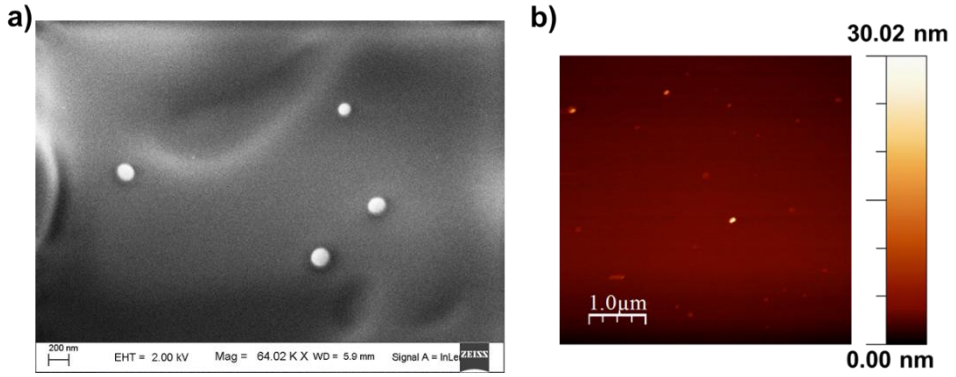


**Figure S 9.** a) FESEM studies corroborates with b) AFM studies in supporting the spherical nature of the composite NPs.

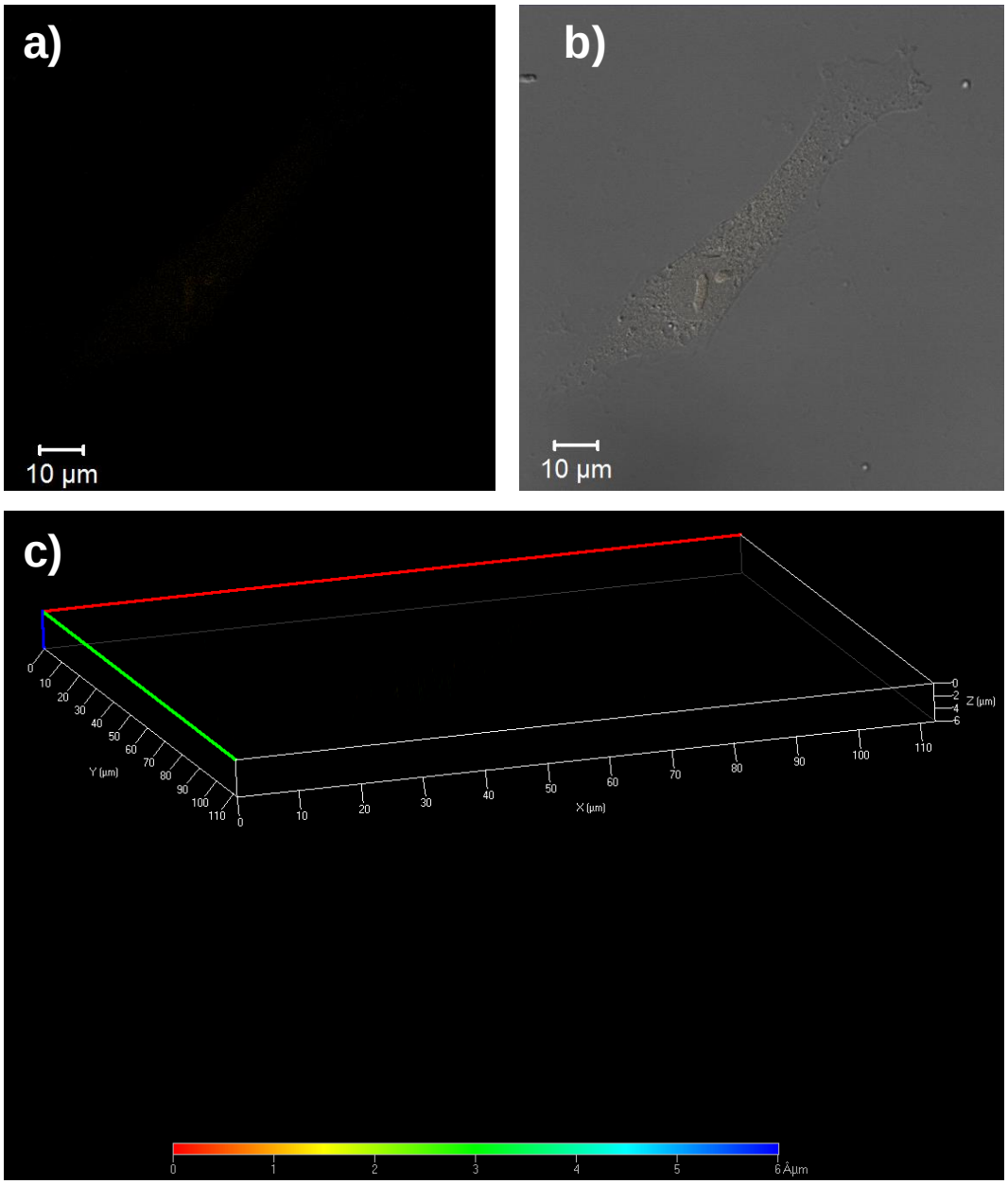


**Figure S 10.** Confocal imaging of HeLa cells treated with the composite NPs for 4h at 4 $^{o}$C a) fluorescent image of the cells displaying no fluorescence b) merged image of the treated HeLa cells displaying no fluorescence c) confocal 3d projection of 6 µm Z-stack (same cell), displaying no fluorescence from inside the cells.

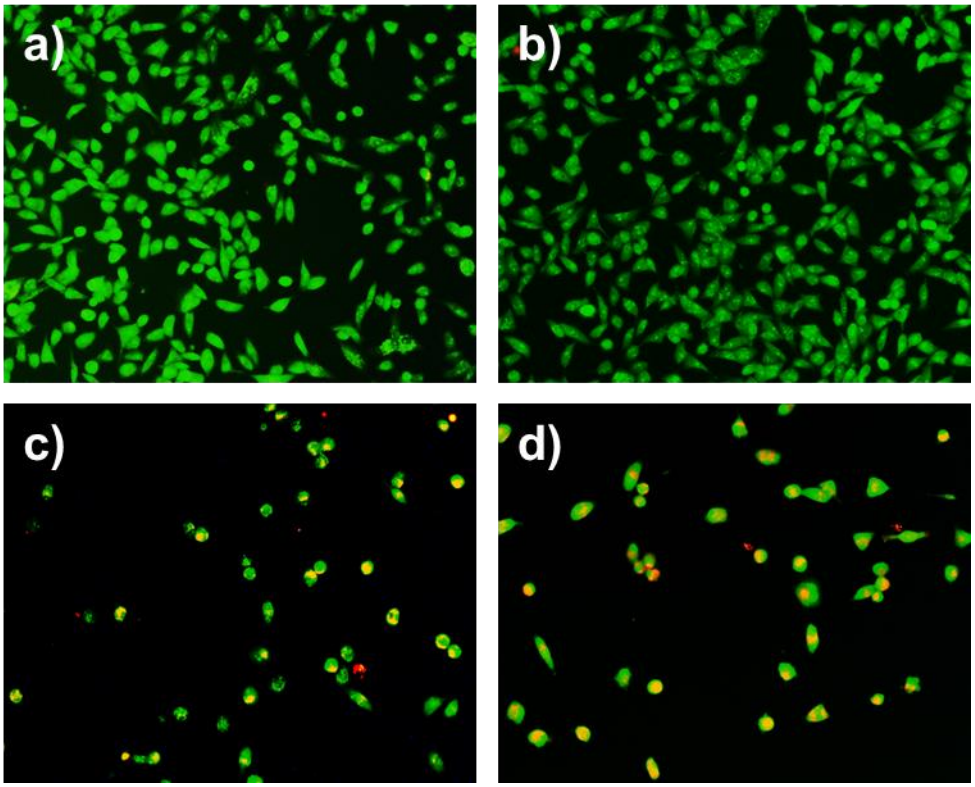


**Figure S 11.** Dual AO/EB Staining of HeLa cells after treatment with (A) Control cells (B) NCs (C) Cisplatin (D) Composite NPs. Here the red cells indicate the dead cells while the green cells indicate the live cells.