Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting Information

Loading of Single-walled Carbon Nanotubes in Cationic Cholesterol Suspensions Significantly Improve Gene Transfection Efficiency in Serum

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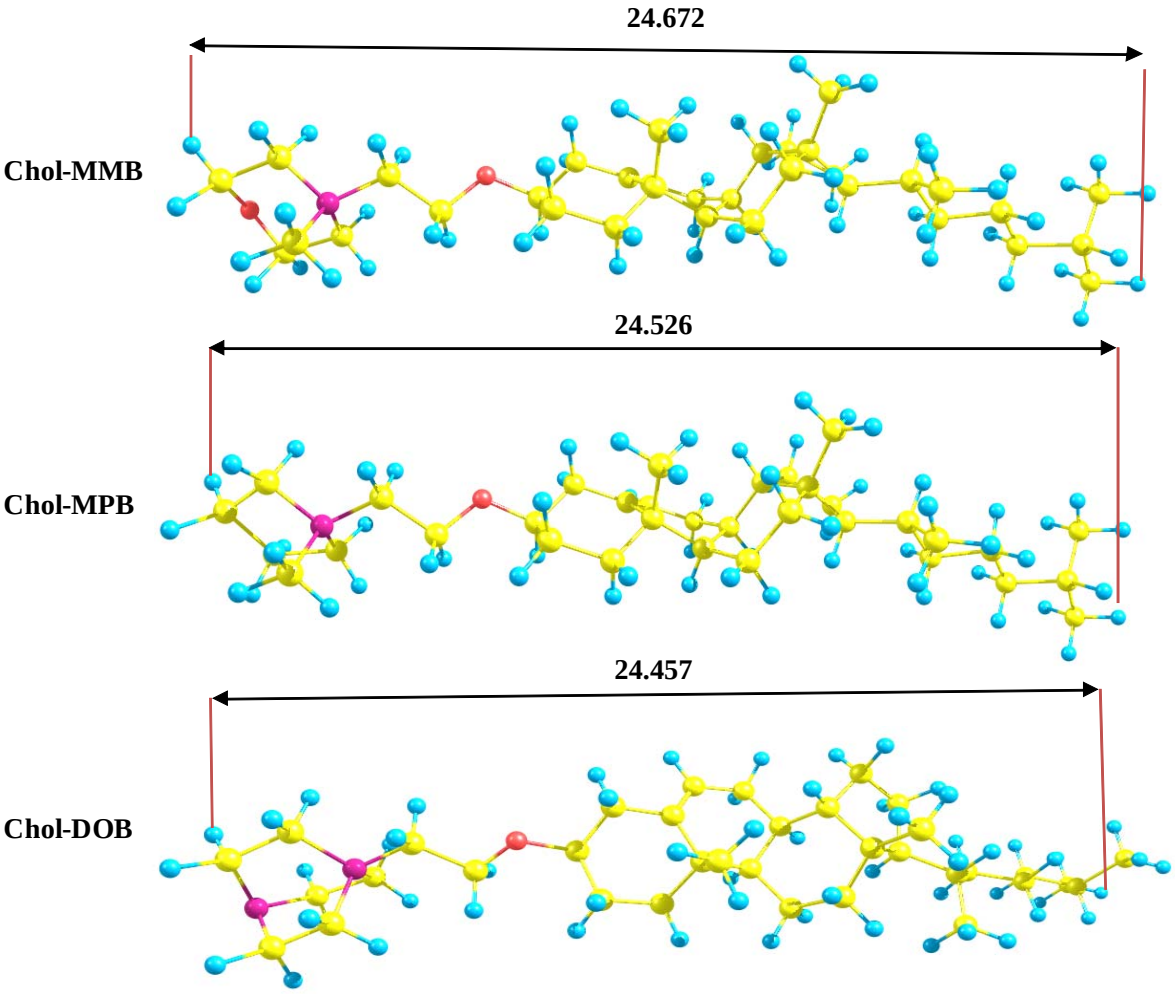

Figure S1. Energy-minimized structure of the cationic cholesterol, Chol-MMB, Chol-MPB and Chol-DOB where 'yellow' atom represents the Carbon atom, light blue: the Hydrogen, purple: Nitrogen and red represents Oxygen.

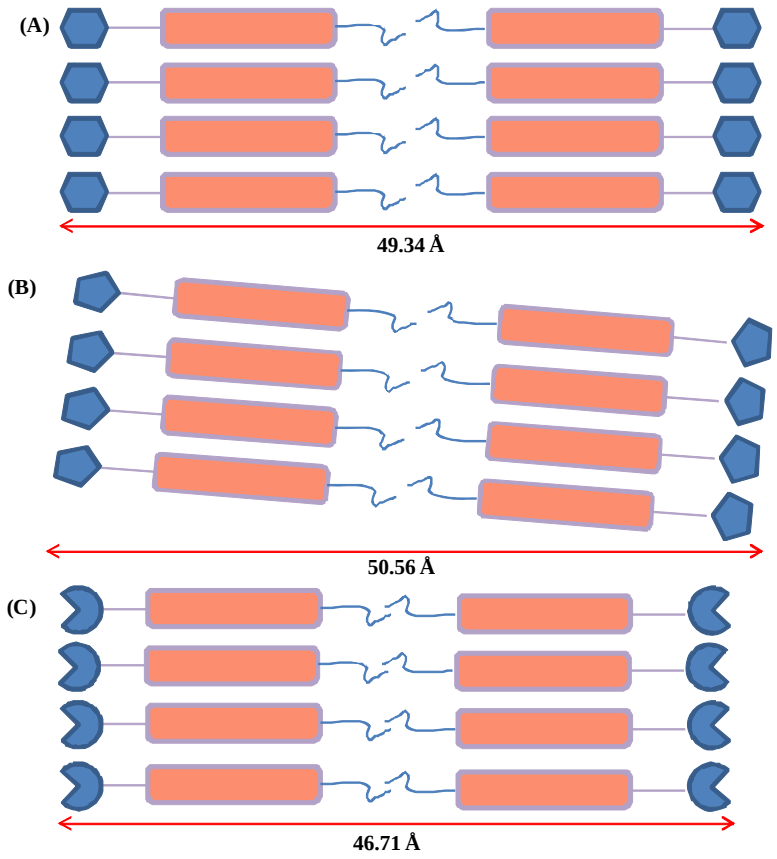

Figure S2. Probable model for bilayer arrangements of (A) Chol-MMB; (B) Chol-MPB and (C) Chol-DOB aggregates as observed from the XRD measurements.

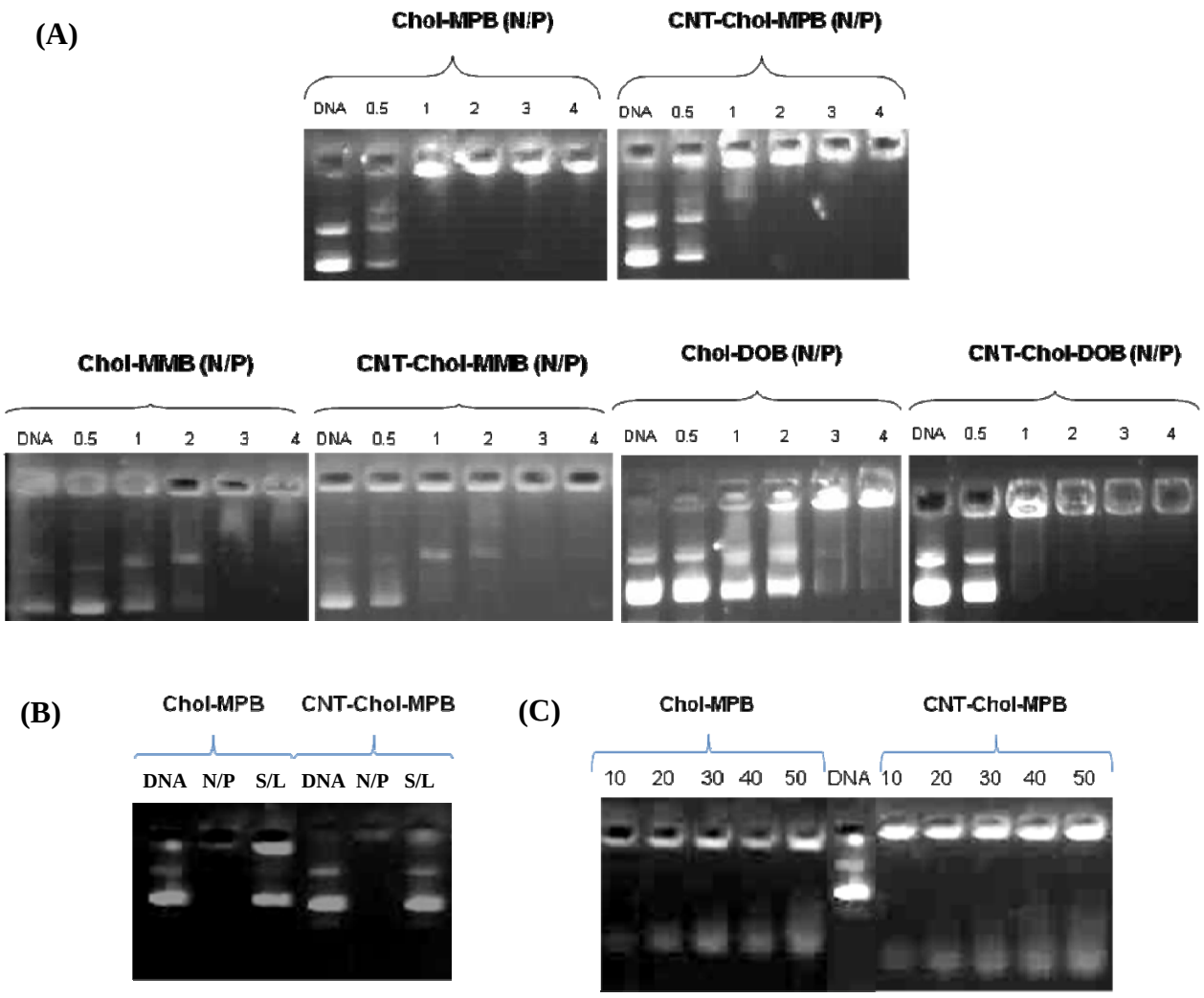

Figure S3. DNA binding ability of formulations based on Chol-lipid alone and CNT-Chol-lipid composites having identical amount of lipid (A). SDS mediated DNA release efficiency of Chol-MPB-DNA and CNT-Chol-MPB-DNA complex, where N/P represents Lipid/DNA charge ratio = 3/2 and S/L represents SDS/Lipid molar ratio = 1 (B)**.** Comparison of the stability of Chol-MPB-DNA and CNT-Chol-MPB-DNA complexes in various % of FBS (10 – 50%) added to the complexes (C). Each well has 0.2 μg of DNA.

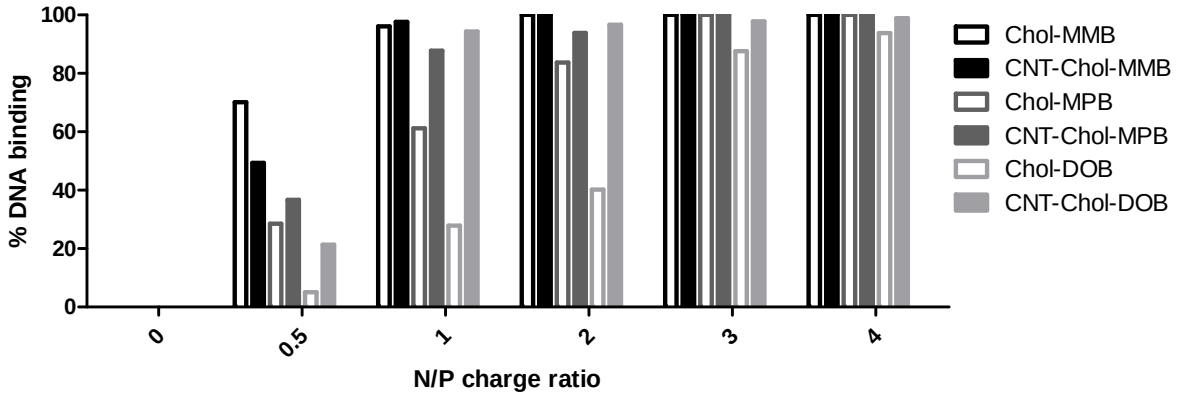

Figure S4. Extent of DNA binding with different cationic Chol lipid suspensions, with or without CNT as obtained from gel electrophoresis. Experiment was performed using 0.2 μg DNA/well.

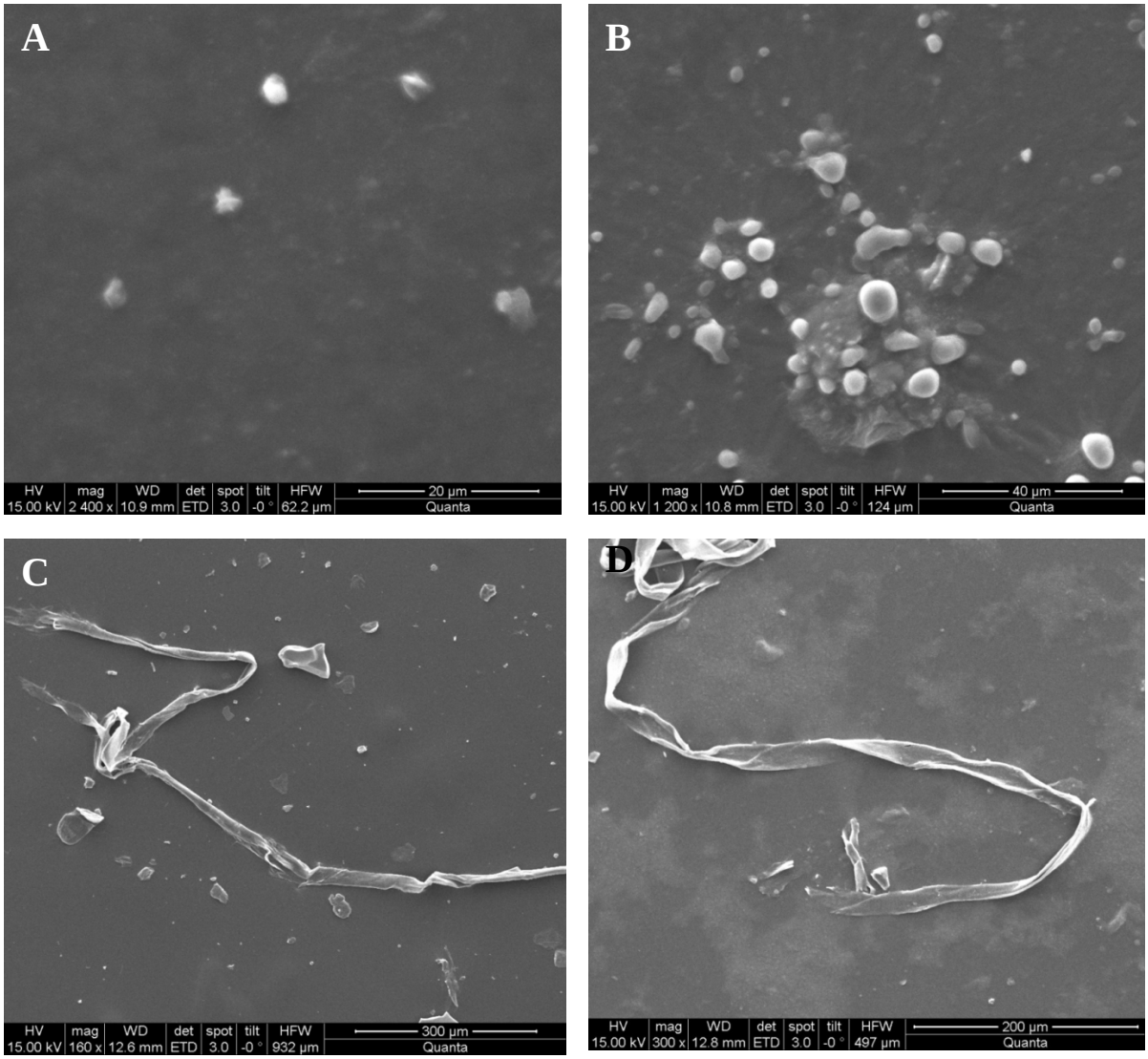

Figure S5. Scanning electron microscopy images of samples of aqueous suspensions of (A) Chol-MPB; (B) Chol-MPB-DNA; (C) CNT-Chol-MPB and CNT-Chol-MPB-DNA.

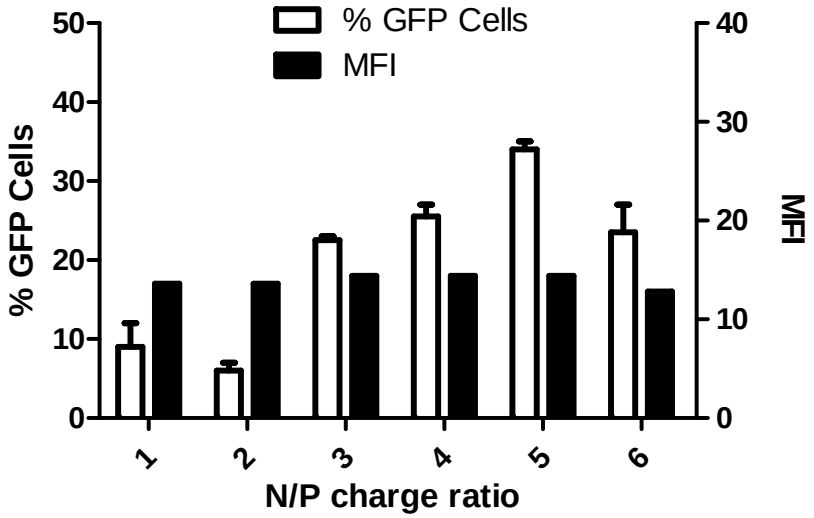

Figure S6. Optimization of the amount of SWCNT in CNT-Chol-MPB-DNA complex. N/P charge ratio represents the ratio of the cationic chol and DNA base molarity present in the complex. Experiment was performed using 0.8 μg DNA/well in A549 cells.

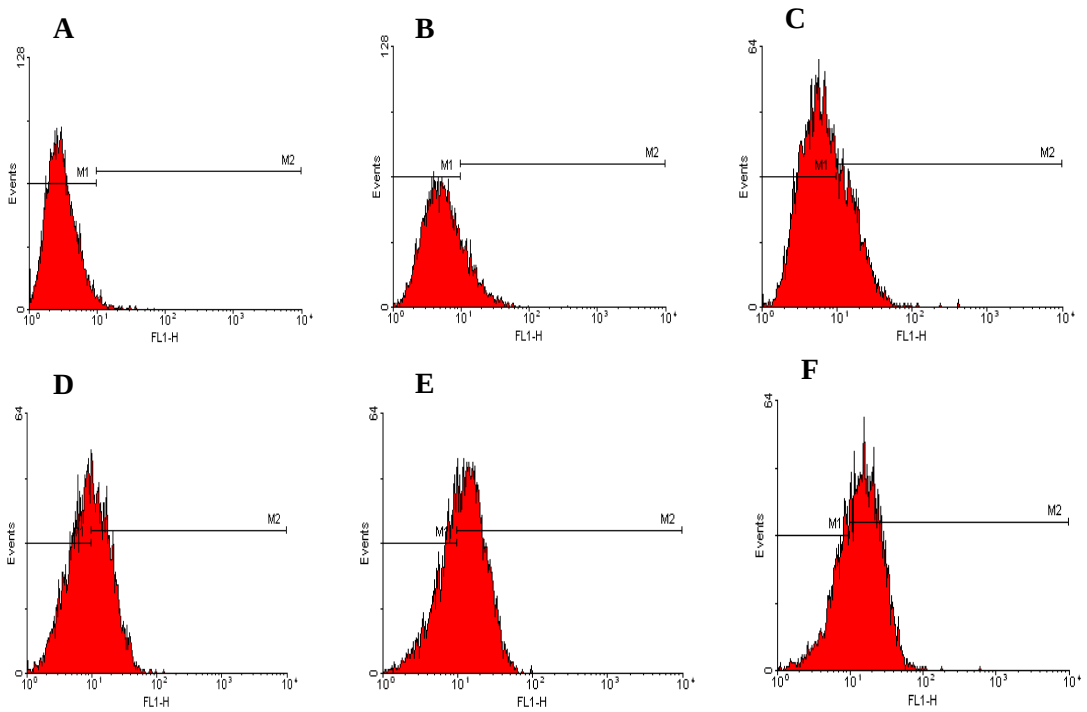

Figure S7. Histogram showing an increase in M2 cell population (cells with GFP expression) with increases in N/P charge ratio from 0-to-5 (A-F). Experiment was performed using 0.8 µg DNA/well in A549 cells.

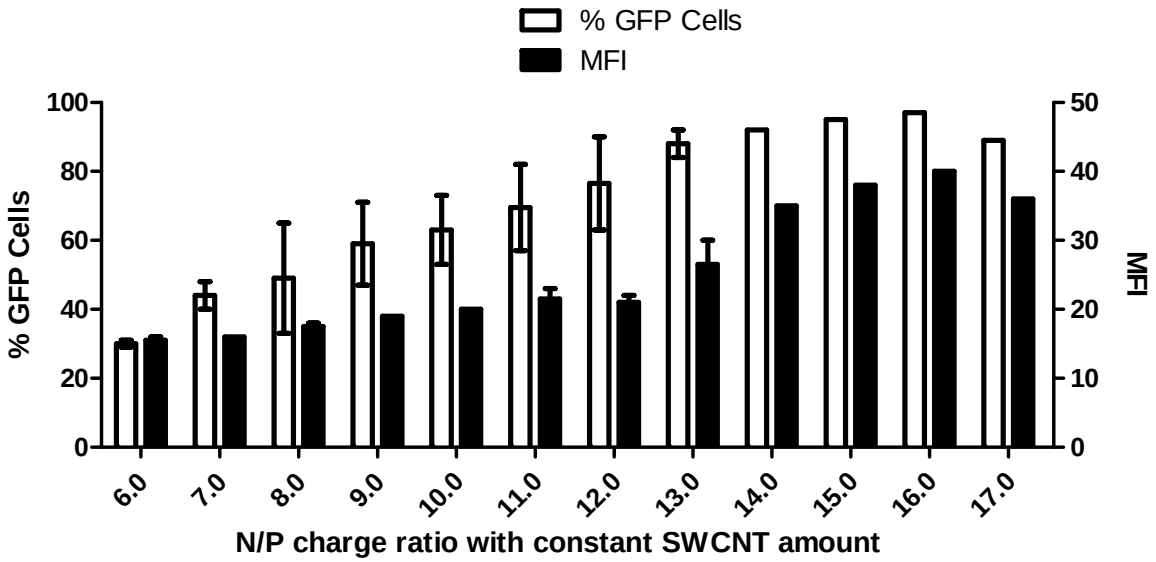

Figure S8. Effect of gradual increases of cationic Chol-MPB in pre-formed CNT-Chol-MPB-DNA complex on the gene transfection efficiency. Experiment was performed using 0.8 μg DNA/well in A549 cells.

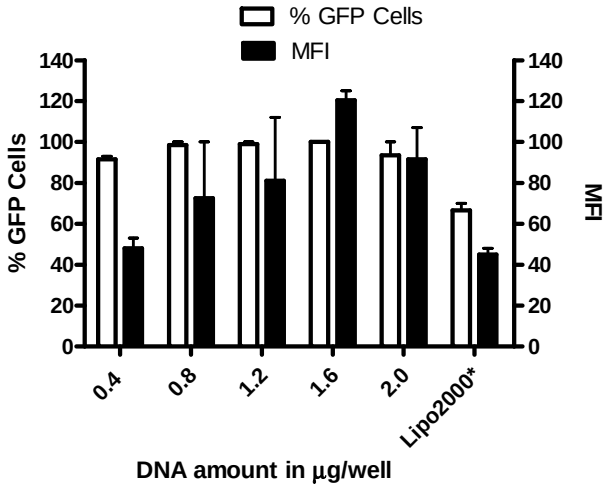

Figure S9. Effect of the variation of the amount of DNA on pEGFP-C3 gene transfection. Aqueous suspension of SWCNT-Chol lipid was used for experiment in presence of different percentage of serum. 1.6 µg of DNA per well for 60,000 cells is best optimized for the reporter gene feed.

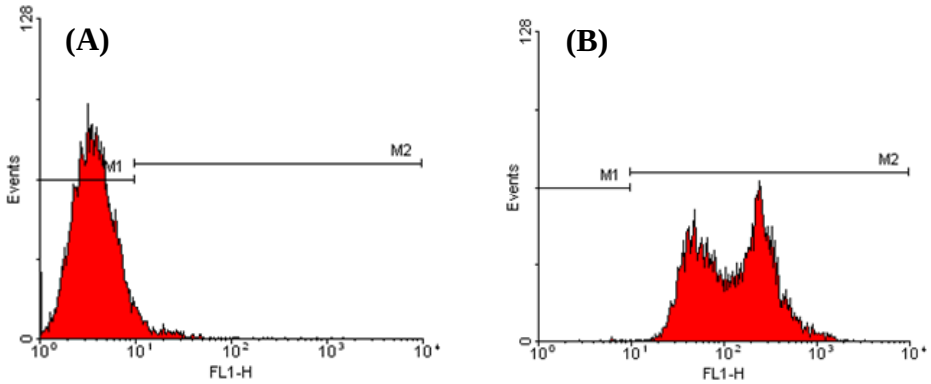

Figure S10. Shift in the FACS peak, on pEGFP-C3 reporter gene transfection in A549 cells in absence of serum. FACS histogram shows population of (A) un-transfected cells and (B) transfected cells. CNT-Chol-MPB suspension at N/P charge ratio = 15 with DNA = 1.6 µg/well was used in the transfection experiment. The region 'M1' shows the residual fluorescence which belongs to non-specific proteins present in cells while 'M2' region shows the fluorescence originated from the GFP alone, expressed from reporter gene introduced in A549 cells via CNT-lipid mediated transfection.