Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Compaction of DNA with Lipid Modified Silica Nanoparticles
SUSHMA SAVARALA, STEPHANIE L WUNDER, MARC ILIES, Temple University — There is an increasing interest in modified inorganic nanoparticles, polymers or hybrid polymer-inorganic nanoparticles for use in DNA transfection, rather than viral vectors or liposomes. Adsorption of the DNA to the nanoparticles prevents enzymatic degradation of the DNA, although the reason for this protection is not completely understood. In order to compact the negatively charged DNA, a positively charged surface is required, and for transfection applications, the nanosystems must remain stable in suspension. It is also useful to minimize the amount of cytotoxic cationic lipid needed for DNA compaction in delivery applications. Here we investigate the colloidal stability of supported lipid bilayers (SLBs) composed of mixtures of 1,2-dimyristoyl-sn-glycero-3-phosphocholine (DMPC, 14:0 PC) and 1,2-dimyristoyl-3-trimethylammonium-propane (DMTAP, 14:0 TAP), and their ability to compact plasmid DNA. Ionic strengths and DMPC/DMTAP ratios that resulted in SLB formation, no excess small unilamellar vesicles (SUVs) in the suspensions, and colloidal stability, were determined. DNA/SLB/lipid ratios that resulted in compaction were then investigated.

Stephanie L Wunder
Temple University

Date submitted: 29 Nov 2011 Electronic form version 1.4