

Title: Modification of Liposome Release Characteristics with Metal Nanoparticles

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Gold nanoparticles have been getting increasing amount of attention due to their stability, optical properties and low toxicity in the field of consumer products and biomedicines. Gold nanoparticles with various surface chemistries have been synthesized in order to take advantage of the size, shape and morphology dependent properties of the nanoparticles which vary greatly from the bulk properties. These properties of gold nanoparticles have made them attractive in optical sensing, targeted drug delivery, bio imaging, chemical, catalytic and photo thermal applications. These surface functionalized nanoparticles were used to study nanoparticle-lipid bilayer interactions using lipid bilayer permeability studies, where permeability of small unilamellar vesicles (SUVs) were studied spectrofluorometrically by measuring the efflux of encapsulated fluorescent marker dye from the vesicles in the presence of the surface functionalized gold and silver nanoparticles. SUVs containing highly self-quenched entrapped fluorescein was prepared from common lipids and subjected to nanoparticles. Initially the fluorescence is low due to self-quenching but increases dramatically as the entrapped dye leaks out of the liposomes (with time, temperature or due to interactions with the nanoparticles resulting in the change of stability or permeability of the lipid bilayer). This extent of change in fluorescence signal in the form of relative fluorescence of the leaked marker dye was used to determine the change in membrane permeability.