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**Effects of Gold Nanoparticles on Lipid Packing and Membrane Pore Formation** ANUPAMA BHAT, LANCE EDWARDS, Delaware State University DE, XIAO FU, NIH Bethesda MD, DILLON BADMAN, University Of Rochester NY, SAMUEL HUO, Wilmington Friends School DE, ALBERT JIN, NIH Bethesda MD, QI LU, Delaware State University DE — Gold nanoparticles (AuNPs) have been increasingly integrated in biological systems, making it imperative to understand their interactions with cell membranes. Herein, liposomes composed of 1,2-dimyristoyl-sn-glycero-3-phosphocholine (DMPC) as a model membrane were treated with citrate stabilized AuNPs of various sizes and concentrations. The fluorescence shifts of Laurdan probe revealed that AuNPs in general made liposomes more fluidic. The increased fluidity leads to an increased surface area which makes liposome less circular, as further confirmed in fluorescence images. The localized stress in lipids induced by electrostatically adsorbed AuNPs was hypothesized to cause the dominant long-range effect of fluidization of unbound lipid membranes. A secondary effect of the AuNP-induced lateral pressure is the formation of pores, which was observed in AFM images. What we found in this study offers a new approach of modulating the stiffness of lipid membranes: by adsorption of AuNPs, lipids at the binding sites are stiffened whereas lipids afar are fluidized. Understanding the factors that modulate lipid packing is important for the discovery of new therapeutic methods for diseases that are linked to membrane integrity such as high blood pressure and cancer metastasis.

Anupama Bhat
Delaware State University DE

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