

Abstract Submitted  
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**Barrier Function of Lipid Membrane in the Interaction with Nanostructures.**<sup>1</sup> SERGIY MINKO, Clarkson University, YURY ROITER — Tiny details of the phospholipid (DMPC) membrane morphology in close vicinity to nanostructured silica surfaces have been discovered in the atomic force microscopy experiments. The structural features of the silica surface were varied in the experiments by the deposition of silica nanoparticles of different diameter on plane and smooth silica substrates. It was found that, due to the barrier function of the lipid membrane; only particles larger than 22 nm in diameter, with a smooth surface were completely enveloped by the lipid membrane. However, nanoparticles with bumpy surfaces (curvature diameter of bumps as that of particles <22 nm) were only partially enveloped by the lipid bilayer. For the range of nanostructure dimensions between 1.2 nm and 22 nm, the lipid membrane underwent structural rearrangements by forming pores (holes). The nanoparticles were accommodated into the pores but not enveloped by the lipid bilayer. The study also found that the lipid membrane conformed to the substrate with surface structures of dimensions less than 1.2 nm without losing the membrane integrity.

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