

Abstract Submitted
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Nanoscope Dynamics of Phospholipid Based Unilamellar Vesicles: Effect of Phase Transition and Addition of Melittin Peptide and Cholesterol V. K. SHARMA, Biology and Soft Matter Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA, E. MAMONTOV, Chemical and Engineering Materials Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA, D. B. ANUNCIADO, H. O'NEILL, V. URBAN, Biology and Soft Matter Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA — Dynamics of DMPC phospholipid in unilamellar vesicles (ULV) has been investigated using quasielastic neutron scattering (QENS) techniques and reported here. Effect of addition of melittin and cholesterol on the dynamics of the lipid molecules in the ULV is also investigated. For DMPC ULV, a sharp fall in the elastic scan intensity is observed at 296 K, which is an indication of a solid gel to fluid phase transition. The addition of cholesterol or melittin inhibits this steep fall indicating that these molecules do have an influence on the main phase transition of DMPC ULV. QENS experiments have been carried out on DMPC ULV solution in the presence and absence of these additives at 280 K, in the solid gel phase, and at 310K, where lipids are in the fluid phase. The data analysis clearly shows the presence of two distinct motions: lateral and internal motions of the DMPC monomer. Both lateral and internal motions are found to be affected by the main phase transition. The addition of cholesterol or melittin influences the dynamics significantly in a different way, depending on the phase of lipid bilayers and the nature of additives. Effect of phase transition and additives on the dynamics of lipid in ULV will be discussed in details.

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