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Effect of Short Chain Alcohols on Bending Rigidity of Lipid Bilayer

Authors : Buti Suryabrahmam, V. A. Raghunathan

Abstract : We study the effect of short chain alcohols on mechanical properties of saturated lipid bilayers in the fluid phase. The Bending rigidity of 1,2-dimyristoyl-sn-glycero-3-phosphocholine (DMPC) membrane was measured at 28 °C by employing Vesicle Fluctuation Analysis technique. The concentration and chain length (n) of alcohol in the buffer solution were varied from 0 to 1.5 M and from 2 to 8 respectively. We observed a non-linear reduction in the bending rigidity from ~17×10^{-20} J to ~10×10^{-20} J, for all chain lengths of alcohols used in our experiment. We observed approximately three orders of the concentration difference between ethanol and octanol, to show the similar reduction in the bending values. We attribute this phenomenon to thinning of the bilayer due to the adsorption of alcohols at the bilayer-water interface.

Keywords : alcohols, bending rigidity, DMPC, lipid bilayers
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