

Abstract Submitted
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Shifting of Cholesterol Maximum Solubility in Lipid Bilayers by Ceramide M.R. ALI, J. HUANG, Department of Physics, Texas Tech University — Cholesterol oxidase (COD) activity assay has been proven to be an excellent method to measure the chemical potential of cholesterol in lipid bilayers. The time-based reaction rate gives the direct measure of the escape tendency or chemical potential of cholesterol. The Umbrella model (Huang and Feigenson, *Biophysical Journal*, vol.**76**: pp.2142-2157, 1999) predicted the formation of regular distribution domains of cholesterol and a steep rise of cholesterol chemical potential at the cholesterol solubility limit. Thus, the COD activity assay can be used to measure the maximum solubility of cholesterol in lipid bilayers. In this study, we systematically investigated the shifting of cholesterol solubility limit in POPC lipid bilayers as a function of ceramide composition. Samples prepared with 0% to 40% ceramide showed a gradual shift of solubility limit to the lower cholesterol mole fractions. The result is in a good agreement with the Umbrella model: ceramide molecules, like cholesterol, also need the neighboring headgroups of PC to cover their nonpolar bodies in a lipid bilayer. When phosphatidylcholines are replaced by smaller head group molecules, such as ceramide, the membrane becomes less capable to host cholesterol molecules.

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