

Abstract Submitted
for the TSF10 Meeting of
The American Physical Society

The Maximum Solubility of Cholesterol in POPC/POPE Lipid Mixtures SERKAN BALYIMEZ, JUYANG HUANG¹, Texas Tech University — Cholesterol is a major constituent of cell membranes and has many important cell functions. The maximum solubility of cholesterol in a lipid bilayer is the highest mole fraction of cholesterol that can be incorporated into a lipid bilayer before cholesterol crystals precipitate. The maximum solubility can provide valuable information about cholesterol-phospholipid interaction. In this study, the maximum solubility of cholesterol in mixtures of POPE/POPC lipid bilayer has been investigated systematically using a cholesterol oxidase (COD) reaction rate assay. The maximum solubility of cholesterol was determined to be 67 mol% in POPC bilayers and 50 mol% in POPE bilayers. In mixtures of POPE/POPC, the maximum solubility of cholesterol increases linearly as a function of the ratio POPC/(POPE+POPC). The data indicates that cholesterol prefers the large headgroup lipid (POPC) over the small headgroup lipid (POPE) and the maximum solubility increases with the population of large headgroup lipid (POPC), which are consistent with the Umbrella Model. Previously, it has been suggested that cholesterol may form a “hexagonal” regular distribution pattern at the maximum solubility limit in POPE bilayers and a “maze” pattern at the maximum solubility in POPC bilayers. It is still unclear whether domains of these patterns exist at the maximum solubility limit in POPE/POPC mixtures, and more investigation is needed.

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Date submitted: 23 Sep 2010

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