

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

X-ray insight into cholesterol-phospholipid interactions DAVID GIDALEVITZ, Division of Physics, BCPS department, CMoS, Illinois Institute of Technology, Chicago, IL, USA — The mechanism of nonideal cholesterol-lipids mixing yet remains controversial. We report on a systematic study of cholesterol-phospholipid interactions in lipid monolayers using Langmuir isotherms, synchrotron X-ray reflectivity (XR), and grazing-incidence X-ray diffraction (GIXD) techniques. Lipid monolayers consisted of cholesterol-DPPC mixtures with cholesterol mole fractions χ_{CHOL} varying from 0 to 1. GIXD reveals that at both χ_{CHOL} and χ_{DPPC} above .85 mixed films exhibit packing order of a prevalent lipid. In between, cholesterol seizes places in DPPC crystalline lattice at the stoichiometry similar as that of the mixture inducing short-range regular-hexagonal packing order with increasing spacing between molecules as a function of cholesterol content. XR shows that cholesterol tends to stay in DPPC acyl chains at low χ_{CHOL} while gradually descending to a subphase at higher χ_{CHOL} accompanied by rearrangement of DPPC headgroups. Thus, a desire of highly nonpolar cholesterol to avoid contacts with polar water molecules and/or DPPC headgroups defines a mode of cholesterol-lipid interactions.

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Date submitted: 28 Nov 2008

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