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Cholesterol Perturbs Lipid Bilayers Non-Universally[1] JOHN NAGLE, JIANJUN PAN, THALIA MILLS, STEPHANIE TRISTRAM-NAGLE, Physics Department, Carnegie Mellon University, Pittsburgh, PA 15213 — Cholesterol is well known to modulate the physical properties of biomembranes. Using modern x-ray scattering methods, we have studied the effects of cholesterol on the bending modulus K_C, the thickness D_{HH}, and the orientational order parameter S_{xray} of lipid bilayers. We find that the effects are different for at least three classes of phospholipids characterized by different numbers of saturated hydrocarbon chains. Most strikingly, cholesterol strongly increases K_C when both chains of the phospholipid are fully saturated but not at all when there are two mono-unsaturated chains.

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