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Evaluating the Reflective Spectral Profiles of Lipid Membranes in Relation to the Concentration of Cholesterol MINARES EHSANI, QI LU, Delaware State University — Giant Unilamellar Vesicles (GUVs) are excellent model systems for studying physical aspects of biological membranes where the interaction between lipids and proteins takes place. The key advantage of GUVs is that they can be observed directly under the light microscope because of their large sizes, comparable to those of mammalian cells. Numerous studies have shown the effects of cholesterol on the phases and structures of the lipid-cholesterol membranes. The lipid "structures" inside the membrane ocean are known as lipid rafts. Cholesterol (CHOL) increases the rigidity of lipid vesicles by forming raft-like structures. In this project, we focused on the lipid reflective spectral profiles obtained from the hyperspectral dark-field microscopy and we studied their correlations to different concentrations of cholesterol (10, 20, 30, and 40 mol%). Reflective spectral profiles of GUVs with 20 mol% CHOL were found to be distinctly different from the other concentrations in both peak wavelength and FWHM (full width at half maximum). This finding was consistent with other studies, suggesting that the hyperspectral analysis technique can be used to characterize the phase and integrity of lipid membranes.

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