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Acyl chain composition and coexisting fluid phases in lipid bilayers YONGWEN GU, MIRANDA BRADLEY, DRAKE MITCHELL, Portland State University — At room temperature phospholipid bilayers enriched in sphingolipids and cholesterol may form a solid phase as well as two coexisting fluid phases. These are the standard fluid phase, or the liquid-disordered phase, ld, and the liquid-ordered phase, lo, which is commonly associated with lipid rafts. Ternary mixtures of palmitoyl-oleoyl-phosphocholine (POPC; 16:0,18:1 PC), sphingomyelin (SPM), and cholesterol (Chol) form coexisting lo, ld and solid phases over a wide range of molar ratios. We are examining the ability of two fluorescent probes to detect these 2 phases: NBD linked to di-16:0 PE which partitions strongly into the lo phase and NBD linked to di-18:1 PE which partitions strongly into the ld phase. We are also examining the effect of the highly polyunsaturated phospholipid stearoyl-docosahexanoyl-phosphocholine (SDPC; 18:0, 22:6 PC) on the ternary phase diagram of POPC/SPM/Chol with particular focus on the functionally important lo/ld coexistence region. We report on the fluorescence lifetime and anisotropy decay dynamics of these two fluorescent probes.

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