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Nanoscopic modulated phases in dDPPC:DLPC membranes studied with small angle neutron scattering NATALIE KRZYZANOWSKI, Univ of Illinois - Chicago, SUMIT GARG, Berg LLC, LIONEL PORCAR, Institut Laue-Langevin, Grenoble, France, URSULA PEREZ-SALAS, Univ of Illinois - Chicago — The lipid raft hypothesis states that functional, small (20-200nm) lateral heterogeneities in the cell membrane arise from the preferential association of proteins, sphingolipids, and cholesterol. Studies of model systems in the past decade have shown the formation of two liquid phases, a liquid-ordered and the typical fluid or liquid-disordered phase in ternary mixtures of a saturated lipid, unsaturated lipid, and cholesterol. These model raft systems on both a nanoscopic and macroscopic level have exhibited circular domains, but these are not the only possible shapes of phase separated domains. Giant vesicles extracted from live cells studied with fluorescence microscopy can exhibit critical behavior, showing distinctly fluctuating and not circular domains. Non-circular domains have also been observed in quarternary component GUVs in the form of modulated or patterned phases. We used small angle neutron scattering (SANS) to study the nanoscopic phase behavior of the well-studied lipid mixture DPPC:DLPC as a function of temperature. We applied an existing ab initio program to reconstruct the membrane without a priori shape fixing. Modulated phases are shown to persist at the nanoscale in small vesicles.

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