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On the Registry of Lipid Domains in Multicomponent Lipid Membranes CLAYTON H. DAVIS, Physics Department, University of Memphis, MOHAMED LARADJI, Physics Dept., University of Memphis — Recent experiments on multicomponent lipid vesicles, composed of a saturated lipid, unsaturated lipid and cholesterol, have shown that the liquid-ordered domains in the two leaflets of the bilayer are in strong registry [1,2]. In order to understand the reasons behind this domain registry, we propose a simple lattice model, where the two leaflets are represented by two spin-half Ising surfaces, where the up and down spins represent the saturated and unsaturated lipids, respectively. Since lipid flip-flops are very rare events, spins in the two Ising lattices are only allowed to diffuse within each leaflet through spin-exchange Kawasaki dynamics. In addition each lattice point can also be occupied by a cholesterol particle which is allowed to both diffuse within each lattice and flip-flop between the two lattices. We found that registration can occur even for small concentrations of cholesterol. We will discuss the effects of cholesterol saturation and intra-layer and inter-layer lipid-cholesterol interaction on domains registration. [1] S.L. Veatch and S.L. Keller, Phys. Rev. Lett. 89, 268101 (2002) [2] T. Beaumgart, S.T. Hess, and W.W. Webb, Nature 425 (2003)

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