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Reconciling differences between Lipid transfer in free-standing and solid supported membranes: a time resolved small angle neutron scattering study. BENNY WAH, JEFFREY BREIDIGAN, JOSEPH ADAMS, LI GE, PIOTR HORBAL, SUMIT GARG, University of Illinois at Chicago, LIONEL PORCAR, Institut Laue-Langevin, URSULA PEREZ-SALAS, University of Illinois at Chicago — The membranes of animal cells have significant variation in the lipid and protein composition. If it weren't for the active work of proteins that maintain most of these variations, membranes would ultimately homogenize throughout by mixing. It has been long been recognized that the study of the passive movement of lipids between and within membranes can provide insight into this energetic toll. Using small angle neutron scattering, a non-invasive in situ technique, we recently demonstrated that tags or small structure changes in the lipids can have a huge effect on their transport characteristics. In the present study we compare lipid transfer and energetics between supported and free standing membranes. We find that exchange and flipping process are comparable while the presence of the surface slightly increases inter and intra-membrane transport rates. The activation energies for exchange appear to be nearly unaffected by the presence of the surface while for flip-flop it slightly increases. Our results strongly suggest that the geometry of the vesicles is responsible the apparent contradicting behavior previously reported between supported flat membrane systems and in free-standing membranes.

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