Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supplementary Material

A Comparison of the surface pressure *vs.* area isotherms of tail hydrogenated and tail deuterated 1,2-dipalmitoyl-*sn*-glycero-3-phospho-(1'-*rac*-glycerol).

Materials: Fully hydrogenated and tail deuterated (d_{62}-) 1,2-dipalmitoyl-*sn*-glycero-3-phospho-(1'-rac-glycerol), DPPG; (synthetic, purity >99%) were purchased from Avanti Polar Lipids (Alabaster, AL, USA) and used without further purification. Stock solutions (1 g/L) of DPPG were prepared in HPLC grade chloroform (Sigma-Aldrich, Dorset, UK) and stored at room temperature. Phosphate buffer salts were also obtained from Sigma-Aldrich (Dorset, UK).

Surface Pressure vs. Area Measurements: Surface pressure measurements were performed on a Langmuir trough (Model 601, Nima Technology Ltd, Coventry, UK). To create lipid monolayers at the air/water interface, the trough was filled with 0.02 M phosphate buffer (pH 7) and 50 µl of fully hydrogenated or tail deuterated (d_{62}-) DPPG solution (1 g/l) was spread at the air/water interface. After chloroform evaporation surface pressure *vs.* area (π-A) measurements were conducted. All measurements were conducted at 20°C.

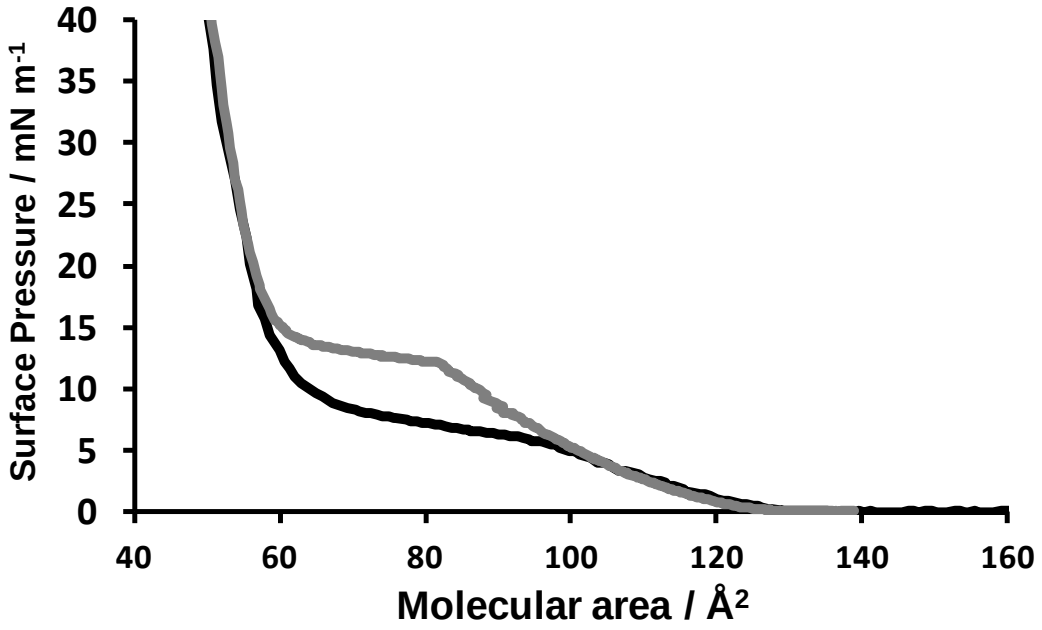

Figure s1, The surface pressure vs. molecular area (π-A) isotherms of tail hydrogenated (black line) and a tail deuterated (d_{62}, grey line) 1,2-dipalmitoyl-*sn*-glycero-3-phospho-(1'-rac-glycerol) monolayers on a 20 mM pH 7.0 phosphate buffer subphase.

Figure s1 shows a comparison of the surface pressure *vs.* area isotherms obtained from fully hydrogenated and tail deuterated (D62) DPPG monolayer used in the experiments described.

The compression isotherms of fully hydrogenated and chain deuterated (d_{62}-) DPPG differ in respect to the position of the liquid expanded to liquid condense phase transition. The reason for the difference in the LE-LC phase transition discussed in more detail elsewhere[1]. Briefly, this effect is thought to be related to a reduction of the interlocking of hydrocarbon chains in deuterated lipid tails compared to hydrogenated chains, due to the difference in bond C-D bond length from that of C-H[2,3].

Other regions of the (π-A) isotherms of the d and h-DPPG monolayer overlay each other well (see Fig. S1). In particular at the initial surface pressure used for protein interaction studies (22 mN m^{-1}) of the tail deuterated and tail hydrogenated is in the condense phase for both h and d-DPPG.

References

1. Dabkowska, A., Barlow, D. J., Hughes, A. V., Campbell, R. A., Quinn, P. J., and Lawrence, M. J., *J. R. Soc. Interface*, 2011, 9, 548–561.

2. Petersen, N. O., Kroon, P. A., Kainoshoa, M., and Chan, S. I., *Chem. Phys. Lipids*, 1975 14, 343–349.

3. Sunder, S., Cameron, D., Mantsch, H. H., and Bernstein, H. J. *Can. J. Chem*. 1978, 56, 2121–2126.