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## Synthesis of Perdeuterated 1-Palmitoyl-2-oleoyl-*sn*-glycero-3-phosphocholine ([D82]POPC) for Neutron Studies on Bilayer Lipid Membranes

Nageshwar Rao Yepuri<sup>1</sup>, Tamim Darwish<sup>1</sup>, Anna Leung<sup>2</sup>, Anwen Krause-Heuer<sup>1</sup>, Hannah Wacklin<sup>2</sup>, Robin Delhom<sup>2</sup>, and Peter Holden<sup>1</sup>

<sup>1</sup> NDF-NSTLI-ANSTO, Australia

<sup>2</sup> ESS, Sweden

*The complexity of the chemical synthesis of completely deuterium-labelled unsaturated lipids has meant that most neutron experiments, to date, have been restricted to saturated phospholipid species, the behaviour of which under physiological conditions may not be representative of the unsaturated varieties found in biological membranes. Unsaturated lipids occur widely in nature and are crucial for the fluidity of cell membranes. Biologically relevant phospholipids such as 1-palmitoyl-2-oleoyl-*sn*-glycero-3-phosphocholine (POPC) are typically asymmetric and *cis*-9 unsaturated in the *sn*-2-acyl chain, whereas the *sn*-1 chain is often saturated. Commercially available *sn*-1 chain deuterated [D31]1-palmitoyl-2-oleoyl-*sn*-glycero-3-phosphocholine ([D31]POPC) does not provide enough contrast for detailed structural investigation through neutron studies, and is nearly perfectly contrast-matched to most proteins and membrane binding peptides in heavy water, which makes them neutron invisible. With this background in mind, we have developed a method for the synthesis of perdeuterated POPC and its partially labelled form.[1] The structure of a supported bilayer membrane formed from these lipids was determined by measuring neutron reflectivity in a series of solvent contrasts, which will be discussed in this paper.*

### Reference:

(1) Yepuri, N. R.; Darwish, T. A.; Krause-Heuer, A. M.; Leung, A. E.; Delhom, R.; Wacklin, H. P.; Holden, P. J. *ChemPlusChem* **2016**, *81*, 315.