Experimental report

01/09/2022

Proposal: **EASY-1039** **Council:** 4/2021

Title: Structure and dynamics of lipid bilayers

Research area: Soft condensed matter

This proposal is a new proposal

Main proposer: **Yuri GERELLI**

Experimental team: Florence GROS
Erica DUGO

Local contacts: Giovanna FRAGNETO

Samples: natural lipids

Instrument	Requested days	Allocated days	From	To
D17	48	48	04/10/2021	06/10/2021

Abstract:

We propose to perform preliminary measurements for the optimisation of the deposition protocol for natural lipids produced at the PSCM. If successful, the obtained bilayers will be used to test the capabilities of neutron reflectometry for detecting the phospholipid flip-flop. This experimental plan can be performed in 48 hours on the D17 reflectometer.

Report for EASY-1039

The experiment EASY-1039 was requested to test the deposition protocols for natural lipid extracts produced at the PSCM (lipid lab facility).

Depositions were performed using fully deuterated and fully protiated vesicles prepared by tip-sonication. To test different vesicle fusion protocols, samples were prepared in pure water and in 500 mM NaCl solutions. Vesicles were injected in the NR flow-cells, left to incubate onto a silicon substrate, and then washed with 500 mM NaCl or pure water respectively to apply an osmotic shock.

The temperature was chosen to have all lipids in the fluid phase as determined by micro-DSC.

NR data were acquired after the osmotic shock was applied. The measurements indicated a clear difference of behaviour between the protiated and deuterated lipid extracts; while the protiated ones formed a solid-supported lipid bilayer in all the investigated conditions, it was impossible to fuse the vesicles formed using fully deuterated lipids.

This negative result is at the basis of the re-development and re-optimization of extraction and purification protocols currently performed within the activity of the lipid-lab at the ILL and by an ILL PhD student (G. Corucci).