Bilayers at the ILL

Contribution ID: **21** Type: **Oral presentation**

Adsorption and interactions of polymer stabilised lipid nanodiscs with a bilayer at the solid-liquid interfaces

Friday, 13 December 2019 11:40 (20 minutes)

Styrene-maleic acid lipid particles (SMALPs) are self-assembled discoidal structures composed of a polymer belt and a segment of lipid bilayer, which are capable of encapsulating membrane proteins directly from the cell membrane. In recent years a number of different nanodisc forming polymers with varying properties have been developed and characterised. For example, Styrene-maleic imide lipid particles (SMILPs) are stable over a different pH range but are still able to solubilize membrane proteins.
Here we will present recent results from a detailed investigation into the interaction of SMALP and SMILP nanodiscs with phospholipid bilayers at the solid-liquid interface. Using Neutron Reflectome-try and ATR-FTIR we have examined the kinetics of lipid exchange between nanodiscs and biliayers. While lipid exchange is seen in each case, the kinetics and extent to which this occurs are considera-bly different for each polymer. Further, under certain conditions and highly dependent on the poly-mer, it is possible to adsorb discs at the solid-liquid interface. This is the first evidence of such ad-sorption for polymer stabilized nanodiscs and has important implications for future applications that would use SMALP technology to deliver membrane proteins to interfaces.

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Session Classification: Session H