**Bilayers at the ILL** 



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## DNA-tagged lipid bilayers: novel nano-scaled membrane-mimetic systems

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Lipid bilayers and lipid-associated proteins play a crucial role in biology. Since studies and manipulation in vivo are inherently challenging, several in vitro membrane-mimetic systems have been developed to enable the study of lipidic phases, lipid-protein interactions and membrane protein function. Controlling the size and shape or introducing functional elements in a programmable way is, however, difficult to achieve with common systems based on polymers, peptides or membrane scaffolding proteins. We have combined DNA-nanotechnology with lipid bilayer self-assembly to create DNA-encircled bilayers (DEBs) as a novel nano-scaled membrane-mimetic. For this, alkylated oligonucleotides were hybridized to a single-stranded minicircle (ssMC) to provide an inner hydrophic surface for lipid attachment. DEBs open new routes to membrane biophysical studies, enabling improved size control, stability and programmability[1]. Here, we present further developments of DNA-associated lipid bilayers for the reconstitution of membrane proteins and for the generation of self-assembled higher order structures. The latter may be ultimately used for the structural biology of membrane proteins in Cryo-EM or in diffraction experiments using advanced X-ray sources, such as synchrotrons or XFELs.

1. K. Iric, M. Subramanian, et al. Nanoscale 10 (2018) 18463-18467

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