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SANS for membrane proteins

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Small angle neutron scattering enables to study the structure of macromolecular complexes in solution, at low resolution. Within last few years new tools dedicated to the study of membrane proteins were developed. An integrated Size exclusion chromatography (SEC, 1) system enables to exchange both the membrane protein detergent for its D2O-invisible counterpart (2, and the buffer for D2O-based low-background buffer.
As a result, when the sample reaches the Neutron measurement cell, only the membrane protein contributes to the scattering signal, which can be analyzed just like SAXS data from soluble protein 3,4.
To go further in this direction, we are developing D2O-invisible nanodiscs using a circularized-solubility enhanced scaffold protein 5 with the goal of studying membrane protein conformation in different lipid environment, and combining with SAXS to image the whole protein-lipid system as well. These new tools will enable to study the conformational impact of specific lipid-protein interaction within a good membrane mimicking environment.

1. Johansen, N. T., Pedersen, M. C., Porcar, L., Martel, A. & Arleth, L. Introducing SEC–SANS for studies of complex self-organized biological systems. Acta Crystallogr D Struct Biol 74, 1178–1191 (2018).
2. Midtgaard, S. R. et al. Invisible detergents for structure determination of membrane proteins by small-angle neutron scattering. FEBS J 285, 357–371 (2018).
3. Golub, M. et al. "Invisible" Detergents Enable a Reliable Determination of Solution Structures of Native Photosystems by Small-Angle Neutron Scattering. J. Phys. Chem. B 126, 2824–2833 (2022).
4. Johansen, N. T. et al. Mg2+-dependent conformational equilibria in CorA and an integrated view on transport regulation. eLife 11, e71887 (2022).
5. Johansen, N. T. et al. Circularized and solubility-enhanced MSP s facilitate simple and high-yield production of stable nanodiscs for studies of membrane proteins in solution. FEBS J 286, 1734–1751 (2019).

Session

Interaction lipids/polymers/membrane proteins

Primary author: MARTEL, Anne (ILL)

Presenter: MARTEL, Anne (ILL)

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