Bilayers at the ILL

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Interaction of cellulose nanocrystals with lipid bilayers

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Using elementary building blocks to mimic and reconstruct biological structures is intriguing both from fundamental aspects, providing a simple model to study a complex environment, as well as from the applicative point of view, opening the possibility of utilizing such constructs for the creation of new functional materials. Understanding the key parameters governing the interaction between the building blocks of such systems is highly important.
In the frame work of bio-inspired materials, the plant cell wall provides an interesting platform, since its basic components are abundant, eco-friendly and possess outstanding properties. In plant kingdom, one of the first steps of cell wall constitution is the deposition of cellulose microfibrils on top of the plant plasma membrane.[1] In model systems, cellulose nano crystals (CNCs), prepared by acid hydrolysis of the natural fiber, are an attractive building block since they possess properties similar to the native fiber and have excellent colloidal stability.[2]
In this work we have investigated the interaction between CNCs and lipid membranes using 2D and 3D architectures. Quartz crystal microbalance with dissipation, total internal reflection fluorescence microscope, atomic force microscopy and neutron reflectometry were used for the investigation of the 2D system, in which CNCs were deposited on top of supported lipid membranes (SLBs). The interaction between lipid vesicles and CNCs was studied in suspension using isothermal titration calorimetry, light scattering and transmission electron microscopy.[3] Key parameters governing the interaction were elucidated and the results are discussed in the context of plant cell wall inspired materials.

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1. Cosgrove,D.J., *Nat.rev.mol.cell.biol.*, 6 (2005), 850.
2. Jean et al., *Langmuir*, 25 (2005), 3920-3923.
3. Navon et al., *Biomacromolecules*, 18 (2017), 2918-2927.

Primary author: NAVON, Yotam (Cermav, UGA, BGU)

Co-authors: JEAN, Bruno (Cermav); BERNHEIM, Anne (Ben Gurion University of the Negev); HEUX, Laurent (Cermav)

Presenter: NAVON, Yotam (Cermav, UGA, BGU)

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