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Transport Mechanisms in Biological and Synthetic Nanopores and –channels

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Membrane arrays for nanopores

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To be implemented as single-molecule detectors nanopores have to be inserted into stable, electrically highly insulating membranes. Moreover, an automated chip-based parallel measurement platform is required for efficient nanopore analysis. Here we describe formation and characterization of versatile membrane arrays suitable for nanopore studies on the surface of different micro electrode cavity array (MECA)[1,2] chips.

Developed techniques allow for rapid formation of reproducible membrane arrays from different substances including natural or synthetic lipids and their mixtures, artificial phospholipids and polyoxazoline based triblock copolymers both manually and in an automated fashion.

Formation, electrical properties and stability of membranes made from different solutions on the cavities of different sizes were extensively characterized. Diverse protein nanopores were tested for insertion efficiency and performance. Limitations such as appearance of stable pores in membranes containing oxidized lipids as well as lipid mixtures close to the phase transition temperature of one of the components are shown and discussed.

References

[1] G. Baaken, Lab on a Chip 8, 938 (2008)

[2] J.M. Del Rio Martinez, Small 11, 119 (2015)