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Abstract: 99O

From Superbugs to tBLMs: increasing the complexity in model membrane systems.

Ingo Koeper, Ashley Carey, Louisa Howard, Bart Eijkelkamp

College of Science and Engineering, Flinders University, Adelaide, Australia

Tethered bilayer lipid membranes (tBLMs) are model systems, where a lipid bilayer is covalently attached to a solid support, creating a stable system that is accessible to a wide range of analytical techniques. Most tBLMs in the past have used a single type of lipid, rarely more complex mixtures. While these systems are useful and allow for an in-depth study of membrane related processes such as the binding or functional incorporation of membrane proteins, they are often criticized for not being truly representative of the membrane they are supposed to mimic.

We have recently used the basic structure of a tBLM, i.e. a tethered lipid monolayer, and created a mimic for a bacterial membrane, in particular the inner leaflet of the two pathogenic nosocomial pathogens *Acinetobacter baumannii* and *Staphylococcus aureus*. Tethered monolayers have been fused with whole-cell extracts from multidrug resistant strains of *A. baumannii* and *S. aureus*.

The extracts have been characterised chemically through analytical techniques. Lipid monolayers have been formed at the air-water interface of a Langmuir film balance, and pressure-area isotherms have been recorded. The interaction of the monolayer with various antimicrobial agents has been investigated using the Langmuir balance.

The completed tBLMs have been characterised using electrochemical impedance spectroscopy and neutron reflectivity.

The combined chemical and biophysical analysis of the membrane systems has shown that we were able to create model membranes that contain a lipid composition, which accurately represents the bacterial membrane.

We are now able to systematically reduce the membrane complexity in order to answer the question, how complex a model membrane has to be to be called an adequate mimic of a natural membrane.