NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Biological Sciences
College of Science

Seminar Announcement

Aquaporin-based biomimetic membranes in water treatment

Date: **8 January 2021, Friday**

Time: **4pm**

Venue: **Classroom 1, SBS**

Biomimetic membranes are attracting attention as platforms for membrane-based separations and water treatment. I will talk about a project that was born about ten years ago out of a collaboration with an engineering group in NTU. We initially explored the feasibility of producing aquaporin-based sea water desalination membranes to compete with current synthetic reverse osmosis membranes and ended up with less ambitious but still worthwhile objectives. Since this project is about to end, I thought appropriate to recapitulate how the project started with the development of small-scale prototypes, and how it has finally resulted in the construction of modules than can process several cubic meters of water per day. Aquaporin is the key component in these membranes, providing high permeability and exquisite selectivity when embedded in a relatively impermeable synthetic matrix. However, fabrication of defect-free layers with a high protein density at low cost is still a challenge. This is compounded by nuances in lipid composition requirements that are not completely understood. Nevertheless, the current implementation has the potential to use other membrane proteins to target specific separations in the subnanometer to nanometer size range, such as in antibiotic separations or food processing, or for applications in drug discovery. Biomimetic membranes may overcome the permeability-selectivity trade off characteristic of synthetic membranes.

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