Guest Editorial

Highlight: The gatekeepers of life yield their secrets

Biological membranes are dynamic frontiers whose molecules keep us alive in a stress field between compartmentalization and communication. Yet the gap between the vital significance of transport and signaling through membranes and our poor understanding of the precise functionality of these processes is still daunting. Drawing on increasing structural knowledge about membrane proteins, progress in the field is nevertheless promising. The present Highlight Issue has been stimulated by the International Symposium ‘Membrane Transport and Communication’, held at the Biocenter of Goethe-University Frankfurt from November 21 to November 22, 2008 (for meeting report see: Schleiff and Tampé 2009, Nat. Chem. Biol. 5, 135–139).

With a growing appreciation of the importance and complexity of these biological structures in mind, 22 speakers and 200 international participants recently gathered for the conference, which was dedicated to interconnect academia and pharmaceutical industry. The audience included a large number of post-docs and students from the European Membrane Biology Network (EMBN-Train). The meeting was co-sponsored by the German Research Foundation (SFB 807 – Membrane Transport and Communication), the German Society of Biochemistry and Molecular Biology (GBM – Biomembranes), the Center for Membrane Proteomics (CMP), and a number of industrial partners.

This Highlight Issue covers a range of emerging topics that deal with the structures of transporting proteins, the mechanism of protein translocation, the dynamics and modulation of membrane protein complexes, the dynamics of membrane machines, the mysterious role of lipids, and advance techniques to study membrane proteins. Two poster prize winners were awarded as additional contributions for this Highlight Issue. In planning this Highlight Issue, I particularly wanted to inspire the next generation of scientists to contribute to the exciting field of membrane biology.

Scientists who are involved in investigating membrane transport and communication share excitement about the rapid advancement of their field. As more and more snapshots of membrane proteins at high resolution appear, the principles of their molecular function are beginning to emerge and will soon be assembled like pieces of a jigsaw puzzle. How these proteins exert their exact functions in their natural environment, however, embedded in and supported by a dynamic interplay of lipids, and integrated into the complexities of cell transport and signaling, remains still largely unknown – and serves as an invitation for discovering uncharted territory (Schleiff and Tampé, 2009). Setting sails for these discoveries, scientists will find exciting opportunities and new horizons.

Robert Tampé
Center for Membrane Proteomics (CMP)
and Cluster of Excellence Frankfurt (CEF)
Institute of Biochemistry
Biocenter
Goethe University Frankfurt
Max-von-Laue-Str. 9
D-60438 Frankfurt
Germany
e-mail: tampe@em.uni-frankfurt.de