*Tampere, 23.03.2012*

**Adam Orlowski**
Tampere University of Technology
Department of Physics
PO Box 692
FIN-33101 Tampere
FINLAND

**Céline Seewald**
Administrator
Biomedical Sciences
European Science Foundation
1 quai Lezay-Marnésia • BP 90015
67080 Strasbourg cedex • France

## SCIENTIFIC REPORT FROM 4th INTERNATIONAL SINGAPORE LIPID SYMPOSIUM

### I. Summary

Symposium took place in Singapore on 13-16 of March 2012. Participation in the meeting gave me an opportunity to broaden my knowledge about the advances in research closely related to my PhD topic. I had a chance to see presentations of world leading scientists from the field and talk with them in person. This has given me a unique opportunity to improve my research and follow trends in the field. Moreover, I was honored to give a presentation about my scientific investigations on the role of cholesterol in hydrophobic matching of peptides and lipids. It was definitely a big step in my career and will help me in planning for my future in science. Many of the presentations in the conference were directly linked to my scientific interests and broadened my knowledge. In summary, the meeting was very helpful and interesting.

# II. Programme of the event

## Mar 13: Workshop

10:00-12:00 workshop 1

**Lipid metabolism and homeostasis – case studies cholesterol and ceramides**

Song Baoliang

Scott Summers

*12:00 lunch*

13:00–15:00 workshop 2

**Global standards for mass spectrometry based lipidomics**

Harald Koefeler

Dominik Schwudke

Shui Guanghou

Todd Mitchel

*15:00 break*

15:30–17:30 workshop 3

**Curating lipidomic information**

Ed Dennis

Ioannis Xenarios

Andrej Shevchenko

*19:00 Reception at conference hotel (by invitation)*

## March 14

09:00 *Opening Remarks*
09:20 Ed Dennis
10:00 Rob Parton
10:40 *break*
11:10 Xun Huang
11:50 Andreas Zumbusch
12:30 *lunch*
13:30 Peter Meikle
14:10 Andrej Shevchenko
14:50 Joanne Yew
15:30 *break*
16:00 Yuki Nakamura
16:20 Brendan Prideaux
16:40 Christian Eggeling
17:00 Guillaume Thibault
17:30 *posters and reception*
19:30 *bus to hotel*

## March 15

09:00 Patricia Bassereau
09:40 Herman Overkleeft
10:20 *break*
10:50 Toon de Kroon
11:30 Anne-Claude Gavin
12:10 Markus Wenk

12:50 *lunch and poster*
12:50 AB Sciex lunch talk
14:00 Takao Shimizu
14:40 Gabriele Kastenmüller
15:20 Benhur Lee
16:00 *break*
16:30 *Chakravarty BN Marella*
16:50 *Adam Orlowski*
17:10 *Ajay K. Mahalka*
17:30 Lok Hang Mak
18:00 *bus to conference dinner*
18:30 *conference dinner*
21:00 *bus to hotel*

## March 16

09:00 Xu Chenqi
09:40 Chng Shu Sin
10:20 *break*
10:50 Igor Butovich
11:30 John Harwood
12:10 Ivo Feussner

12:50 *lunch and posters*

14:00 Chye Mee-Lan
14:40 Neil Clarke
15:20 Chew Fook Tim
16:00 *break*
16:30 Giovanni D'Angelo
16:50 Mathieu Blanc
17:10 *Guan Xueli*
*17:30 Thusitha Rupasinghe*
17:50 *closing remarks*
18:30 *bus to hotel*

**III. Scientific content of the event**

Once viewed simply as a reservoir for carbon storage, lipids are no longer cast as bystanders in the drama of biological systems. The emerging field of lipidomics is driven by technology, most notably mass spectrometry, but also by complementary approaches for the detection and characterization of lipids and their biosynthetic enzymes in living cells. The development of these integrated tools promises to greatly advance our understanding of the diverse biological roles of lipids. The aim of the symposium was to spur this process by bringing together investigators with diverse backgrounds in lipid research. Leading scientists from around the world presented their latest research advances in a workshop-style forum.

Speakers of the symposium:

- Patricia Bassereau, Institut Curie
- Song Baoliang, Chinese Academy of Sciences
- Igor Butovich, UT Southwestern
- Chew Fook Tim, National University of Singapore
- Chng Shu Sin, National University of Singapore
- Chye Mee-Len, The University of Hong Kong
- Neil Clarke, Genome Institute of Singapore
- Toon de Kroon, Utrecht University
- Ed Dennis, UCSD
- Christian Eggeling, MPI Goettingen
- Ivo Feussner, University of Goettingen
- Guan Xueli, Swiss TPH
- Richard Harkewicz, UCSD
- John Harwood, Cardiff University
- Michael Hayden, University of British Columbia
- Xun Huang, Chinese Academy of Sciences
- Harald Koefeler, Medical University Graz
- Benhur Lee, University of California Los Angeles
- Todd Mitchell, University of Wollongong

- Yuki Nakamura, Academia Sinica
- Herman Overkleeft, Leiden University
- Brendan Prideaux, Novartis
- Sir George Radda, Singapore Bioimaging Consortium
- Dominik Schwudke, NCBS Bangalore
- Andrej Shevchenko, MPI Dresden
- Takao Shimizu, The University of Tokyo
- Shui Guanghou, National University of Singapore
- Karsten Suhre, Weill Cornell Medical College Qatar
- Scott Summers, Duke-NUS
- Guillaume Thibault, Temasek Life Sciences Laboratory
- Markus Wenk ,National University of Singapore
- Ioannis Xenarios, Swiss Institute of Bioinformatics
- Joanne Yew, Temasek Life Sciences Laboratory
- Andreas Zumbusch, University of Konstanz
- Xu Chenqi, Chinese Academy of Sciences
- Anne-Claude Gavin, EMBL Heidelberg
- Rob Parton, The University of Queensland

**IV. Presentation made by the applicant at the event**

**Title:** Role of membrane cholesterol in hydrophobic matching and the resulting redistribution of proteins and lipids

One of the physical mechanisms leading to lateral self-organization of cell membranes is the hydrophobic mismatch between a lipid membrane and the transmembrane part of a membrane protein. Meanwhile, cholesterol is in many ways a unique molecule with regard to its capability to promote membrane order and control the physical properties of lipids around it. In this spirit, it is tempting to consider how cholesterol could contribute to hydrophobic mismatch. The topic is particularly exciting given that there is a gradient of cholesterol along the secretory pathway, implying that the changes in membrane properties due to varying concentration of cholesterol can be an important factor for the sorting of non-matched Golgi transmembrane proteins.

We have combined atomistic simulations with a major arsenal of experimental techniques to study the role of cholesterol in hydrophobic mismatch as well as its biological consequences. We have observed cholesterol to play a central role in controlling structural adaptations at the protein-lipid interface under mismatch. This is shown to result in a sorting potential that leads to selective segregation of proteins and lipids according to their hydrophobic length. The results allow us to provide a mechanistic framework for a better description of the organizing role of cholesterol in eukaryotic membranes.

**V. An assessment of the results and impact of the event on the EUROCORES programme**

EUROMEMBRANE as part of the EUROCORES program is defined as follows on the web pages of the ESF: "The aim of this EUROCORES Programme on EuroMEMBRANE is to answer long-standing questions in membrane biology using cutting-edge technologies. These will address functional problems in a quantitative manner bringing together experimental tools with theoretical approaches. There will be a special emphasis on lipid-lipid and (glyco)lipid-protein interactions in the plane of the membrane in health and disease. Using various model organisms would allow cross-species comparison and bring an evolutionary perspective to biomembrane studies. This type of research requires a strong interdisciplinary collaboration that covers biological, chemical, physical and computational aspects of membranology over a broad dynamic range of time and length."

Considering the scope of EUROMEMBRANE, the conference I attended is directly and the most strongly associated with the interests of the programme. Further, given that the 4th Intl Singapore Lipid Symposium was so rich in science, and the speakers were leaders of their own subfields, the impact that I felt in person was simply overwhelming. Scientifically, overall, the impact of the conference will in my opinion be profound, based on the energetic discussions and agreements of new collaborations that I heard of during the conference.

**VI. Other comments / annexes**

None to think of, at the moment.

23.03.2012 Adam Orłowski