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ESF-Euromembrane sponsored speaker at FEBS conference "From lipidomics to disease and green energy" (Spetses, Greece 23.-29.08.2012)

SCIENTIFIC REPORT

1. Summary

The purpose of the trip was to attend the international workshop on lipid research, held on the island of Spetses, Greece, on August 23 - 29, 2012 (note that my departure was scheduled already for the morning of 28th). I work at the laboratory of prof. Elina Ikonen, and the focus of my recent studies has been the relation of cell stress and lipid droplet formation in a motor neuron disease. I presented the data of these recent unpublished results both as an oral presentation and a poster at the meeting.

2. Final programme of the event

Below is the final programme. My presentations are highlighted in yellow.

Thursday, August 23
Arrival, registration
16:00 - 20:30 Welcome drinks and snacks Co-sponsored by Agilent
Friday, August 24
08:45 - 09:00 Introduction
09:00 - 09:50 Opening lecture Karl Hostetler (San Diego, USA): Using Phospholipid Mimicry to Design Antiviral Drugs
Session 1: Lipids in inflammation
Morning Chair Bernd Helms
09:50 – 10:40 Edward Dennis (La Jolla, USA)
Evolution of Phospholipases A2 in Catalysis and Cellular Function on Membranes
10:40 - 11:00 Coffee break
11:00 – 11:50 Marco Lepore (Basel, Switzerland): Recognition of lipid antigens by the immune system
11:50 - 12:10 Marielle Klein (Vienna, Austria): The ceramidome and Toll-like receptor signaling
12:10 - 12:30 Vassilis Aidinis (Athens, Greece): Lysoglycerophospholipids in chronic inflammatory disorders
12:30 - 12:50 Hayley Gallagher (Cardiff, Wales): Molecular mechanisms underlying the anti-inflammatory and anti-atherogenic actions of dihomo-gamma-linolenic acid (DGLA)
13:00 Lunch
15:30 - 17:30 Poster session A (even numbers)
Enabling technology session: Progress in Lipidomics
Evening Chairs Gerhard Liebisch & David Russell
17:30 - 18:30 Markus Wenk (Singapore) Biochemical membrane lipidomics during Drosophila development
18:30 - 19:00 Round table discussion related to lectures
19:00 - 19:20 Karel Wirtz (Utrecht, The Netherlands) Spetses, a rich history
20:30 Dinner
Saturday, August 25
Session 2: Lipids in host-pathogen interactions
Morning Chair Frances Platt
09:00 - 9:50 David Russell (Ithaca, USA). Lipid metabolism, the common language of host and pathogen in tuberculosis
09:50 - 10:40 Kirstin Sandvig (Oslo, Norway): Entry of protein toxins into cells: Role of specific membrane lipids

10:40 - 11:00 Coffee break
11:00 - 11:50 Sergio Grinstein (Toronto, Canada): Phospholipids as regulators of phagosome formation and maturation
11:50 - 12:10 Luce Farine (Bern, Schwitzerland): Localization of enzymes involved in phosphatidylethanolamine synthesis in Trypanosoma brucei
12:10 - 12:30 Anne Bendt (Singapore): Mycolic acids as diagnostic markers for tuberculosis case detection and drug efficacy
12:30 - 12:50 Daniel Schlam (Toronto, Canada): Diacylglycerol kinases terminate diacylglycerol signalling during phagocytosis leading to heterogeneous phagosomal NADPH oxidase activity.
13:00 Lunch

15:30 - 17:30 Poster session A (even numbers)

Enabling technology session: Progress in Lipidomics

Evening Chairs Isabelle Dugail & Konrad Sandhoff
17:30 - 17:50 Joost Brandsma (Southampton, UK)
Predictive lipid biomarkers for severe asthma phenotypes: Unbiased lipidomics analysis for U-BIOPRED
17:50 - 18:50 Edward Dennis (La Jolla, USA)
Understanding omega-3 fatty acid functioning through lipodomics analysis of the macrophage and plasma lipodomes
18:50 - 19:30 Round table discussion related to lectures
20:30 Dinner

Sunday, August 26

Session 3: Lipid droplets

Morning Chair Markus Wenk
09:00 - 9:50 John McLauchlan (Glasgow, United Kingdom): The role of lipids and lipid droplets in Hepatitis C Virus infection
09:50 - 10:40 Isabelle Dugail (Paris, France): Caveolin and adipocyte lipid droplet storage
10:40 - 11:00 Coffee break
11:00 - 11:50 Bernd Helms (Utrecht, The Netherlands): Lipid droplet dynamics in hepatic stellate cells
11:50 - 12:10 Maja Radulovic (Graz, Austria): Novel approaches to lipid droplet biology in the yeast Saccharomyces cerevisiae
12:10 - 12:30 Barbara Koch (Graz, Austria): Topology of triacylglycerol lipases of the yeast Saccharomyces cerevisiae
12:30 - 13:00 Maarit Holtta-Vuori (Helsinki, Finland): Alleviation of seipinopathy related ER stress by neutral lipid storage. Lecture sponsored by ESF-Euromembrane
13:00 Lunch

15:30 - 17:30 Poster session B (odd numbers)

Enabling technology session: Progress in Lipidomics

Evening Chairs Sergio Grinstein & Marco Lepore
17:30 - 17:50 Silke Matysik (Regensburg, Germany): Gas chromatography coupled to tandem mass spectrometry: A rapid and reliable method for the simultaneous determination of oxysterols, plant sterols, and cholesterol precursors
17:50 - 18:50 Markus Wenk (Singapore): Application of lipidomics to host-pathogen interactions
18:50 - 19:30 Round table discussion related to lectures
20:30 Dinner
Monday, August 27
Session 4: Lipid disorders
Morning Chair Karel Wirtz
09:00 - 9:50 Konrad Sandhoff (Bonn, Germany): Sphingolipid digestion and storage in disease
09:50 - 10:40 Frances Platt (Oxford, United Kingdom). Glycosphingolid storage disorders
10:40 - 11:00 Coffee break
11:00 - 11:50 Thijn Brummelkamp (Amsterdam, The Netherlands): Haploid genetic screens decipher lipid biology hijacked by pathogens
11:50 - 12:10 Jitka Rybova (Prague, Czech Republic): Blood group B antigens are major glycosphingolipids accumulated in the pancreas of a patient with Fabry disease, blood group B secretor
12:10 - 12:30 Ajay Kumar Mahalka (Aalto, Finland): Molecular mechanisms of lipid-protein interactions in pathologically stressed conditions
12:30 - 12:50 Joanna Siedlecka (Warsaw, Poland): Lipid profile of Ercc1-/- mouse model of accelerated aging
13:00 Lunch

15:30 - 17:30 Poster session B (odd numbers)

Enabling technology session: Progress in Lipidomics

Evening Chairs John McLaughlan & Kirstin Sandvig
17:30 - 17:50 Feven Sahle (Helsinki, Finland): Lipidomics for aging human bone marrow mesenchymal stem cells
17:50 - 18:50 Gerhard Liebisch (Regensburg, Germany): Lipidomics - Tools to find lipid biomarker and study cellular lipid metabolism
18:50 - 19:30 Round table discussion related to lectures
20:30 Dinner

Tuesday, August 28

09:00 - 09:50 Special Lecture Karl Hostetler (San Diego, USA): Changing Phospholipid Structure to Change Drug Behavior

Session 5: Lipid-based biofuels

Morning Chair Bernd Helms
09:50 - 11:00 John Harwood (Cardiff, United Kingdom): Algal-based lipids: regulation and implications
11:00 - 11:20 Coffee break
11:20 - 12:20 John Harwood (Cardiff, United Kingdom): Crops as sustainable sources of oils, chemical feedstocks and biofuels
12:20 - 12:40 Lital Davidi (Rehovot, Israel): Characterization and origin of two types of lipid droplets in Dunaliella bardawil
12:40 - 13:00 Angeliki Bourtsala (Athens, Greece): Study of cotton (Gossypium hirsutum) phospholipase D and its involvement in wound stress responses
13:00 Lunch
15:00 - 18:00 Excursion by boat including Meet the Expert sessions in subgroups on the beach
20:30 Conference DinnerCo-sponsored by Avanti

Wednesday, August 29

Departure

3. Description of the scientific content

The topics of the meeting covered a wide range of lipid research spanning from cell biology to lipidomics, pathogens, and biofuels. The data was presented both in oral presentations (invited speakers as well as selected topics from poster abstracts) and poster sessions. At the end of each day, there was time allocated for "round table discussions" that allowed more informal discussion of the topics presented at the sessions. Also the evening dinners were arranged in subgroups, which enabled free discussion on both scientific topics as well as career development etc. For the presentations, there was a lot of unpublished data and the whole meeting was very well received by all the participants.

4. Presentations by the applicant

Below is my abstract for the meeting. I had both an oral presentation as well as a poster.

Alleviation of seipinopathy related ER stress by neutral lipid storage

Maarit Hölttä-Vuori[1,4], Veijo T. Salo[1], Yuki Ohsaki[1,2], Maximiliano L. Suster[3] and Elina Ikonen[1,4]

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Mutations affecting the N-glycosylation site in Berardinelli-Seip lipodystrophy associated gene BSCL2/seipin lead to a dominantly inherited spastic paraplegia termed seipinopathy. While seipin loss of function leads to severe congenital lipodystrophy, the effect of seipin N-

glycosylation mutations on lipid balance in the nervous system is unknown. In this study, we show that seipin N88S mutant expression led to a decreased triglyceride content in astrocytoma and motor neuron cell lines. This imbalance was corrected by supplementation with exogenous oleic acid. Upon oleic acid loading, seipin N88S protein was relocated from the ER to the surface of lipid droplets and this was paralleled by alleviation of ER stress induced by the mutant protein. This effect was not limited to seipin N88S, as oleic acid loading also reduced tunicamycin induced ER stress in motor neuron cells. Furthermore, both seipin N88S and tunicamycin induced ER stress was decreased by inhibiting lipolysis, suggesting that the presence of lipid droplets protected neuronal cells from ER stress. In developing zebrafish larvae, seipin N88S expression led to triglyceride imbalance and reduced spontaneous free swimming. Importantly, supplementation with exogenous oleic acid increased fish motility and reduced ER stress in the zebrafish head. We propose that decreased triglyceride storage contributes to the pathology induced by seipin N88S, and that rescuing triglyceride levels may provide a new therapeutic strategy in seipinopathy.

5. In relation to EUROCORES programme

The idea of EUROCORES is to promote collaborative research, networking and dissemination between colleagues of European countries and beyond. This workshop met that goal excellently, offering numerous chances for interaction and forming collaborations between different disciplines of lipid research.