

Conference Report: 13th Yeast Lipid Conference in Paris, France, 17-20 May 2017

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After the 2015 Ghent session (Belgium), the biannual meeting of the yeast lipid research community took place in Paris at the end of May 2017 and gathered experts from around the world. More than 110 researchers and students met in the historical AgroParisTech building in central Paris.

The conference started on Wednesday afternoon May 17th, with some welcoming words from the local organizer Jean-Marc Nicaud highlighting the activities of FEMS and the sponsors. Thanks to their financial support, the organizers were able to allocate conference grants to ten young scientists.

Christopher McMaster (Halifax, Canada) opened the conference with a key-note lecture on aspects of the Henry regulatory loop and Opi1, the master transcriptional regulator of phospholipid biosynthesis Opi1. Then, systematic lipidomics of yeast mutants were developed and explained by Howard Riezman (Geneva, Switzerland) including a parallel with worms, and the role of ceramides in resistance/sensitivity to anoxia. Vishal M. Gohil (Texas, USA) talked about non-bilayer-forming phospholipids and their specific role in mitochondrial respiratory chain function and formation. Later, Martin Graef (Cologne, Germany) presented his work on autophagy driven by Acyl-CoA synthetases, showing insight into their localization, and the requirement for fatty acid activation in cell survival during starvation.

The end of the first day was dedicated to short presentations by six recipients of FEMS Young Scientific Meeting Grants: Winnie Kerstens (Leuven, Belgium), Dominika Čimborová (Ivanka pri Dunaji, Slovakia), Francesca Martani (Milano, Italy), Zsófia Csáky (Ivanka pri Dunaji, Slovakia), Marilyn De Graeve (Ghent, Belgium), and Peter Gajdoš, (Bratislava, Slovakia).

The second morning started with a session dedicated to lipid homeostasis. The founder of the Yeast Lipid Conferences, Günther Daum (Graz, Austria) introduced the first session by an interesting talk about motif characterization in the yeast enzyme phosphatidylserine decarboxylase 1. Toon de Kroon (Utrecht, Netherlands), showed the interplay between phospholipid class and acyl chain length composition in yeast cells that grow with absolutely no PC defective, where compensatory mechanisms maintain physical parameters of the membrane. George M. Carman (New Jersey, USA), described the regulation of Nem1-Spo7 and Pah1 PA phosphatase downstream of them by Protein Kinase A and the consequences. Monica Montero-Lomeli (Rio de Janeiro, Brazil) described the discovery of novel regulators of acetyl-CoA carboxylase by chemogenomics using soraphen A. Jana Patton-Vogt (Pittsburgh, USA) presented work on the role of the glycerol phosphocholine acyltransferase in PC remodelling.

The next section focussed on lipid traffic. Takashi Tatsuta (Cologne, Germany) introduced intra mitochondrial phospholipid trafficking and presented work on the lipid transfer proteins Ups1 and Ups2. Anant K. Menon (New York, USA) presented work in collaboration with

Chris Beh suggesting that ER-PM contact sites control a critical step in sterol import in yeast. Rabih Darwiche (Fribourg, Switzerland, Young Scientific Meeting Grant award holder) talked about lipid binding, sequestration and export by the yeast proteins Pry1 and Pry2, members of the CAP superfamily. After that, Mike Renne (Utrecht, Netherlands) described how over-expression of glycerol-3-phosphate acyltransferase Sct1 to prevent palmitic acid reaching Ole1 synergises with lipid synthesis and lipid trafficking defects, and so can probe crosstalk between lipid unsaturation and lipid transport.

The following session on lipid global networking, metabolic models and lipid regulation was opened by Jens Nielsen (Gothenburg, Sweden), who gave a complete overview of different systems biology and metabolic engineering strategies carried out in his group to understand lipid metabolism in yeast and to produce biotechnologically relevant lipid-derived compounds. After that, Uroš Petrovič (Ljubljana, Slovenia), talked about how extreme quantitative trait loci screening and serial crossing of segregants allowed identification of polygenic traits involved in lipid metabolism in yeast. To close the day, Tristan Rossignol (Jouy-en-Josas, France) discussed new high throughput overexpression screening approaches for lipid production in the non-conventional yeast *Yarrowia lipolytica*.

At the end of an intense second day, the participants had the opportunity to visit the Musée d'Orsay before the conference dinner in the museum's restaurant.

The 3rd day started with a session on the biogenesis of lipid bodies. First, Thierry Chardot (Versailles, France), gave a broad overview of lipid droplets. Then, Alenka Copic (Paris, France) described a fine grain analysis of the peptide sequences of perilipins repeats and other proteins with amphipathic helices that interact with lipid droplets and other compartments. Stephanie Cottier (Fribourg, Switzerland) showed how time-lapse fluorescence imaging of mating yeast can probe lipid droplet dynamics and the importance of connection via the ER for LD proteins to exchange. The two following speakers switched topic to lipid analysis tools, demonstrating the potential of new biophysical approaches to map cellular lipids with nanoscale imaging detection methods. Atomic Force Microscopy coupled with infra-red spectroscopy (AFM-IR spectroscopy) was described by Ariane Deniset-Besseau (University Paris-Sud, France). High-throughput analysis of fatty acid accumulation and profiles using vibrational spectroscopy was described by Volha Shapaval (Ås, Norway).

The conference's last session on the final afternoon was about using yeast as a platform for lipid production. It started with Vasiliki Tsakraklides (Novogy Inc, Cambridge, USA), who presented metabolic engineering of *Yarrowia lipolytica* as a platform for production of high-oleic oil. Inge Van Bogaert (Ghent, Belgium) switched to another non-conventional yeast, *Starmerella bombicola* and discussed its ability to make sophorolipids with biosurfactant properties. Zhiwei Zhu (Gothenburg, Sweden) talked about how to engineer the structure of the mega-enzyme fatty acid synthase to produce short chain fatty acids in *S. cerevisiae*. Then, Iva Pichová (Prague, Czech Republic) gave a talk on the identification and characterization of novel fatty acid desaturases from insects and how they can be used for biotechnological purposes. Milan Čertík (Bratislava, Slovak Republic) talked about ways to add value to waste-products containing animal fats and plant oils using *Y. lipolytica*. Govindprasad Bhutada, (Graz, Austria, FEMS Young Scientists Meeting Grant) showed different new approaches to increase lipid content in *Y. lipolytica* like, for example by deleting glycogen synthase and by overexpressing the perilipin-like protein LDP1. Finally, to close the session, Coraline Rigouin (Toulouse, France), brought back the discussion to fatty acid synthase with computer-aided

engineering of the ketoacyl synthase domain as an approach to produce medium chain fatty acids in *Yarrowia lipolytica*.

During the closing remarks, Tim Levine (London, UK), the new chairman of the Yeast Lipid Conference Steering Committee described the objectives of the YLC, and Jean-Marc Nicaud awarded two prizes sponsored by TOTAL: one for the best short presentation by an awardee of a Young Scientists Meeting Grant to Zsófia Csáky (Ivanka pri Dunaji, Slovakia) for her work on the lipotoxicity of squalene to yeast cells defective in lipid droplet biogenesis, and the other for the best poster to Harald Hofbauer (Frankfurt, Germany) who described the role of the amphipathic helix in the control of Opi1. Finally, the 14th Yeast Lipid Conference was announced. It will be organized in Ljubljana (Slovenia) on May 22-24, 2019, by Uroš Petrovič (Jozef Stefan Institute, Ljubljana, Slovenia). Information about all future and previous YLCs can be found at <http://www.yeastlipidconference.com/>