

## Meeting report: Embo Conference CILIA 2016 (4-7 October 2016, Amsterdam, The Netherlands)

Delphine Gogendeau

The EMBO conference 'CILIA 2016' was held in Amsterdam from the 4<sup>th</sup> to the 7th October 2016. About 500 clinicians, basic researchers, students, patients and patient representatives from all over the world attended the meeting. Fifty two talks and more than 200 posters presented recent and mainly unpublished new results covering the main aspects of ciliary function under normal and pathological conditions. Topics covered included: i) Links between cilia and ciliopathies and new therapeutic approaches; ii) Cilia in signaling and development; iii) Ciliogenesis and intraflagellar transport and iv) Structure and organization of centrioles, basal bodies and cilia. This report will give a brief overview of the meeting and highlight a selection of oral presentations based on my personal interest in the field.

A big effort has been made by the CILIA community to better understand the molecular organization of the different ciliary regions. Namely, many groups used proximity labelling techniques (BioID or APEX) to identify new specific components of cilia (Nachury and Schermer groups), transition zone (Gull and Pelletier labs), Basal foot (Mennella group) and satellites (Firat-Karalar and Pelletier groups). This conference was also a clear demonstration of the boom in the use of super resolution microscopy, highly illustrated in many talks and posters. Precise cartographies of centriolar, satellites, basal feet and transition zone constituents are now available. In particular, in her talk, Quynh Nguyen from Mennella's lab, pinpointed the importance, in these super resolution techniques, of the TAG or epitope positioning when addressing the localization of large proteins such as Ninein. She showed that the basal foot is composed of two major modules linked to each other by Ninein and centriolin.

Greg Pazour opened the conference by presenting his data on IFT25 and IFT27 proteins, which are not required for cilia formation but play an essential role in the transport and accumulation of Gli2 at ciliary tips. He also presented a new approach to mislocalise IFT proteins (by targeting them to mitochondria) once the cilium has been made, in order to identify new roles for IFT proteins.

Greg Mazo, from Tsou lab, showed that altering, in RPE1 cells, C-Nap1 and subdistal appendages function, perturbs primary cilia localization and its association with the Golgi. Furthermore, these primary cilia are not anymore submerged but emerge outside of the cell. As a consequence, cilia with more exposed surfaces presented elevated levels of the signaling molecule Smo, suggesting that some cell types would be more or less sensitive to ciliary signaling according to the amount of ciliary tip exposed.

Maxence Nachury presented new data on ectosomes. He showed that disrupting the retrieval of GPCR (G-protein coupled receptor) from the cilium to the cytosol, does not lead to the accumulation of these receptors into the cilium. Indeed, GPCRs are released from the ciliary tip by vesicles called ectosomes. By proximity labelling and functional studies, he showed that these ectosomes are enriched in actin regulators that are required for ciliary ectocytosis. Interestingly, ectocytosis is a selective process that includes regulators of hedgehog signaling and would play a role in tuning ciliary signaling.

Dhivia Kumar, from Eipper lab, won the award for the best talk given by a PhD student. Her data show that PAM (Peptidylglycine alpha-amidating monooxygenase) an enzyme essential for the synthesis of bioactive peptides, localized in Cilia and Golgi, is required for ciliogenesis. This function is conserved from Chlamydomonas to metazoans and mammals. These data suggest a novel role for the amidation process in ciliogenesis.

Kathryn Anderson showed that RSG1, a small GTPase, is involved in the early steps of ciliary assembly. RSG1 partially co-localizes with TTBK2 at the transition zone and acts downstream of TTBK2. Defects in RSG1 result in docked basal bodies at the ciliary vesicle but without axonemal extension. In a second part of her talk, by using an Arl13b-mCherry, centrin2-GFP mouse line, she showed that during mouse development after stage E6.5 ciliation occurred not only in node cells, but also in all epiblast derived cells.

A session devoted to exchange with patient representatives was a great opportunity to gain feedback from patients about the ongoing research. They pinpointed the importance of making Cilia research accessible and understandable for non-scientists and get the patients involved in research projects, even for fundamental research.

One of the main messages of the conference resides in the fact that, although appearing similar, a great diversity exists between cilia: an inter-species diversity but also between cell types within a same species. This fact emphasizes the need for addressing ciliary research in different cell types and system models. Furthermore, even if great advances on cilia biogenesis and functions have been hitherto achieved as demonstrated during this meeting, many things remain to be understood notably how the cilia signaling is finely controlled or which regulators determine how cells will become ciliated and which treatment could be efficient for patients with ciliopathies.

From a personal point of view, besides the opportunity to attend high quality oral and poster presentations, this conference has allowed me to present my new unpublished results and obtain feedback from experts concerning my project, and also to re-inforce collaborations and share new experimental approaches and reagents. I really enjoyed this conference on this amazing field of Cilia Biology and I am grateful to the GDR3581 CIL for the travel grant which allowed me to attend the meeting.