

ORAL PRESENTATION

Open Access

The transcriptional regulation of ciliogenesis in differentiating *Drosophila* sensory neurons

A Jarman*, FG Newton, PI zur Lage, G Gallone, DJ Moore, K Styczynska

From First International Cilia in Development and Disease Scientific Conference (2012)
London, UK. 16-18 May 2012

In contrast to the progress in understanding ciliogenesis and cilium function, we know less about the transcriptional regulation of ciliogenesis genes and how this regulatory program is modulated to generate diverse cilia. *Drosophila* sensory neurons have ciliary dendrites that are structurally and functionally specialised for receiving different sensory modalities. Time-course gene expression profiling of differentiating chordotonal (Ch) mechanosensory neurons allowed us to determine how Atonal, a proneural bHLH factor, regulates events leading to mechanosensory cilium formation and specialisation. Atonal regulates ciliogenesis via activation of two downstream transcription factors: the well-known cilia gene regulator, Rfx, and a novel factor of the Forkhead family (Fd3F). Rfx regulates a variety of ciliogenesis genes in all ciliated sensory neurons. In contrast, Fd3F is unique to Ch neurons, where it regulates a cohort of genes required for ciliary motility – a unique specialisation of Ch cilia in *Drosophila* and an essential part of the hearing mechanism. Among the targets of Fd3F are genes with human homologues linked to primary ciliary dyskinesia, a congenital condition resulting from defective ciliary motility. We provide evidence that Fd3F is a previously unrecognised orthologue of Foxj1, the so-called master regulator of motile ciliated cells in vertebrates. Interestingly, Fd3F and Rfx cooperate to regulate motility target genes directly via adjacent DNA binding sites, thus providing a mechanism for how Rfx can regulate genes for cilium specialisation in addition to 'core' ciliogenesis genes. Our study suggests how Foxj1 and Rfx factors may interact in vertebrates to generate ciliary diversity.

<http://www.ed.ac.uk/schools-departments/integrative-physiology/staff-profiles/andrew-jarman>

Published: 16 November 2012

doi:10.1186/2046-2530-1-S1-O14

Cite this article as: Jarman *et al.*: The transcriptional regulation of ciliogenesis in differentiating *Drosophila* sensory neurons. *Cilia* 2012 1(Suppl 1):O14.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit



* Correspondence: andrew.jarman@ed.ac.uk
University of Edinburgh, UK