

# The molecular mechanisms of calcium signalling in *Chlamydomonas* flagella

PW Collingridge\*, G Wheeler, C Brownlee

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

The motile green alga, *Chlamydomonas*, has long been used as a model system to understand flagella structure and function. In addition to the well characterised roles of cilia and flagella in motility, cell biologists are becoming increasingly aware of their importance as cellular sensors. Ca<sup>2+</sup>-dependent signalling mechanisms are associated with many flagellar processes, although in many cases the underlying mechanisms remain unclear. Whilst *Chlamydomonas* possesses many genetic and biochemical advantages for the study of flagella, imaging Ca<sup>2+</sup> in this alga has proven to be problematic. We have developed techniques to introduce Ca<sup>2+</sup> responsive fluorescent dyes into *Chlamydomonas* cells via biolistics, which enables us to routinely and robustly image Ca<sup>2+</sup> in both the cytosol and in the flagella. To visualise Ca<sup>2+</sup> elevations within the flagella, we have developed imaging techniques using Total Internal Reflectance Fluorescence (TIRF) microscopy. This approach allows us to specifically image fluorescence from the flagella at high spatial and temporal resolution in the absence of interfering fluorescence from the cell body. We have found that *Chlamydomonas* flagella exhibit a range of dynamic Ca<sup>2+</sup> elevations in response to different stimuli. Each flagellum demonstrates the ability to generate Ca<sup>2+</sup> elevations independently from each other, suggesting a level of control in *Chlamydomonas* flagella signalling processes not previously demonstrated. We are currently using RNAi approaches to assess the contribution of different flagella-localised ion channels to these Ca<sup>2+</sup> signalling processes.

Published: 16 November 2012

doi:10.1186/2046-2530-1-S1-P19

**Cite this article as:** Collingridge et al.: The molecular mechanisms of calcium signalling in *Chlamydomonas* flagella. *Cilia* 2012 **1**(Suppl 1):P19.

**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](http://www.biomedcentral.com/submit)

