AN IMMUNOELECTRONMICROSCOPY ANALYSIS OF THE INTERACTIONS BETWEEN IFT PROTEINS AND THE FLAGELLAR TIP COMPONENTS

Pratelli A, Gentile M, Paccagnini E, Lupetti P, and Mencarelli C.
Departemnt of Life Science, University of Siena

Cilia and flagella are dynamics organelles that undergo cycles of assembly/disassembly in a manner that is temporally coordinated with the cell cycle.

These organelles lack the machinery required for protein synthesis and thus rely on protein precursors that are synthetised in the cell body. A bidirectional transport process - known as the IntraFlagellar Transport (IFT)- moves precursors up to the ciliary tip (anterograde transport), where ciliary assembly takes place, and turnover products back to the cell body (retrograde transport). IFT plays a crucial function to ensure the maintenance of the flagellar homeostasis.

Molecular actors of IFT are two specific molecular motors (kinesin II as the anterograde motor, and dynein 1b as the retrograde one) and the IFT particles, macromolecular complexes that are moved by motors along the axoneme, between doublet surface and the flagellar membrane, and act as platforms for cargo transport.

At the distal end of the organelle, the anterograde transport phase is converted into the retrograde phase. The distal ciliary district, where turnaround takes place, is thus crucial for ciliary functioning. However, despite its key role, very limited structural and molecular information is currently available on this compartment, and nothing is known on the interactions that occur between the distal end and the IFT components.

In order to contribute to the knowledge of IFT turnaround, we have undertaken a detailed electronmicroscopy and immunoelectronmicroscopy analysis of the flagellar tip district in Chlamydomonas reinhardtii. Our studies revealed that IFT protein specifically and differentially interact with structural components of the axonemal tip.

Key words: cilia, flagellar tip, immunoelectron microscopy