

Researchers Capture Images that Illuminate One of Cell's Mysteries

July 18 2008, By Bill Hathaway

(PhysOrg.com) -- Within human cells, tiny membrane-bound compartments called vesicles shepherd biomolecules from place to place.

How these vesicles form, move and finally fuse to deliver cargo at a particular destination largely remains a mystery, now being investigated by Yale researchers Karin Reinisch and Susan Ferro-Novick.

The scientists, both of the Department of Cell Biology, have focused on understanding the molecular basis for the final steps of cargo delivery, a process believed to be important in specifying the correct delivery address for a particular vesicle.

In the June issue of the journal *Cell*, they describe how they used X-ray crystallography to visualize a key step in this process.

A decade ago, Ferro-Novick's lab first discovered the large multi-protein complex known as TRAPPI that plays a role in tethering a vesicle to its target. In a technically demanding feat, the team captured an image of TRAPPI as it activates a regulatory protein within the cell. Activation of the protein, known as Rab GTPase Ypt1, is a crucial step leading to the fusion of the vesicle. The study provides a framework for understanding how the many proteins involved in vesicle docking cooperate.

Large protein assemblies are difficult to crystallize and to visualize at an adequate level of detail, but the team led by Yiying Cai, lead author of

the study, was able to overcome those technical hurdles.

“We were able to get these results only because Yiying was relentless in preparing samples of sufficient quality,” Reinisch says.

Other team members currently in the Department of Cell Biology include Darina Lazarova, Shekar Menon and Anthony Sclafani. Key contributions were also made by Harvey Chin in the lab of Enrique De La Cruz in the Department of Molecular Biology and Biophysics.

Provided by Yale University

Citation: Researchers Capture Images that Illuminate One of Cell's Mysteries (2008, July 18)
retrieved 10 April 2024 from
<https://phys.org/news/2008-07-capture-images-illuminate-cell-mysteries.html>

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