

nature cell biology

Membrane traffic at a crossroads

The field of membrane traffic is at a crossroads, and the interface between it and other areas of study — most notably cytoskeletal dynamics, signal transduction and development — is becoming more significant.

This issue of *Nature Cell Biology* contains several papers that focus on the subject of membrane traffic. This area includes familiar topics directly related to intracellular protein and lipid transport — such as endocytosis, exocytosis, vesicle fusion, Golgi assembly and ER dynamics. But in the broadest sense it also encompasses protein translocation and folding, nuclear import and export, antigen processing and presentation, and organelle biogenesis and movement. The field is experiencing a period of rapid growth, in part because it is at a crossroads, and the interface between it and other areas of study — most notably cytoskeletal dynamics, signal transduction and development — is becoming more significant. Integrating these fields and understanding the mechanisms governing membrane traffic has important implications for treating a wide variety of human diseases. For these reasons, we have chosen to examine this field in greater depth.

Technical improvements have played an important part in accelerating the rate of discovery. Enhanced imaging techniques, improvements in microscopy, mass spectroscopy and ultrastructural analysis, and the proliferation of genetic information have had the most impact. But there has also been a rapid growth in ideas. For example, the SNARE hypothesis (which proposes that pairs of SNARE proteins mediate vesicle fusion) and the more speculative 'raft' hypothesis (which proposes that sphingolipids and cholesterol cluster to form functional rafts within the lipid bilayer) have galvanized the field. These hypotheses are influential not because they are entirely accurate (for example, we now know that vesicle targeting is more complex than anticipated and involves a variety of protein–protein interactions) but because they bring together investigators working on a variety of systems and subject areas. Both proposals have stimulated heated debate and vigorous experimentation, contributing to the current swell of activity. Understanding how organelle identity is established and the precise role of lipids in membrane traffic remain major challenges for the future.

Membrane traffic: electronic information centre

To increase our coverage of this topic, we've constructed a special 'membrane traffic centre' on our website and we're pleased to offer free access to this material during the month of October. This site contains all of the material published in *Nature Cell Biology* over the past six months in the field of membrane traffic. We will continue to update it on a monthly basis and we hope you will find it a useful resource. We look forward to hearing your opinions of it.

Coming soon...

Nature Cell Biology is an interdisciplinary forum read by scientists from diverse backgrounds, and we are dedicated to covering the discipline of cell biology in its entirety. As part of this goal, we will from time to time focus on a wide variety of topics of immediate interest to a broad range of cell biologists. By combining original research papers with News & Views and Review articles in these special issues, we hope to offer 'something for everyone' — specialists and non-specialists alike. Our aim is not to provide a comprehensive overview but rather to capture some of the diversity of important and evolving subject areas.