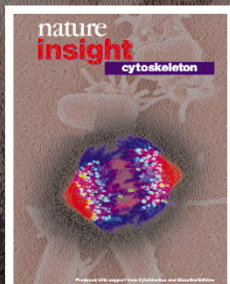


nature insight

cytoskeleton



Cover illustration

SKOV3 ovarian cells in anaphase (centre); microtubules are stained red, chromatin is blue and kinetochores are green (courtesy of Cytokinetics). The background image shows enteropathogenic *E. coli* disrupting the host cell's cytoplasm (courtesy of S. Gruenheid and B. B. Finlay).

The cytoskeleton of eukaryotic cells pervades the cytoplasm. It comprises three broad classes of proteins: actin filaments, microtubules and intermediate filaments. In addition to establishing cell and tissue shape, the cytoskeleton — along with associated motor proteins — influences a wide range of fundamental cellular functions, including cell migration, movement of organelles and cell division.

We are witnessing a rapid advance in our understanding of the cytoskeleton, driven in particular by determination of the structures of key molecules and acquisition of proteomics inventories of cytoskeletal proteins and their binding partners. The cytoskeleton is now no longer considered to be a rigid scaffold, but instead is viewed as a complex and dynamic network of protein filaments that can be modulated by internal and external cues.

This Insight examines many different facets of the cytoskeleton, reviewing the basic principles of filament organization, the operation of motor proteins and the role of the cytoskeleton in key biological processes. There is also consideration of the ways that pathogens subvert the cytoskeletal elements of the host cell to allow entry and spread of the invading organism. With this broad range of topics we aim to appeal not only to the cytoskeleton community, but also to the wide range of our readers who have an interest in cell biology.

Although significant progress has been made in understanding the cytoskeleton there is much still to be learnt. This *Nature* Insight, therefore, not only provides an overview of the current status of the field, but also provides perspectives on the directions of future research from leading scientists.

We are indebted to all the authors who contributed to the Insight and we apologize to those whose areas could not be covered owing to space restraints.

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Deepa Nath Senior Editor

overview:

- 741 The cytoskeleton, cellular motility and the reductionist agenda**
T. D. Pollard

review articles:

- 746 Cell division**
*J. M. Scholey,
I. Brust-Mascher
& A. Mogilner*
- 753 Dynamics and mechanics of the microtubule plus end**
*J. Howard
& A. A. Hyman*
- 759 Molecular motors**
M. Schliwa & G. Woehlke
- 766 Adaptation of core mechanisms to generate cell polarity**
W. J. Nelson
- 775 Microbial pathogenesis and cytoskeletal function**
*S. Gruenheid
& B. B. Finlay*

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