

nature cell biology

Focus on cell division



Nature Cell Biology is delighted to welcome you to this special issue, 'Focus on Cell Division', which we hope will be of interest not only to researchers within the field, but also to our readers in other disciplines.

It is a truism that the cell cycle and cell division lie at the heart of cell biology. During the development of any multicellular organism, as well as during adult life, cell multiplication and division contribute to the generation of specialized cells, which are necessary to form tissues and carry out particular functions. Cell division is also central to the replenishment of cells with a limited life span, such as blood and skin cells. Hence, the mechanisms of cell division need to be tightly regulated, as malfunctions in their control can lead to tumour formation or developmental defects.

In recent years the field has witnessed rapid growth, and many of the molecular players that regulate these processes have been identified. At the same time, the field has become more multidisciplinary — advances in the understanding of developmental and stem-cell biology, signal transduction, DNA replication and repair, checkpoint control, cytoskeleton dynamics and molecular motors, organelle inheritance and oncogenesis are all now linked to the more classical framework of the cell-cycle machinery. This diversity is reflected in several original research papers, reviews, News & Views articles and picture stories in this issue. All pieces related to our Focus on Cell Division are highlighted with a special logo (above) on the contents page. From this issue on, articles related to this field will be collated within a special Focus Section on Cell Division on our website (<http://cellbio.nature.com>), similar to our Focus Sections on Membrane Traffic and the Cytoskeleton. Some highlights from this month include papers on the role of Scrambled protein in actin reorganization, asymmetric cell division in different cell types, the control of duplication of the spindle pole body, and the requirement (or not!) for the anaphase-promoting complex in meiotic anaphase.

A historical view

Cell division has been studied since the 19th century, when Rudolf Virchow's aphorism "omnis cellula e cellula" encapsulated the concept that all cells are derived from pre-existing cells. A Historical Perspective by Mitchison and Salmon on page E17 of this issue describes these first studies on mitosis, what we have learned since the term was first coined in the early 1880s, and what remains to be resolved. Cell division, and mitosis in particular, has yielded some of the most striking images in biology (see, for example, the cover of this issue), and this Historical Perspective includes some of the original images and drawings that were used to illustrate early studies of the mitotic process. A Commentary by Pines and Rieder on page E3 proposes that various stages of mitosis can now be redefined on the basis of molecular, rather than morphological, events.

We hope that our readers will find this collection of primary research and review pieces informative and enjoyable, and we look forward to hearing your feedback on this special issue. In addition, we would like to invite you to visit a special web page (<http://www.nature.com/ncb/celldivision>) that will not only take you to the content of this issue, but will also provide links to the January 2001 'Focus on cell division' issue of *Nature Reviews Molecular Cell Biology*. Some of the features of this Focus issue include review articles on such topics as asymmetric cell division, mitotic kinases, determination of the location of plant cell walls, and regulation of cell size and number, and a Perspective on Walther Flemming, the pioneer of mitosis research. □