Trends in Cell Biology

December 2011 Volume 21, Number 12 pp. 681–754

Editorial Enquiries
Trends in Cell Biology
Cell Press
600 Technology Square
Cambridge, MA 02139, USA
Tel: +1 617 386 2105
Fax: +1 617 397 2810
E-mail: tcb@cell.com

Editorial

681 **The third dimension: cell biology comes alive** — Rebecca Alvania

Review

682 **Microscopy in 3D: a biologist's toolbox** — Robert S. Fischer, Yicong Wu, Pakorn Kanchanawong, Hari Shroff and Clare M. Waterman

692 **Modeling cellular processes in 3D** — Alex Mogilner and David Odde

701 **Compartmentalization of the nucleus** — Lauren Meldi and Jason H. Brickner

709 **The ER in 3D: a multifunctional dynamic membrane network** — Jonathan R. Friedman and Gia K. Voeltz

718 **Rho protein crosstalk: another social network?** — Christophe Guilluy, Rafael Garcia-Mata and Keith Burridge

727 **Epithelial organization, cell polarity and tumorigenesis** — Luke Martin McCaffrey and Ian G. Macara

736 **Extracellular matrix determinants of proteolytic and non-proteolytic cell migration** — Katarina Wolf and Peter Friedl

745 **From 3D cell culture to organs-on-chips** — Dongeun Huh, Geraldine A. Hamilton and Donald E. Ingber

Cover: Cell biological research is becoming increasingly three dimensional, taking into account spatial dynamics when studying biological questions. In this special issue of *Trends in Cell Biology*, researchers from across various fields discuss how the inner architecture of the cell, and the external environment that surrounds it, impacts upon cell function. The cover image, Z-stack projections of a mouse mammary organoid grown in Matrigel 3D cultures, provides a striking example of how considering three-dimensional structure can offer insight into behaviour. Cover image courtesy of Ian Macara.