



nature publishing group



ARIANNE HEINRICHS



EKAT KRITIKOU



FRANCESCA CESARI



ASHER MULLARD

**W**e all have our own way of dealing with stress, but how do our cells deal with it at a molecular level? Cells sense physical stress from their three-dimensional environment — certain properties of the extracellular matrix, neighbouring cells and other mechanical forces. Extensive research has uncovered how mechanical forces are transduced into biochemical signals (mechanotransduction) and how mechanotransduction affects cellular function. Several molecules that are involved in mechanotransduction, including ion channels, cell adhesion receptors, cytoskeletal and extracellular matrix molecules, have recently been identified. Progress has also been made towards measuring and defining *in vivo* forces, and understanding their roles in pathogenesis. Any molecular defect that interrupts or alters mechanical sensing and subsequent cell signalling events could perturb the normal cellular function and potentially lead to various diseases.

This month's Focus (<http://www.nature.com/nrm/focus/mechanotransduction>) considers different aspects of mechanotransduction — from how cells sense mechanical forces through adhesion molecules (Geiger, Spatz and Bershadsky, page 21) and through ion channels (Chalfie, page 44), to mechanochemical coupling between the cell surface and the nucleus, as Ingber, Wang and Tytell explain on page 75. Understanding how cells sense and respond to mechanical cues is important not only for our understanding of embryogenesis (Wozniak and Chen, page 34) and vascular physiology (Hahn and Schwartz, page 53), but also for diseases, ranging from muscular dystrophies and cardiomyopathies to cancer progression and metastasis (Jaalouk and Lammerding, page 63).

We wish all our readers, authors and referees a happy and productive New Year!

**EDITORIAL OFFICES**

**LONDON** NatureReviews@nature.com  
The Macmillan Building, 4 Crinan Street,  
London N1 9XW, UK  
Tel: +44 (0)20 7843 3620;  
Fax: +44 (0)20 7843 3629

**CHIEF EDITOR:** Arianne Heinrichs  
**SENIOR EDITOR:** Ekaterina Kritikou  
**ASSOCIATE EDITOR:** Francesca Cesari  
**ASSISTANT EDITOR:** Asher Mullard  
**COPY EDITOR:** Simon Bishop  
**SENIOR COPY EDITORS:** Isobel Barry,  
Craig Nicholson, Man Tsuey Tse, Gillian Young  
**SENIOR ART EDITOR (NRMCB):** Vicky Askew  
**ART CONTROLLER:** Susanne Harris  
**SENIOR ART EDITOR:** Patrick Morgan  
**MANAGING PRODUCTION EDITOR:**  
Judith Shadwell  
**SENIOR PRODUCTION EDITOR:**  
Simon Fenwick  
**PRODUCTION CONTROLLER:**  
Natalie Smith

**SENIOR EDITORIAL ASSISTANT:** Laura Firman  
**EDITORIAL ASSISTANT:** Jacques Smit  
**WEB PRODUCTION MANAGER:**  
Deborah Anthony  
**MARKETING MANAGERS:** Tim Redding,  
Leah Rodriguez

**MANAGEMENT OFFICES**

**LONDON** nature@nature.com  
The Macmillan Building, 4 Crinan Street,  
London N1 9XW, UK  
Tel: +44 (0)20 7833 4000;  
Fax: +44 (0)20 7843 4596/7  
**OFFICE MANAGER:** Kiersty Darnell  
**PUBLISHER:** Stephanie Diment  
**MANAGING DIRECTOR:** Steven Inchcoombe  
**EDITOR-IN-CHIEF, NATURE PUBLICATIONS:**  
Philip Campbell  
**ASSOCIATE DIRECTORS:**  
Jenny Henderson, Tony Rudland  
**EDITORIAL PRODUCTION DIRECTOR:**  
James McQuat  
**PRODUCTION DIRECTOR:** Yvonne Strong

**DIRECTOR, WEB PUBLISHING:** Timo Hannay  
**HEAD OF WEB PRODUCTION:**  
Alexander Thurrell

**NATUREJOBS PUBLISHER:** Della Sar

**NEW YORK** nature@natureny.com  
Nature Publishing Group,  
75 Varick Street, 9th floor, New York,  
NY 10013-1917, USA  
Tel: +1 212 726 9200;  
Fax: +1 212 696 9006

**CHIEF TECHNOLOGY OFFICER:**  
Howard Ratner

**HEAD OF INTERNAL SYSTEMS DEVELOPMENT:**  
Anthony Barrera

**HEAD OF SOFTWARE SERVICES:**

Luigi Squillante

**HEAD OF GLOBAL ADVERTISING, SALES AND**

**SPONSORSHIP:** Dean Sanderson

**HEAD OF NATURE RESEARCH & REVIEWS**

**MARKETING:** Sara Girard

**BUSINESS DEVELOPMENT EXECUTIVE:**

David Bagshaw

**TOKYO** nature@natureasia.com  
Chiyoda Building 5F, 2-37-1 Ichigayatamachi,  
Shinjuku-ku, Tokyo 162-0843, Japan  
Tel: +81 3 3267 8751; Fax: +81 3 3267 8746  
**ASIA-PACIFIC PUBLISHER:** Antoine E Bocquet  
**MANAGER:** Koichi Nakamura  
**ASIA-PACIFIC SALES DIRECTOR:**  
Kate Yoneyama  
**SENIOR MARKETING MANAGER:**  
Peter Yoshihara  
**MARKETING/PRODUCTION MANAGER:**  
Takesh Murakami  
**INDIA** SA/12 Ansari Road, Daryaganj,  
New Delhi 110 002, India  
Tel/Fax: +91 11 2324 4186  
**SALES AND MARKETING MANAGER, INDIA:**  
Harpal Singh Gill

Copyright © 2009 Nature Publishing Group  
Research Highlight images courtesy of  
Getty Images unless otherwise credited.  
Printed in Wales by Cambrian Printers  
on acid-free paper