nature publishing group

► **COVER:** 'Model organisms' by Patrick Morgan, inspired by the Perspective on p575.


LOUISA FLINTOFT


TANITA CASCI


MARY MUERS


DARREN BURGESS

This month's issue traces a path through epigenetic research from early observations of epigenetic phenomena, through the emergence of principles of gene regulation to the future application of epigenomics in human disease research.

The field of epigenetics owes much to studies of two classic phenomena: X-chromosome inactivation, which is discussed in a Review by Anton Wutz (p542), and genomic imprinting, which is the topic of a Perspective by Anne Ferguson-Smith (p565). Both are paradigms for epigenetic gene regulation, and their study, mainly in mice, underpins widely applied principles in this field. Wutz considers how stable silencing is achieved across an entire chromosome; the stepwise process that is emerging could be informative for other instances of gene silencing. However, X-chromosome inactivation also provides a lesson in caution when extrapolating across systems, as there are hints that inactivation occurs differently in other mammals.

Ferguson-Smith comments on the remarkable progress that has been made since the first use of the term 'imprinting' to the latest work on harnessing next-generation sequencing to seek new imprinted genes. Her historical Perspective also sets the stage for new horizons in epigenetics: characterizing epigenomes on a large scale and at high resolution and understanding genotype–epigenotype–phenotype relationships.

Also looking to the future, in a Review on p529, Stephan Beck and colleagues provide a framework for epigenome-wide association studies. Applying the principles of genome-wide association studies to variation in DNA methylation offers the exciting prospect of filling in some of the blanks in our understanding of common disease. This new direction highlights the fascinating recent transition from epigenetic phenomena being largely viewed as isolated curiosities to being seen as an integral part of complex traits.

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: Louisa Flintoft
SENIOR EDITORS: Tanita Casci, Mary Muers
ASSISTANT EDITOR: Darren Burgess
COPY EDITOR: Matthew Smyllie
SENIOR COPY EDITORS: Yukie Ozawa , Catriona Rodwell, Man Tsuey Tse, Lucie Wootton
COPY EDITING MANAGER: Lewis Packwood
SENIOR ART EDITOR (NRG): Patrick Morgan
ART CONTROLLER: Susanne Harris
SENIOR ART EDITORS: Vicky Summersby, Kirsten Lee
MANAGING PRODUCTION EDITOR: Judith Shadwell
SENIOR PRODUCTION EDITOR: Simon Fenwick
PRODUCTION CONTROLLER: Natalie Smith
SENIOR EDITORIAL ASSISTANT: Laura Corns
EDITORIAL ASSISTANT: Ella Lines
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: Laura Firman
PUBLISHER: James Butcher
MANAGING DIRECTOR: Steven Inchcoombe
EDITOR-IN-CHIEF, NATURE PUBLICATIONS: Philip Campbell
ASSOCIATE DIRECTORS: Jenny Henderson, Dominic Pettit
EDITORIAL PRODUCTION DIRECTOR: James McQuat
PRODUCTION DIRECTOR: Yvonne Strong
DIRECTOR, WEB PUBLISHING: Dan Pollock
HEAD OF WEB PRODUCTION: Alexander Thurrell

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
GLOBAL HEAD OF ADVERTISING AND SPONSORSHIP: Dean Sanderson
HEAD OF NATURE RESEARCH & REVIEWS MARKETING: Sara Girard

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 5A/12 Ansari Road, Daryganj,
New Delhi 110 002, India
Tel/Fax: +91 11 2324 4186
SALES AND MARKETING MANAGER, INDIA: Harpal Singh Gill

Copyright © 2011 Nature Publishing Group
Research Highlight images courtesy of Getty Images unless otherwise credited.
Printed in Wales by Cambrian Printers on acid-free paper

© 2011 Macmillan Publishers Limited. All rights reserved