



nature publishing group



► **COVER:** 'Heart's content' by Patrick Morgan. Adapted from the image of a corrosion cast of the vasculature of a newborn mouse, provided by Jonathan Epstein, University of Pennsylvania, Philadelphia, USA (also see the Review on p49).



MAGDALENA SKIPPER



TANITA CASCI



LOUISA FLINTOFT



PATRICK GOYMER

The concept of a histone code has influenced many who work in the fields of chromatin and epigenetics. The basic idea is that different combinations of the chemical marks that decorate histone tails are read out by interacting proteins, which ultimately determines the expression status of the underlying DNA.

However, as highlighted in the Review by Steven Henikoff on page 15, a body of evidence has built up that requires us to consider a different view of chromatin's influence on eukaryotic gene expression. Here, chromatin is not considered as a static template that varies only in the marks added or removed from histone tails. Instead, nucleosome destabilization and histone turnover are essential ingredients for propagating active chromatin states. In particular, Henikoff points to a key role for the dynamic replacement of 'standard' histone H3 with the variant H3.3 in the epigenetic memory of gene-expression states. This theme crops up again in a Research Highlight on page 2. The topic here is recent work in *Xenopus laevis* showing that replacement with H3.3 is essential for cells to remember their previous gene-expression states as they commit to developmental fates.

In the context of this dynamic view of the role of chromatin in gene expression, the influence of histone modifications needs to be considered in terms of their effects on nucleosome stability. And as well as the roles of histone variants, other aspects of chromatin biology — such as the functions of histone chaperones and chromatin-remodelling enzymes — can be reconsidered in terms of their role in gene expression through histone turnover.

As we begin 2008, the editors would like to thank the authors of our 2007 articles, and all those who provided valued input through peer review, for their contributions to *Nature Reviews Genetics* over the past 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: Magdalena Skipper**SENIOR EDITORS:** Tanita Casci, Louisa Flintoft**ASSISTANT EDITOR:** Patrick Goymer**SENIOR COPY EDITOR:** Carrie Patis**COPY EDITOR:** Elizabeth Neame**SENIOR ART EDITOR (NRG):** Patrick Morgan**EDITORIAL SUPPORT MANAGER:**

Elinor Faulkner

ART CONTROLLER: Susanne Harris**SENIOR ART EDITOR:** Vicky Askew**MANAGING PRODUCTION EDITOR:**

Judith Shadwell

DEPUTY PRODUCTION EDITOR:

Simon Fenwick

PRODUCTION CONTROLLER: Natalie Smith**EDITORIAL ASSISTANTS:** Laura Firman,

Robert Monk

WEB PRODUCTION MANAGER, UK:

Alexander Thurrell

MARKETING MANAGERS: Kellie Lane,

Amy Maurer

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: Sheryl Ocampo**PUBLISHER:** Hugh Blackbourn**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:

Jeremy Macdonald

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

DIRECTOR OF NEW TECHNOLOGY:

Greg Suprock

HEAD OF WEB SERVICES:

Anthony Barrera

NATUREJOBS PUBLISHER: Ben Crowe**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 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 © 2008 Nature Publishing Group

Research Highlight images courtesy of

Getty Images unless otherwise credited.

Printed in Wales by Cambrian Printers

on acid-free paper