nature publishing group

► **COVER:** Design by Claudia Bentley

Research into the role of stem cells in mammalian physiology has burgeoned over the past 20 years. Indeed, in 2007 Martin Evans, Mario Capecchi and Oliver Smithies were recognised for their pioneering contributions to stem-cell research by being award the Nobel Prize for Medicine. It is therefore timely to present this Nature Reviews collection on stem cells — a selection of recent Reviews and Perspectives specially chosen to provide an introduction to diverse aspects of stem cell research.

It is now over half a century since bone-marrow reconstitution experiments, first indicated the existence of the haematopoietic stem cell (HSC). Its discovery awakened the field of stem-cell biology. In a Review on page S5, Anne Wilson and Andreas Trumpp describe the recent progress in understanding the HSC bone-marrow microenvironment, known as the HSC niche. Such understanding will allow expansion of HSCs for therapeutic use.

An important question being addressed by the stem-cell community is how do stem cells age and how does this contribute to mammalian ageing? On page S19, Norman Sharpless and Ron DePinho discuss how certain stem cells obtain decreased regenerative capacity with advancing age, and how this has a role in human age-related conditions such as frailty, atherosclerosis and type II diabetes.

Another disease in which stem cells are hypothesised to have a key role, is cancer. Cancer stem cells are thought to maintain the growth of the tumour, and the role of stem cells in brain tumours is the focus of the Review by Angelo Vescovi, Rossella Galli and Brent Reynolds on page S30. Understanding the cellular and genetic mechanisms that control adult neurogenesis and brain tumorigenesis should enable the development of new therapeutic strategies.

Finally, in a Perspective article on page S42 Shin-Ichi Nishikawa, Lars Martin Jakt and Takumi Era discuss the technical challenge of studying early processes of mammalian embryogenesis — an essential area of study for further elucidation of the molecular mechanisms that govern stem-cell fate and the identification of specific stem-cell markers.

Further Reviews and Perspectives, as well as primary papers and Research Highlights can be found in the accompanying web focus (http://www.nature.com/reviews/focus/stemcells). We are very grateful to Thermo Scientific for their financial support, which was instrumental in the production of this collection.

Ezzie Hutchinson, Chief Editor, Nature Reviews Cancer

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

SUPPLEMENT EDITOR: Ezzie Hutchinson
COVER DESIGN: Claudia Bentley
MANAGING PRODUCTION EDITOR: Judith Shadwell
DEPUTY PRODUCTION EDITOR: Simon Fenwick
PRODUCTION CONTROLLER: Natalie Smith

WEB PRODUCTION: Manpreet Mankoo
WEB PRODUCTION MANAGER: Alexander Thurrell
MARKETING MANAGERS: Kellie Lane, Leah Rodriguez
PUBLISHER: Hugh Blackbourn

EDITOR-IN-CHIEF, NATURE PUBLICATIONS: Philip Campbell

NATURE REVIEW JOURNALS
Nature Reviews Cancer
Chief Editor: Ezzie Hutchinson
www.nature.com/reviews/cancer

Nature Reviews Drug Discovery
Chief Editor: Peter Kirkpatrick
www.nature.com/reviews/drugdisc

Nature Reviews Genetics
Chief Editor: Magdalena Skipper
www.nature.com/reviews/genetics

Nature Reviews Immunology
Chief Editor: Elaine Bell
www.nature.com/reviews/immunol

Nature Reviews Microbiology
Chief Editor: David O'Connell
www.nature.com/reviews/micro

Nature Reviews Molecular Cell Biology
Chief Editor: Arianne Heinrichs
www.nature.com/reviews/molcellbio

Nature Reviews Neuroscience
Chief Editor: Claudia Wiedemann
www.nature.com/reviews/neuro

Printed in Wales by Cambrian Printers
on acid-free paper