# CONTENTS

12 December 2013 / Vol 504 / Issue No 7479

# THIS WEEK

### **EDITORIALS**

187 RESEARCH

### Failure of care

Scientists must take proper care of all animals used in their labs

### 187 INTELLECTUAL PROPERTY

### The patent bargain

Ease of access and transparency are key to a flourishing patent system

### 188 EQUALITY

# Gender progress (?)

Nature takes stock of its efforts to combat editorial imbalance

#### **WORLD VIEW**

# 189 Preserve the European Research Council's legacy

Helga Nowotny
Changes at European Commission
must not be allowed to undermine
the ERC's focus on quality

### **RESEARCH HIGHLIGHTS**

### 190 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Bees make fruit / Ice loss promotes drought / Storm forecasts / Baboons eyeto-eye / US surface waters contaminated / Bat culls may not halt rabies / Oestrogen on the brain

### **SEVEN DAYS**

### 192 THE NEWS IN BRIEF

Dementia on the rise / UK invests in quantum technology / Pacific Biosciences targets bacterial genomes / Pfizer opens up access to clinical data

### CAREERS

### 319 COMPUTING

### Out of the hood

Life scientists can flourish by dropping in vivo experiments in favour of in silico models

### 321 COLUMN

### A faulty hypothesis

Carolyn Beans

It's sometimes right to be wrong but you don't have to enjoy it

### NEWS IN FOCUS



# 95 AGRICULTURE

Spread of fungus ramps up threat to banana crops

### 196 GEOLOGY

Florida plans predictive map of sinkholes

### 198 MEDICINES

Emerging diabetes drugs face rocky road to approval

### 199 AGRICULTURE

Business bets on microbial assistance for plants

### 200 CONSERVATION

Row erupts over protection of biodiversity hotspot in India

### 201 COSMOLOGY

Warmth of early Universe may have meant more water — and maybe life

# **FEATURES**

# 202 RADIOISOTOPES

### The medical testing crisis

In a bid to avert shortages, companies are exploring novel ways to make radioisotopes



# COMMENT

### 209 DEVELOPMENTAL BIOLOGY

# Support mothers to secure future public health

David Barker, Mary Barker, Tom Fleming & Michelle Lamp!
Many chronic diseases would be

Many chronic diseases would be avoided by prioritizing prenatal care



### 211 BIBLIOMETRICS

# Global gender disparities in science

Vincent Larivière, Chaoqun Ni, Yves Gingras, Blaise Cronin & Cassidy R Sugimoto Bibliometrics analysis confirms that barriers to women in science abound

### **BOOKS & ARTS**



### 214 COMPUTER ANIMATION

Digital heroes and computergenerated worlds

Joe Letteri

# 216 GEOLOGY

The maverick founder of modern seismology George Helffrich

217 BOOKS IN BRIEF

# CORRESPONDENCE

218 Keep the research ships at sea / Saving Asian banana crops / Mobility within Europe / Training in Africa

### **FUTURES**

324 Sibyl

Deborah Walker

# CONTENTS

12 December 2013 / Vol 504 / Issue No 7479

### RESEARCH

### **NEW ONLINE**

219 Papers published this week at nature.com

### **NEWS & VIEWS**

### 220 NEUROSCIENCE

Faster than kiss-and-run
An ultrafast mode of endocytosis
Soyoun Cho & Henrique von Gersdorff
SEE ARTICLE P.242

# 221 EXTRASOLAR PLANETS

Inner edge of the habitable zone
A new estimate for the inner boundary
of the habitable zone
James F Kasting & Chester E Harman
SEE LETTER P.268

### 223 DEVELOPMENTAL BIOLOGY

Mechanics in the embryo Mechanical forces are a conserved regulator of gastrulation Stefano Piccolo

#### 225 CANCER

### A suppression switch

The effect of autophagy inhibition depends on p53 activity

Hanna Starobinets & Jayanta Debnath
SEE LETTER P.296

# 226 ASTROPHYSICS

Tracking our neighbours' past
Explaining the planes of dwarfs around
Andromeda and the Milky Way
Alan McConnachie

### 228 NEUROSCIENCE

The highs and lows of memory
The role of parvalbumin-expressing
neurons in memory function
Kevin Allen & Hannah Monyer
SEE LETTER P.272

# 229 SOFT-MATTER PHYSICS

# Ferromagnetic ferrofluids

Ferromagnetism in a novel marriage of particle and fluid

Noel A Clark SEE ARTICLE P.237

### REVIEW

231 EVOLUTION An archaeal origin of eukaryotes supports only two primary domains of life T A Williams, P G Foster, C J Cox & T M Embley

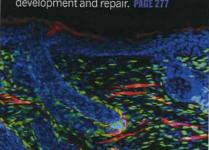
### ARTICLES

237 MATERIALS SCIENCE Ferromagnetism in

### ON THE COVER

# Separate cells

Grafted dermal fibroblasts (green) support hair follicle formation in a skin wound. Fibroblasts all look alike but a transplantation and lineage tracing study in mice shows that skin connective tissue arises from two distinct fibroblast lineages that also contribute differentially to skin development and repair. PAGE 277



# suspensions of magnetic platelets in liquid crystal

A Mertelj, D Lisjak, M Drofenik & M Čopič SEE N&V P.229

- 242 NEUROSCIENCE Ultrafast endocytosis at mouse hippocampal synapses S Watanabe et al. SEE N&V P.220
- 248 PARASITOLOGY Targeting Plasmodium Pl(4)K to eliminate malaria C W McNamara et al.
- 254 STRUCTURAL BIOLOGY Structural mechanism of ligand activation in human GABA<sub>B</sub> receptor Y Geng, M Bush, L Mosyak, F Wang & Q R Fan

### **LETTERS**

- 260 ASTROPHYSICS Baryons in the relativistic jets of the stellar-mass black-hole candidate 4U 1630-47 M Díaz Trigo, J C A Miller-Jones, S Migliari, J W Broderick & T Tzioumis
- 263 QUANTUM INFORMATION An exactly solvable model for quantum communications

  G Smith & J A Smolin
- 268 EXTRASOLAR PLANETS Increased

insolation threshold for runaway greenhouse processes on Earth-like planets

J Leconte, F Forget, B Charnay, R Wordsworth & A Pottier SEE N&V P.221

272 NEUROSCIENCE Parvalbuminexpressing basket-cell network plasticity induced by experience regulates adult learning F Donato, S B Rompani & P Caroni

**SEE N&V P.228** 

- 277 STEM CELLS Distinct fibroblast lineages determine dermal architecture in skin development and repair R R Driskell et al.
- 282 STEM CELLS Derivation of novel human ground state naive pluripotent stem cells

  O Gafni et al.
- 287 MICROBIOLOGY A chain mechanism for flagellum growth
  L. D. B. Evans, S. Poulter, E. M. Terentjev,
  C. Hughes & G. M. Fraser
- 291 CELL BIOLOGY High-content genomewide RNAi screens identify regulators of parkin upstream of mitophagy S A Hasson et al.
- 296 CANCER p53 status determines the role of autophagy in pancreatic tumour development

  MTRosenfeldt et al. SEE N&V P.225
- 301 STRUCTURAL BIOLOGY Mechanism of farnesylated CAAX protein processing by the intramembrane protease Rce1

  / Manolaridis et al.
- 306 GENETICS Chromatin connectivity maps reveal dynamic promoter-enhancer long-range associations Y Zhang et al.
- 311 CELL BIOLOGY Primary cilia are specialized calcium signalling organelles

  M Delling, P G DeCaen, J F Doerner, S Febvay & D E Clapham
- 315 CELL BIOLOGY Direct recording and molecular identification of the calcium channel of primary cilia P G DeCaen, M Delling, T N Vien & D E Clapham

RYAN DRISKELL, KING'S COLLEGE LONDON