

# CONTENTS

23 October 2014 / Vol 514 / Issue No 7523

## THIS WEEK

### EDITORIALS

#### 403 BIOSAFETY

##### A ripe time for gaining ground

The frosty debate over gain-of-function work shows signs of a thaw

#### 403 ANIMAL RESEARCH

##### The ice bucket

Success of social-media challenge sidestepped emotive issue

#### 404 ENVIRONMENT

##### Toxic influence

Europe must respond to threat to vultures posed by livestock drugs



### WORLD VIEW

#### 405 Stormy outlook for long-term ecology studies

Tim Birkhead

Axed guillemot survey raises fears over funders' priorities

### RESEARCH HIGHLIGHTS

#### 406 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Sleep loss and obesity / Saving rhinos / Solar corona heating / PhD supply tops demand / Tornadoes clustered

### SEVEN DAYS

#### 408 THE NEWS IN BRIEF

Contentious snails / L'Aquila appeal gets under way / Australia boosts ties between science and industry

## CAREERS

#### 523 CAREER CHANGES

##### Open for business

An MBA can open new career paths for the business-minded scientist

#### 525 TURNING POINT

Andrew Dove sees the latest biodegradable polymers as a potential boon to regenerative medicine

### NATUREJOBS ADVERTISING FEATURES

Spotlight on postgraduate opportunities  
Spotlight on Shanghai

## NEWS IN FOCUS



#### 411 BIOSECURITY

White House enforces moratorium on gain-of-function research

#### 412 POLITICS

US elections hold promise of bleak outlook for science funding

#### 413 ANTHROPOLOGY

Oldest genome from modern human gives fresh twist to African exodus

#### 414 ASTRONOMY

Solar force offers Kepler telescope new lease of life

#### 416 STRUCTURAL BIOLOGY

Protein database wrestles with challenge posed by molecular machines

### FEATURES

#### 418 RESEARCH

##### The ethics squad

Scientists with moral dilemmas dial up ethics consultancies

### PALAEONTOLOGY

## Hobbit tale

The discovery of *Homo floresiensis* in the words of those who made the find

PAGE 422



## COMMENT

### HUMAN EVOLUTION

## The Flores problem

Ten years on, researchers are still trying to get to grips with *Homo floresiensis* **PAGE 427**



#### 430 EMERGENCY PLANNING

##### Be prepared

Jennifer K Pulliam, Gordon S Roble & Mark A Raymond

Standard emergency preparations tend to fail when the worst happens, but there is another way

### BOOKS & ARTS

#### 432 IN RETROSPECT

##### On the Connexion of the Physical Sciences

Richard Holmes

### CORRESPONDENCE

434 Keep the 2°C climate target / GlobeLand30 mapping for all / Realistic sustainability goals / Research evaluations

### FUTURES

#### 528 Google car takes the test

Norman Spinrad





# CONTENTS

23 October 2014 / Vol 514 / Issue No 7523

## RESEARCH

### NEW ONLINE

435 Papers published this week at nature.com

### NEWS & VIEWS

#### 436 CLIMATE CHANGE

##### A crack in the natural-gas bridge

Abundant natural gas may have little effect on CO<sub>2</sub> emissions

Steven J Davis & Christine Shearer

SEE LETTER P.482

#### 437 HIV

##### A stamp on the envelope

A high-resolution crystal structure of the pre-fusion Env trimer

Rogier W Sanders & John P Moore

SEE ARTICLE P.455

#### 438 LUNG DISEASE

##### Treatment by cell transplant

Gene-corrected macrophages treat pulmonary alveolar proteinosis in mice

Mary Jane Thomassen & Mari S Kavuru

SEE ARTICLE P.450

#### 440 ASTRONOMY

##### Hurling comets around a planetary nursery

Star-grazing comets in the  $\beta$  Pictoris planetary system form two families

Aki Roberge SEE LETTER P.462

#### 441 PHYSIOLOGY

##### Relax and come in

Dendritic-cell signals promote relaxation of lymph-node stromal cells

Kari Vahtomeri & Michael Sixt

SEE LETTER P.498

#### 442 HIV

##### Potency needs constancy

Fc $\gamma$ R-mediated effector functions needed for antibody-based viral control

Alexandra Trkola

### ARTICLES

445 **GENETICS** Genome sequence of a 45,000-year-old modern human from western Siberia

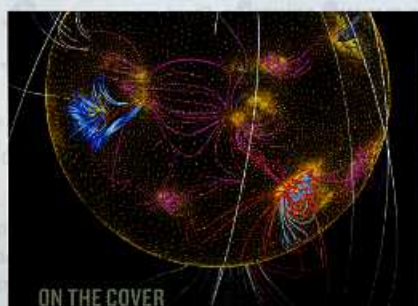
Q Fu et al.

450 **CELL BIOLOGY** Pulmonary macrophage transplantation therapy

T Suzuki et al. SEE N&V P.438

455 **IMMUNOLOGY** Structure and immune recognition of trimeric pre-fusion HIV-1 Env

M Pancera et al. SEE N&V P.437



ON THE COVER

## Solar storm

A magnetic model of the Sun before a solar eruption produced by an ejected magnetic rope, based on data from the Helioseismic and Magnetic Imager of the NASA Solar Dynamics Observatory mission. Tahar Amari et al. show that the probable driving force for such ejections is the appearance and then the ejection of a 'twisted rope' of magnetic flux. **PAGE 465**

### LETTERS

462 **PLANETARY SCIENCE** Two families of exocomets in the  $\beta$  Pictoris system

F Kiefer et al. SEE N&V P.440

465 **ASTRONOMY** Characterizing and predicting the magnetic environment leading to solar eruptions

T Amari, A Canou & J-J Aly

470 **NANOTECHNOLOGY** Piezoelectricity of single-atomic-layer MoS<sub>2</sub> for energy conversion and piezotronics

W Wu et al.

475 **INORGANIC CHEMISTRY** Identification of an iridium-containing compound with a formal oxidation state of IX

G Wang et al.

478 **CLIMATE SCIENCE** Methane dynamics regulated by microbial community response to permafrost thaw

C K McCalley et al.

482 **CLIMATE SCIENCE** Limited impact on decadal-scale climate change from increased use of natural gas

H McJeon et al. SEE N&V P.436

486 **ECOLOGY** Producing more grain with lower environmental costs

X Chen et al.

490 **DEVELOPMENTAL BIOLOGY** A *Hox* regulatory network of hindbrain segmentation is conserved to the base of vertebrates

H J Parker, M E Bronner & R Krumlauf

494 **EVOLUTIONARY GENETICS** Pre-Columbian mycobacterial genomes reveal seals as a source of New World human tuberculosis

K I Bos et al.

498 **IMMUNOLOGY** Dendritic cells control fibroblastic reticular network tension and lymph node expansion

S E Acton et al. SEE N&V P.441

503 **STEM CELLS** Diabetes recovery by age-dependent conversion of pancreatic  $\delta$ -cells into insulin producers

S Chera et al.

508 **CANCER** High-fat-diet-mediated dysbiosis promotes intestinal carcinogenesis independently of obesity

M D Schulz et al.

513 **CANCER** Contrasting roles of histone 3 lysine 27 demethylases in acute lymphoblastic leukaemia

P Ntziachristos et al.

518 **STRUCTURAL BIOLOGY** Structure and mechanism of Zn<sup>2+</sup>-transporting P-type ATPases

K Wang et al.

### IMMUNOLOGY

## Moving target

The Env trimer, key to HIV's evasion of the immune response. **PAGE 455**

