



THIS WEEK

EDITORIAL

Reasons to be cheerful

As two new fronts in the war on disease demonstrate, creativity remains a key weapon for scientists in the hunt for drugs.

[Listen up](#)

Human echolocation kicks off the *Nature* podcast's new series on sound science

WORLD VIEW

Economic divide taking toll on European science

The Horizon 2020 programme threatens to siphon away the best scientists from southern Europe, argues Colin Macilwain.

RESEARCH HIGHLIGHTS

Climate-change biology: Salmon adapt to warmer waters

Engineering: Muscle sensor controls robot arm

Structural biology: Cold drug fits in virus's pocket

Human evolution: Light bones linked to less activity

Developmental biology: Cells stop dividing to heal wounds

Neuroscience: Direct route from gut to brain

Immunology: Fat cells fight bacterial infection

Stem cells: Diabetes reversed after transplant

Population genetics: Small numbers led to lemur demise

• SOCIAL SELECTION

Word-processing war flares up on social media

SEVEN DAYS

Seven days: 2–8 January 2015

The week in science: Discredited stem-cell findings linked to contamination; NASA balloon mission springs a leak; and US to consider protections for monarch butterfly.

NEWS IN FOCUS

Greek science haunted by hydra of problems

Leading researchers hang on despite austerity, but their Herculean efforts may not be enough.

Alison Abbott

End of cancer-genome project prompts rethink

Geneticists debate whether focus should shift from sequencing genomes to analysing function.

Heidi Ledford

South Korean survey ships open up to science

Vessels used mainly for seabed surveys will expand in focus.

Mark Zastrow

Rave drug holds promise for treating depression fast

Companies and clinicians turn to ketamine to treat mental-health disorder as pipeline of new drugs dries up.

Sara Reardon

Correction

FEATURES

Military health: The insurmountable gulf

Twenty-four years after the conflict ended, scientists and veterans are still fighting for recognition of Gulf War illness.

Sara Reardon

Environmental science: Pollution patrol

Step aside, fitness trackers. The next wave of personal sensors is giving people the ability to monitor the air they breathe.

Kat Austen

COMMENT

Immunology: Fifty years of B lymphocytes

Alexander D. Gitlin and Michel C. Nussenzweig reflect on the discovery of two lineages of adaptive immune cells, and how it influenced vaccination, cancer therapy and the development of a class of antibody-based drugs.

BOOKS AND ARTS

Mineralogy: Painful extractions

Andrew Bloodworth weighs up a study revealing the high cost of our technology-driven lust for rare metals.

Review of *Rare: The High-Stakes Race to Satisfy Our Need for the Scarcest Metals on Earth*

Keith Veronese

Books in brief

Barbara Kiser reviews five of the week's best science picks.

Resources: Silt, dams and hydraulic heroes

A study of China's Yellow River shows how water shapes the nation, finds Philip Ball.

Review of *The Yellow River: The Problem of Water in Modern China*

David A. Pietz

Correction

CORRESPONDENCE

Publishing costs: Peer review as a business transaction

Eleftherios P. Diamandis

Pollution: Uncouple from economy boom
Hong-Wei Xiao, A. S. Mujumdar & Liming Che

Pollution: Clear blue skies over Beijing
Zhaohui Gong

Pollution: Build on success in China
Yansui Liu, Yuheng Li & Cong Chen

Global vision: International Council for Science responds
Gordon McBean

CAREERS

FEATURES

Outreach: Speak up for science

Whether publishing contentious findings or defending evidence, the right tone is essential.
Virginia Gewin

CAREER BRIEFS

Career decisions: Of academic interest

Women and minority groups report declining interest in faculty posts over graduate career.

Grants: Paint me a picture

Revised format designed to put research in context.

Higher education: UK science numbers up

Science enrolments up, while enrolments overall flatten.

[naturejobs job listings and advertising features](#)

FUTURES

The descent of man

A precarious position.
Christoph Weber

RESEARCH

NEWS & VIEWS

Ocean biogeochemistry: Carbon at the coastal interface
Nicolas Gruber

Biophysics: Enzymes surf the heat wave
Joshua Wand

Climate science: Unburnable fossil-fuel reserves
Michael Jakob & Jérôme Hilaire

50 & 100 Years Ago

Cancer: Resistance through repopulation
Ian F. Tannock

Quantum information: Spin memories in for the long haul
John J. L. Morton & Klaus Mølmer

Regenerative biology: The versatile and plastic liver
Meritzell Huch

Neuroscience: A three-dimensional neural compass
David C. Rowland & May-Britt Moser

ARTICLES

Three-dimensional head-direction coding in the bat brain

Arseny Finkelstein, Dori Derdikman, Alon Rubin, Jakob N. Foerster, Liora Las+ [et al.](#)

Human gut Bacteroidetes can utilize yeast mannan through a selfish mechanism

Fiona Cuskin, Elisabeth C. Lowe, Max J. Temple, Yanping Zhu, Elizabeth A. Cameron+ [et al.](#)

Glutathione activates virulence gene expression of an intracellular pathogen

Michelle L. Reniere, Aaron T. Whiteley, Keri L. Hamilton, Sonya M. John, Peter Lauer+ [et al.](#)

LETTERS

The temperature and chronology of heavy-element synthesis in low-mass stars

P. Neyskens, S. Van Eck, A. Jorissen, S. Goriely, L. Siess+ [et al.](#)

Optically addressable nuclear spins in a solid with a six-hour coherence time

Manjin Zhong, Morgan P. Hedges, Rose L. Ahlefeldt, John G. Bartholomew, Sarah E. Beavan+ [et al.](#)

High-value alcohols and higher-oxidation-state compounds by catalytic Z-selective cross-metathesis

Ming Joo Koh, R. Kashif M. Khan, Sebastian Torker, Miao Yu, Malte S. Mikus+ [et al.](#)

The geographical distribution of fossil fuels unused when limiting global warming to 2 °C

Christophe McGlade & Paul Ekins

Segmented lateral dyke growth in a rifting event at Bárðarbunga volcanic system, Iceland

Freysteinn Sigmundsson, Andrew Hooper, Sigrún Hreinsdóttir, Kristín S. Vogfjörð, Benedikt G. Ófeigsson+ [et al.](#)

Copulation in antiarch placoderms and the origin of gnathostome internal fertilization

John A. Long, Elga Mark-Kurik, Zerina Johanson, Michael S. Y. Lee, Gavin C. Young+ [et al.](#)

Calcium transient prevalence across the dendritic arbour predicts place field properties

Mark E. J. Sheffield & Daniel A. Dombeck

Precision microbiome reconstitution restores bile acid mediated resistance to *Clostridium difficile*

Charlie G. Buffie, Vanni Bucci, Richard R. Stein, Peter T. McKenney, Lilan Ling+ [et al.](#)

Blocking PGE₂-induced tumour repopulation abrogates bladder cancer chemoresistance

Antonina V. Kurtova, Jing Xiao, Qianxing Mo, Senthil Pazhanisamy, Ross Krasnow+ [et al.](#)

T–B-cell entanglement and ICOSL-driven feed-forward regulation of germinal centre reaction

Dan Liu, Heping Xu, Changming Shih, Zurong Wan, Xiaopeng Ma+ [et al.](#)

EFF-1-mediated regenerative axonal fusion requires components of the apoptotic pathway

Brent Neumann, Sean Coakley, Rosina Giordano-Santini, Casey Linton, Eui Seung Lee+ [et al.](#)

Allosteric activation of the RNF146 ubiquitin ligase by a poly(ADP-ribosylation) signal

Paul A. DaRosa, Zhizhi Wang, Xiaomo Jiang, Jonathan N. Pruneda, Feng Cong + [et al.](#)

The heat released during catalytic turnover enhances the diffusion of an enzyme

Clement Riedel, Ronen Gabizon, Christian A. M. Wilson, Kambiz Hamadani, Konstantinos Tsekouras+ [et al.](#)