CONTENTSHBURSTHOO

4 July 2013 / Vol 499 / Issue No 7456

THIS WEEK

EDITORIALS

5 POLICY

More than hot air

Obama must ensure that his fine words on climate change translate into action

5 SCIENCE & SOCIETY

Russian roulette

Consultation is imperative if Russia is not to destroy its Academy of Sciences

6 HEALTH & RESEARCH

Presumed consent

The awkward ethics of organ and tissue donation



WORLD VIEW

7 Biology must develop its own big-data systems John Boyle Standardized data-management systems don't have the flexibility needed by the life sciences

RESEARCH HIGHLIGHTS

8 SELECTIONS FROM THE SCIENTIFIC LITERATURE SIRT1 protein calls time / Pearl of a nanomaterial / Nest location / Putting the S in broccoli / Why starfish are starshaped / Earthquakes versus volcanoes



10 THE NEWS IN BRIEF

UK edges towards DNA transplants / Stem cells 'cure' two men of HIV infection / Alaskan eruption intensifies / US pledges to power up African nations

CAREERS

115 COLLABORATION

A problem shared

Fewer jobs and not enough time — graduate students need all the help they can get

117 CAREER BRIEFS

NEWS IN FOCUS



- 13 ENVIRONMENT
 Europe poised for U-turn over biofuels
- 14 ENVIRONMENTAL POLICY
 China launches programme to clean up
 polluted groundwater
- 15 EDUCATION

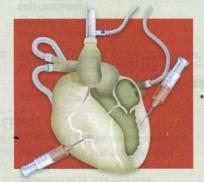
 US states sign up to teach climate change and evolution
- 16 SYNTHETIC BIOLOGY
 Companies turn to open source to boost bioengineering
- 17 POLICY
 US Senate backs plan to boost immigration
- 18 FUNDING /
 Europe strikes deal to cut red tape for researchers

FEATURE

TISSUE ENGINEERING

Pump it up

Researchers are racing to grow hearts in the lab to meet the demand for transplants PAGE 20



COMMENT

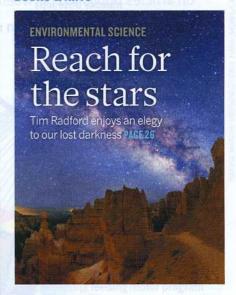
23 BIODIVERSITY

Feeding the future

Susan McCouch

Plant breeders need to mine seed banks to create tomorrow's food crops

BOOKS & ARTS



- 27 BOOKS IN BRIEF
- 28 ARTS

Think beyond Joanne Baker

CORRESPONDENCE

29 US patent law right on genes / Lowcarbon China / Rosewoods in danger / Twins and fingerprints / Latin America's science base

OBITUARY

30 Heinrich Rohrer (1933–2013) Christoph Gerber



FUTURES

120 The ostracons of Europa Ken Hinckley

CONTENTS

4 July 2013 / Vol 499 / Issue No 7456

RESEARCH

NEW ONLINE

31 Papers published this week at nature.com

NEWS & VIEWS

32 SOCIAL SCIENCE

The cost of children

Economic factors are the key drivers of fertility decline Ruth Mace

33 PLANETARY SCIENCE

The robustness of planet formation Detection of two transiting planets in an open star cluster William F Welsh SEE LETTER P.55

34 ANCIENT DNA

Towards a million-year-old genome Tracing the origins of horses using a 700,000-year-old sequence Craig D Millar & David M Lambert SEE LETTER P.74

35 CANCER

Mutations close in on gene regulation Sequence, methylation and geneexpression data from 200 AML patients Stein Aerts & Jan Cools

37 EARTH SCIENCE

Hot and deep

The cause of voluminous magmatism in Afar

Andrew Mitchinson SEE LETTER P.70

37 CANCER

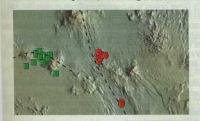
An acidic link

A carcinogenic by-product of microbial bile-acid metabolism in obese mice Suzanne Devkota & Peter J Turnbaugh SEE LETTER P.97

EARTH SCIENCES

From Afar

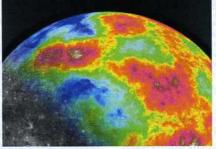
Magmatism on the southern Red Sea rift is driven by deep melting. PAGE 70



ON THE COVER

New faces

A crater density map of Mercury based on MESSENGER probe data (colour-coded foreground) with a global surface mosaic (background). Marchi et al. locate the oldest surfaces on Mercury and conclude that volcanism — and perhaps heavy bombardment — caused planet-wide resurfacing four billion years ago.



38 MALARIA

Sensing when it's time for sex
Parasite-to-parasite communication

through exosome-like vesicles Leann Tilley & Malcolm McConville

40 BIOINORGANIC CHEMISTRY

Enzymes activated by synthetic components

Artificial catalytic units inserted into a [FeFe]-hydrogenase Ryan D Bethel & Marcetta Y Darensbourg SEE LETTER P.66

ARTICLES

43 CANCER Comprehensive molecular characterization of clear cell renal cell carcinoma

The Cancer Genome Atlas Research Network

50 MOLECULAR BIOLOGY 53BP1 is a reader of the DNA-damage-induced H2A Lys 15 ubiquitin mark A Fradet-Turcotte et al.

LETTERS

55 ASTRONOMY The same frequency of planets inside and outside open clusters of stars

S Meibom et al. SEE N&V P.33

- 59 PLANETARY SCIENCE Global resurfacing of Mercury 4.0–4.1 billion years ago by heavy bombardment and volcanism S Marchi et al.
- 62 PHYSICS Reduction of the radiative decay of atomic coherence in squeezed vacuum

 K W Murch et al.
- BIO-INORGANIC CHEMISTRY
 Biomimetic assembly and activation
 of [FeFe]-hydrogenases
 G Berggren et al. SEE N&V P.40
- 70 EARTH SCIENCES Melting during latestage rifting in Afar is hot and deep DJ Ferguson et al. SEE N&V P.37
- 74 EVOLUTION Recalibrating Equus evolution using the genome sequence of an early Middle Pleistocene horse L Orlando et al. SEE N&V P.34
- 79 GENETICS Variation and genetic control of protein abundance in humans

 L Wu et al.
- 83 NEUROBIOLOGY A single pair of interneurons commands the Drosophila feeding motor program TF Flood et al.
- 88 STEM CELLS High-resolution analysis with novel cell-surface markers identifies routes to iPS cells J O'Malley et al.
- 92 STEM CELLS ZFP36L2 is required for self-renewal of early burst-forming unit erythroid progenitors L Zhang et al.
- 97 CANCER Obesity-induced gut microbial metabolite promotes liver cancer through senescence secretome S Yoshimoto et al. SEE N&V P.37
- 102 IMMUNOLOGY Self-assembling influenza nanoparticle vaccines elicit broadly neutralizing H1N1 antibodies M Kanekiyo et al.
- 107 STRUCTURAL BIOLOGY Structural basis for alternating access of a eukaryotic calcium/proton exchanger A B Waight et al.
- 111 STRUCTURAL BIOLOGY Structural basis of histone H2A-H2B recognition by the essential chaperone FACT M Hondele et al.