

CONTENTS

16 July 2015 / Vol 523 / Issue No 7560

THIS WEEK

EDITORIALS

255 ETHICS

Unholy alliance

The American Psychological Association must shut down torture ties

255 BUDGET

Austerity bites

Britain needs to start acting on its promise of support for science

WORLD VIEW

257 Don't distort policy in the name of national pride

Dyna Rochmyaningsih

Indonesia has invested in science — but for the wrong reasons

RESEARCH HIGHLIGHTS

258 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Black Sea weather / 'Doping' bugs form frictionless superfluids / Comb-jelly ancestors / Overtime pay for postdocs?

SEVEN DAYS

260 THE NEWS IN BRIEF

South Korean government hit by MERS lawsuit / Pluto mission sends back spectacular shots / Hope for rare Hainan gibbons



NEWS IN FOCUS



263 PUBLIC HEALTH

Nigeria embraces research to bring polio to the brink of eradication

265 CLINICAL TRIALS

Alzheimer's lawsuit highlights tensions over research ownership

BUILDING THE 21ST CENTURY SCIENTIST

EDITORIAL

256 An education

The science education system needs to adapt to today's society

FEATURES

271 The scientist of the future

A special issue looks deep into what makes a successful scientist

272 The science of teaching science

Active learning trumps passive instruction

276 Inner scientists unleashed

Educators who address the basics: reading, writing and high-energy particle physics

COMMENT

279 Science professors need leadership training

Charles E. Leiserson & Chuck McViney

Value people skills or squander team talent

282 Improve undergraduate science education

Stephen E. Bradforth et al.

Incentives are needed to encourage educators to act on the evidence

BOOKS & ARTS

286 Body of knowledge

Barbara Kiser, Günter Beltzig & Stephen Kellert

The importance of free play in nature for young explorers' learning



A *Nature and Scientific American* special issue nature.com/stem

266 BIOTECHNOLOGY

Pharmaceutical firms start using 'organs-on-chips' in drug development

267 POLITICS

California fails to extend smoking ban to e-cigarettes

267 PARTICLE PHYSICS

Large Hadron Collider finds forsaken pentaquark

268 PSYCHIATRY

Researchers identify genetic links to depression

CAREERS

371 To build a scientist

Paul Nurse; Atsushi Sunami; Jessica Polka; Michael Teitelbaum; Robert Tjian; Jari Kinaret; Jo Handelsman
Views on what is missing from science education



COMMENT

CORRESPONDENCE

290 Tigers' gain is lions' loss / A female response to Tim Hunt imbroglio / Why are drugs so costly? / Better fetal testing / Real-time pollution tracking

FUTURES

376 Outpatient
Dan Stout

CONTENTS

16 July 2015 / Vol 523 / Issue No 7560

RESEARCH

NEW ONLINE

291 Papers published this week at nature.com

NEWS & VIEWS

292 FORUM: DEVELOPMENTAL BIOLOGY

Nanotubes in the niche

Microtubule-based nanotubes mediate maintenance of germline stem cells
Thomas B Kornberg; Lilach Gilboa

SEE LETTER P.329

293 EARTH SCIENCE

Big geochemistry

Evidence for a crystallization hypothesis of continental-crust formation
Christy Till SEE ARTICLE P.301

294 CANCER

A dendritic-cell brake on antitumour immunity

XBP1 expression impairs presentation of tumour antigens
Miriam Merad & Hélène Salmon

296 ASTROCHEMISTRY

Fullerene solves an interstellar puzzle

Signature of a buckyball ion in spectra of the interstellar medium
Pascale Ehrenfreund & Bernard Foing
SEE LETTER P.322

297 SYSTEMS BIOLOGY

Network evolution hinges on history

Historical contingency constrains the evolution of gene networks
Aaron M New & Ben Lehner SEE LETTER P.361

298 SYMBIOSIS

Receptive to infection

EPR3 is a structurally specific receptor for rhizobial exopolysaccharides
Sharon R Long SEE ARTICLE P.308

ARTICLES

301 GEOCHEMISTRY Volcanic-plutonic

parity and the differentiation of the continental crust

C B Keller, B Schoene, M Barboni, K Samperton & J M Husson
SEE N&V P.293

308 PLANT SCIENCES Receptor-mediated

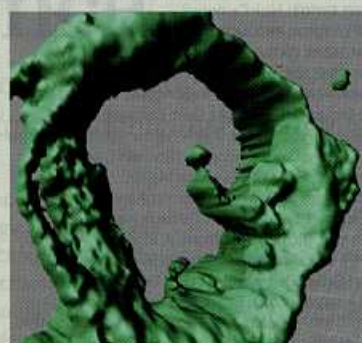
exopolysaccharide perception controls bacterial infection

Y Kawaharada et al. SEE N&V P.298

313 CANCER Progesterone receptor

modulates ER α action in breast cancer

H Mohammed et al.



DEVELOPMENTAL BIOLOGY

Take the tube

Stem cell-niche signalling involves previously unknown structures — microtubule-based nanotubes — that communicate with hub cells. **PAGE 329**

LETTERS

318 **ASTROPHYSICS** Rapidly rotating second-generation progenitors for the 'blue hook' stars of ω Centauri
M Tailo et al.

322 **ASTROCHEMISTRY** Laboratory confirmation of C_{60}^+ as the carrier of two diffuse interstellar bands
E K Campbell, M Holz, D Gerlich & J P Maier SEE N&V P.296

324 **NANOSCALE MATERIALS** Quantum-dot-in-perovskite solids
Z Ning et al.

329 **DEVELOPMENTAL BIOLOGY** Nanotubes mediate niche-stem-cell signalling in the *Drosophila* testis
M Inaba, M Buszczak & Y M Yamashita
SEE N&V P.292

333 **MICROBIOLOGY** Supramolecular assemblies underpin turnover of outer membrane proteins in bacteria
P Rassam et al.

337 **NEUROIMMUNOLOGY** Structural and functional features of central nervous system lymphatic vessels
A Louveau et al.

342 **IMMUNOLOGY** HDL-bound sphingosine-1-phosphate restrains lymphopoiesis and neuroinflammation
V A Blaho et al.

347 **CANCER** Conversion of abiraterone to D4A drives anti-tumour activity in prostate cancer
Z Li et al.

352 **CANCER** Improving survival by exploiting tumour dependence on stabilized mutant p53 for treatment
E M Alexandrova et al.

357 **SYSTEMS BIOLOGY** A noisy linear map underlies oscillations in cell size and gene expression in bacteria
Y Tanouchi et al.

361 **SYSTEMS BIOLOGY** Intersecting transcription networks constrain gene regulatory evolution
T R Sorrells, L N Booth, B B Tuch & A D Johnson SEE N&V P.297

366 **STRUCTURAL BIOLOGY** Structural basis for retroviral integration into nucleosomes
D P Maskell et al.

370 **CORRIGENDUM** A new arboreal haramiyid shows the diversity of crown mammals in the Jurassic period
X Zheng, S Bi, X Wang & J Meng

370 **ERRATUM** Mutant MHC class II epitopes drive therapeutic immune responses to cancer
S Kreiter et al.

370 **RETRACTION** HMGA2 functions as a competing endogenous RNA to promote lung cancer progression
M S Kumar et al.

NANOSCALE MATERIALS

Dot matrix

'Dots-in-a-matrix' crystals bring perovskite's useful electrical properties to quantum dots. **PAGE 324**

