

CONTENTS

19 February 2015 / Vol 518 / Issue No 7539

THIS WEEK

EDITORIALS

273 EPIGENETICS

Beyond the genome

Studies could provide a crucial link between genetic variation and disease

274 POLICY

The idea factory

Science needs to bring together innovation and experience

274 ANNOUNCEMENT

Nature journals offer double-blind review



WORLD VIEW

275 Europe needs fresh focus on big-science projects

Olof Hallonsten
Region must stop playing catch-up to United States and Japan

RESEARCH HIGHLIGHTS

276 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Permanent DNA memory / Fern species stay close / Fragile global food market / Early mammal diversity / Make words count / Toad pest controlled

SEVEN DAYS

278 THE NEWS IN BRIEF

Success for spaceplane test / US to strengthen trade controls / Australian climate chief dies

CAREERS

445 WORKPLACE SAFETY

Risky encounters

A dig in the Middle East has health and safety implications beyond the norm

447 TURNING POINT

An author on 23 of the most highly cited papers of 2013, Stacey Gabriel sees no let-up in the march of genomics

447 CAREER BRIEFS

NATUREJOBS ADVERTISING FEATURE

Spotlight on genetics

NEWS IN FOCUS

281 ARAB SCIENCE

Cutting-edge Saudi laser lab will be boost for biomedicine

282 CYBERSECURITY

Researchers tackle the human element of computer crime

283 CAREER DEVELOPMENT

Innovative biomedical work tends to come from junior researchers

284 LINGUISTICS

Evidence accumulates for Eurasian origin of Indo-European tongues

285 BIOENGINEERING

'Organs on chips' aim to mimic human body

286 TECHNOLOGY

Radical energy projects spur investment

FEATURES



HUMAN BIOLOGY

Sex redefined

Biologists rethink idea of just two sexes **PAGE 288**

292 MUSEUM COLLECTIONS

The endangered dead

Just as collections grow in value, they find themselves under threat

TECHNOLOGY

439 FLOW CYTOMETRY

Measure for measure

Variations on flow cytometry are making waves in biomedical applications

COMMENT



INNOVATION

Eliminate corruption

Alina Mungiu-Pippidi

For science and technology to stimulate growth, nations need good governance **PAGE 295**

BOOKS & ARTS

298 NEUROSCIENCE

Halving it all

Douwe Draaisma

299 BOOKS IN BRIEF

300 HISTORY OF SCIENCE

Unshadowed lens on the past

Robert P Crease

301 THEATRE

Atomic tragedian

Philip Ball

CORRESPONDENCE

303 Antibiotics before penicillin / Eastern European museums in disarray / Ivory rules inadequate / Science needs proof / Moravia celebrates Mendel

OBITUARY

304 Vernon B Mountcastle (1918–2015)

Kevan Martin

FUTURES

450 Good for something

Deborah Walker



CONTENTS

19 February 2015 / Vol 518 / Issue No 7539

EPIGENOME ROADMAP

INTRODUCTION

- 313 **Epigenome Roadmap**

NEWS & VIEWS FORUM

- 314 **Roadmap for regulation**
Casey E Romanoski & Christopher K Glass; Hendrik G Stunnenberg; Laurence Wilson & Genevieve Almouzni

ARTICLES

- 317 **Integrative analysis of 111 reference human epigenomes**
Roadmap Epigenomics Consortium
- 331 **Chromatin architecture reorganization during stem cell differentiation** J R Dixon et al.



- 337 **Genetic and epigenetic fine mapping of causal autoimmune disease variants** K K-H Farh et al.
- 344 **Transcription factor binding dynamics during human ES cell differentiation** A M Tsankov et al.

LETTERS

- 350 **Integrative analysis of haplotype-resolved epigenomes across human tissues** D Leung et al.
- 355 **Dissecting neural differentiation regulatory networks through epigenetic footprinting** M J Ziller et al.
- 360 **Cell-of-origin chromatin organization shapes the mutational landscape of cancer** P Polak et al.
- 365 **Conserved epigenomic signals in mice and humans reveal immune basis of Alzheimer's disease** E Gjoneska et al.

nature.com/epigenomeroadmap

RESEARCH

NEW ONLINE

- 305 Papers published this week at nature.com

NEWS & VIEWS

- 306 **NEUROSCIENCE**
The cortical connection
Defining the relationships between neurons in the visual cortex
Benjamin Scholl & Nicholas J Priebe
SEE LETTER P.399
- 307 **ASTROPHYSICS**
A lithium-rich stellar explosion
Lithium production in a classical nova explosion V339 Del
Margarita Hernanz SEE LETTER P.381
- 309 **BIOCHEMISTRY**
Breaking methane
The structure of compound Q in soluble methane monooxygenase
Amy C Rosenzweig SEE LETTER P.431
- 310 **CLIMATE SCIENCE**
The future of coastal ocean upwelling
Stronger winds and increased ocean upwelling at coasts
Emanuele Di Lorenzo SEE LETTER P.390

ARTICLES

- 371 **EVOLUTION** Evolution of Darwin's finches and their beaks revealed by genome sequencing

S Lamichaney et al.

- 376 **MOLECULAR BIOLOGY** Architecture of the RNA polymerase II-Mediator core initiation complex
C Plaschka et al.

LETTERS

- 381 **ASTROPHYSICS** Explosive lithium production in the classical nova V339 Del (Nova Delphini 2013)
A Tajitsu et al. SEE N&V P.307
- 385 **CHEMISTRY** Direct observation of bond formation in solution with femtosecond X-ray scattering
K H Kim et al.
- 390 **CLIMATE SCIENCES** Intensification and spatial homogenization of coastal upwelling under climate change
D Wang et al. SEE N&V P.310
- 395 **GEOPHYSICS** Seismic evidence of effects of water on melt transport in the Lau back-arc mantle
S S Wei et al.
- 399 **NEUROSCIENCE** Functional organization of excitatory synaptic strength in primary visual cortex
L Cossell et al. SEE N&V P.306
- 404 **NEUROSCIENCE** Modulation of the proteoglycan receptor PTP α promotes

recovery after spinal cord injury
B T Lang et al.

- 409 **DRUG DISCOVERY** Towards a therapy for Angelman syndrome by targeting a long non-coding RNA
L Meng et al.
- 413 **CELL BIOLOGY** Intracellular α -ketoglutarate maintains the pluripotency of embryonic stem cells
B W Carey et al.
- 417 **IMMUNOLOGY** Deubiquitinase DUBA is a post-translational brake on interleukin-17 production in T cells
S Rutz et al.
- 422 **CANCER** Dynamics of genomic clones in breast cancer patient xenografts at single-cell resolution
P Eirew et al.
- 427 **CHEMICAL BIOLOGY** Catalysts from synthetic genetic polymers
A I Taylor et al.
- 431 **BIOCHEMISTRY** Structure of the key species in the enzymatic oxidation of methane to methanol
R Banerjee et al. SEE N&V P.309
- 435 **STRUCTURAL BIOLOGY** Structure of human cytoplasmic dynein-2 primed for its power stroke
H Schmidt et al.