

CONTENTS

21 May 2015 / Vol 521 / Issue No 7552

THIS WEEK

EDITORIALS

259 RESEARCH

Publish or perish

UK universities need to speed their reporting of misconduct cases

259 INTELLECTUAL PROPERTY

A patent problem

It is time to tighten the language of patents to make them less vague

260 NEUROSCIENCE

The kill switch

The brain holds the secret to what leads humans to murder



WORLD VIEW

261 No more hidden solutions in bioinformatics

Mauno Vihinen

Companies must disclose the workings of their sequencing software

RESEARCH HIGHLIGHTS

262 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Starspots on Vega / Slow X-rays / Fully warm-blooded fish / Personal organoids / A thousand-author paper / Zebrafish sunscreen / Quasar supergroup / Busiest bees



SEVEN DAYS

264 THE NEWS IN BRIEF

Honeybees decline in the US / Europe revamps science advice / Bid to curb polar pollution launched / Child mortality falls by nearly half

CAREERS

381 RELOCATION

Out of place

Host institutions can help their foreign researchers cope with culture shock

383 TURNING POINT

Play your cards right — like astrophysicist Josh Dillon did — and your favourite charities can benefit

NEWS IN FOCUS

267 SYNTHETIC BIOLOGY

Yeast modified to produce opiate painkillers



269 DEVELOPING WORLD

Short-term aid has long-lasting effect on extreme poverty

270 POLICY

US Congress prepares bid to quash patent trolls

271 RESEARCH INTEGRITY

UK universities slow to report misconduct investigations

272 NUCLEAR PHYSICS

Electron-ion collider edges closer to reality

273 POLITICS

Russian government threatens to label science funder a 'foreign agent'

FEATURES



274 REPRODUCIBILITY

Blame it on the antibodies

Why a workhorse of the biology lab is creating experimental results that are hard to replicate

278 QUANTUM MECHANICS

What is really real?

A wave of experiments seeks to unpick the roots of quantum weirdness

COMMENT

SYNTHETIC BIOLOGY

Trouble brewing

Yeasts engineered to produce morphine require regulation, say Kenneth Oye, Tania Bubela & J Chappell H Lawson [PAGE 281](#)



284 SUSTAINABILITY

Clean cooking empowers women

Laura S Brown & William F Lankford
Don't just swap stoves, lift lives

BOOKS & ARTS

286 PHYSICS

Fighting for time

Graham Farmelo

287 BOOKS IN BRIEF

288 PALAEOLOGY

Tracing the backbone in China's rocks

Xu Xing

CORRESPONDENCE

289 Public interest in gene editing / When to transfuse blood / Running out of water

OBITUARY

291 Alexander Rich (1924–2015)

Paul Schimmel

FUTURES

386 Grains of wheat

Alex Shvartsman



CONTENTS

21 May 2015 / Vol 521 / Issue No 7552

RESEARCH

NEW ONLINE

293 Papers published this week at nature.com

NEWS & VIEWS

294 ARCHAEOLOGY

Tools go back in time

3.3-million-year-old stone tools from Lomekwi 3 in Kenya

Erella Hovers [SEE ARTICLE P.310](#)

295 QUANTUM PHYSICS

Squeezed ions in two places at once

Schrödinger's cat states of a squeezed calcium ion

Tracy Northup [SEE LETTER P.336](#)

296 STEM CELLS

Asymmetric rejuvenation

Age-dependent apportioning of mitochondria during stem-cell division

Anu Suomalainen

298 MATERIALS SCIENCE

Magnetic alloys break the rules

An unusual form of magnetostrictive behaviour

Richard D James [SEE LETTER P.340](#)

299 STEM CELLS

Equilibrium established

Blocking Wnt signalling stabilizes primed pluripotent stem cells *in vitro*

Kyle M Loh & Bing Lim [SEE ARTICLE P.316](#)

300 MOLECULAR BIOLOGY

Splicing does the two-step

Recursive RNA splicing is more widespread than was thought

Heidi Cook-Andersen & Miles F Wilkinson [SEE LETTERS P.371 & P.376](#)

REVIEW

303 X-RAY CRYSTALLOGRAPHY

The crystallography of correlated disorder

D A Keen & A L Goodwin

ARTICLES

310 ARCHAEOLOGY

3.3-million-year-old stone tools from Lomekwi 3, West Turkana, Kenya

S Harmand et al. [SEE N&V P.294](#)

316 STEM CELLS

An alternative pluripotent state confers interspecies chimaeric competency

J Wu et al. [SEE N&V P.299](#)

322 NEUROSCIENCE

Neurotransmitter and psychostimulant recognition by the



ON THE COVER

Dawn of technology

These stone tools from Lomekwi 3 site on the west shore of Lake Turkana, Kenya, are 3.3 million years old, older than the earliest-known *Homo* fossils. They differ from Oldowan tools found at Olduvai and elsewhere and may constitute a pre-*Homo* 'Lomekwian' tool culture. [PAGES 294 & 310](#)

dopamine transporter

K H Wang, A Penmatsa & E Gouaux

LETTERS

328 ASTRONOMY

A strong ultraviolet pulse from a newborn type Ia supernova

Y Cao et al.

332 ASTRONOMY

No signature of ejecta interaction with a stellar companion in three type Ia supernovae

R P Olling et al.

336 QUANTUM MECHANICS

Spin-motion entanglement and state diagnosis with squeezed oscillator wavepackets

H-Y Lo et al. [SEE N&V P.295](#)

340 MATERIALS SCIENCE

Non-Joulian magnetostriction

H D Chopra & M Wuttig [SEE N&V P.298](#)

344 EVOLUTIONARY GENETICS

Selection on noise constrains variation in a eukaryotic promoter

B P H Metzger, D C Yuan, J D Gruber, F Duveau & P J Wittkopp

348 NEUROSCIENCE

Selective corticostriatal plasticity during acquisition of an auditory discrimination task

Q Xiong, P Znamenskiy & A M Zador

352 STEM CELLS

Early reprogramming regulators identified by prospective isolation and mass cytometry

E Lujan et al.

357 CANCER

Signalling thresholds and negative B-cell selection in acute lymphoblastic leukaemia

Z Chen et al.

362 EBOLA VIRUS

Lipid nanoparticle siRNA treatment of Ebola-virus-Makona-infected nonhuman primates

E P Thi et al.

366 STEM CELLS

Pioneer factors govern super-enhancer dynamics in stem cell plasticity and lineage choice

R C Adam et al.

371 MOLECULAR BIOLOGY

Recursive splicing in long vertebrate genes

C R Sibley et al. [SEE N&V P.300](#)

376 MOLECULAR BIOLOGY

Genome-wide identification of zero nucleotide recursive splicing in *Drosophila*

M O Duff et al. [SEE N&V P.300](#)

380 CORRIGENDUM

Three keys to the radiation of angiosperms into freezing environments

A E Zanne et al.

380 CORRIGENDUM

Oxidant stress evoked by pacemaking in dopaminergic neurons is attenuated by DJ-1

J N Guzman et al.

X-RAY CRYSTALLOGRAPHY

Good order

The successful search for structure in disordered states. [PAGE 303](#)

