

CONTENTS

7 November 2013 / Vol 503 / Issue No 7474

NEUROSCIENCE



EDITORIAL

- 5 Head start**
Europe's Human Brain Project offers more than ambition

WORLD VIEW

- 7 Cleaning damned spots from the obsessive mind**
Stanley Rachman
'Mental contamination' is the key to treat some compulsive behaviour

NEWS

- 14 Transgenic monkeys show potential**

FEATURES

- 21 New angles on the brain**
The study of human cognition is undergoing a renaissance
- 22 Smart connections**
Human neurons inspire a new breed

of computer chip that can do more with less power

BRAIN storm

Getting to grips with Obama's neuroscience initiative

COMMENT

- 29 My life with Parkinson's**
A personal account — from a neuroscientist

Study neuron networks to tackle Alzheimer's

Kenneth S Kosik
The role of collective action in different regions of the brain

BOOKS & ARTS

- 38 Where we are now with Alzheimer's**
Eus Van Someren

 nature.com/neuroscience2013

TECHNOLOGY FEATURE

- 147 Brain mapping in high resolution**
Technology is leading the way towards an understanding of brain organization

CAREERS

- 153 A head start for brain imaging**
Advances in neuroimaging are creating research opportunities

THIS WEEK

EDITORIALS

- 6 CONSERVATION**
Historic work
It is time to give heritage science the respect it deserves
- 6 APPLIED PHYSICS**
Follow the crowd
Mass movement offers collective benefits

RESEARCH HIGHLIGHTS

- 8 SELECTIONS FROM THE SCIENTIFIC LITERATURE**
Changing eye colour in reindeer / Micromotors to tackle chemical weapons / Oceanic heat sink / Thernuclear blasts in the early Universe

SEVEN DAYS

- 10 THE NEWS IN BRIEF**
India probe heads for Mars / New species of dolphin found / Hybrid eclipse over Africa / Dark-matter experiment reveals initial results / CO₂ emissions slow down

NEWS IN FOCUS

- 13 ASTRONOMY**
X-ray telescope takes first place on Europe's space agenda
- 16 GEOSCIENCE**
Earthquake array heads for Alaska
- 18 PROTEOMICS**
Protein analysis solves mystery of Linnaeus's elephant
- 19 VIROLOGY**
Researchers question Europe's laws on pathogens and biosafety

CAREERS

- 155 COLUMN**
Postdoc's torch song
Christopher Schmitt
Research can break your heart just as readily as a failed romance

NATUREJOBS ADVERTISING FEATURE
Neuroscience

COMMENT

BOOKS & ARTS

- 34 HUMAN EVOLUTION**
Us and them
Tim Radford
- 36 URBAN STUDIES**
A paved paradise
Mike Davis
- 37 Q&A**
Airwave trailblazer
Jad Abumrad



CORRESPONDENCE

- 39 Soviet doctorate system / Brazil's research output / Alfred Russel Wallace in Russia**

OBITUARY

- 40 Harold Melvin Agnew (1921–2013)**
Tom Crouch

FUTURES

- 158 Immeasurable**
H E Roulo

CONTENTS

7 November 2013 / Vol 503 / Issue No 7474

RESEARCH

NEW ONLINE

- 41 Papers published this week at nature.com

NEWS & VIEWS

42 NEUROSCIENCE

Sculpting neuronal connectivity

Subcellular-specific regulation of inhibitory synapses by BDNF

Emily Sylwestrak & Peter Scheiffele

SEE LETTER P.121

43 APPLIED PHYSICS

On a roll

Unidirectional collective motion of rolling microspheres

Michael Shelley SEE LETTER P.95

44 EVOLUTIONARY ECOLOGY

Novelty makes the heart grow fonder

Evidence for the rare-male effect in natural guppy populations

Jeffrey S Mckinnon & Maria R Servedio

SEE LETTER P.108

45 NEUROSCIENCE

What to do and how

Control of context-dependent decision-making at cell-population level

Jeffrey C Erlich & Carlos D Brody

SEE ARTICLE P.78

47 CLIMATE SCIENCE

Uncertain then, irrelevant now

The source of uncertainty in estimates of aerosol forcing

Bjorn Stevens SEE ARTICLE P.67

48 PSYCHOLOGY

Good and bad news on the adolescent brain

Asymmetric development of belief updating in young people

Valerie F Reyna

REVIEWS

- 51 **NEUROSCIENCE** Cortical connectivity and sensory coding

K D Harris & T D Mrsic-Flogel

- 59 **ENDOCRINOLOGY** Cooperation between brain and islet in glucose homeostasis and diabetes

M W Schwartz et al.

ARTICLES

- 67 **CLIMATE SCIENCE** Large contribution of natural aerosols to uncertainty in indirect forcing



ON THE COVER

Tipping point

Mutations in the gene for the Shank3 synaptic protein are associated with autism, intellectual disability and schizophrenia. Mice overexpressing SHANK3 are now shown to exhibit mania-like behaviour consistent with a model in which Shank3 is crucial for excitatory-inhibitory balance and mental health. **PAGE 72**

K S Carslaw et al. SEE N&V P.47

- 72 **NEUROSCIENCE** SHANK3 overexpression causes manic-like behaviour with unique pharmacogenetic properties

K Han et al.

- 78 **NEUROSCIENCE** Context-dependent computation by recurrent dynamics in prefrontal cortex

V Mante, D Sussillo, K V Shenoy

& W T Newsome SEE N&V P.45

- 85 **STRUCTURAL BIOLOGY** X-ray structure of dopamine transporter elucidates antidepressant mechanism

A Penmatsa, K H Wang & E Gouaux

LETTERS

- 91 **NANOTECHNOLOGY** Demonstration of electron acceleration in a laser-driven dielectric microstructure

E A Peralta et al.

- 95 **APPLIED PHYSICS** Emergence of macroscopic directed motion in populations of motile colloids

A Bricard, J-B Caussin, N Desreumaux,

O Dauchot & D Bartolo SEE N&V P.43.

- 99 **CHEMISTRY** Colloidal assembly directed by virtual magnetic moulds

A F Demirörs, P P Pillai, B Kowalczyk

& B A Grzybowski

- 104 **GEOCHEMISTRY** Structural change in molten basalt at deep mantle conditions

C Sanloup et al.

- 108 **EVOLUTIONARY BIOLOGY** Mating advantage for rare males in wild guppy populations

K A Hughes, A E Houde, A C Price

& F H Rodd SEE N&V P.44

- 111 **NEUROSCIENCE** Genetic identification of a neural circuit that suppresses appetite

M E Carter, M E Soden, L S Zweifel

& R D Palmiter

- 115 **NEUROSCIENCE** Dendritic spikes enhance stimulus selectivity in cortical neurons *in vivo*

S L Smith, I T Smith, T Branco & M Häusser

- 121 **NEUROSCIENCE** The activity-dependent transcription factor NPAS4 regulates domain-specific inhibition

B L Bloodgood, N Sharma, H A Browne,

A Z Trepman & M E Greenberg

SEE N&V P.42

- 126 **IMMUNOLOGY** Integrin-modulating therapy prevents fibrosis and autoimmunity in mouse models of scleroderma

E E Gerber et al.

- 131 **CELL BIOLOGY** A directional switch of integrin signalling and a new anti-thrombotic strategy

B Shen et al.

- 136 **CELL BIOLOGY** LARGE glycans on dystroglycan function as a tunable matrix scaffold to prevent dystrophy

M M Goddeeris et al.

- 141 **STRUCTURAL BIOLOGY** Structural basis for action by diverse antidepressants on biogenic amine transporters

H Wang et al.

- 146 **RETRACTION** Functional dissection of lysine deacetylases reveals that HDAC1 and p300 regulate AMPK

Y-y Lin et al.

- 146 **CORRIGENDUM** Exercise-induced BCL2-regulated autophagy is required for muscle glucose homeostasis

C He et al.

WEI-HISANG HUANG