# CONTENTS

6 December 2018 / Vol 564 / Issue No 7734

## THIS WEEK

#### **EDITORIALS**

# 5 BIOETHICS

**How to respond to CRISPR babies** We need tighter controls on germline editing of human embryos

#### 5 GENETICS

#### A lonesome life

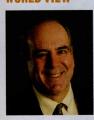
Genome of a legendary Galapagos tortoise holds clues to longevity

#### 6 POLITICS

#### **Climate rules**

Time is running out for global leaders to act on greenhouse-gas emissions

# **WORLD VIEW**



7 How sure are you of your result? Put a number on it

Steven N. Goodman All scientists should give probability estimates to show confidence in a claim

## **RESEARCH HIGHLIGHTS**

# 8 SELECTIONS FROM THE SCIENTIFIC LITERATURE

When unicorns roamed Earth / An ancient taste for caviar / How oil rigs caused earthquakes / Artificial muscles go wireless

#### **SEVEN DAYS**

## 10 THE NEWS IN BRIEF

NASA spacecraft reaches its asteroid / No ban for gene drives / UN report urges climate action / Ebola emergency

#### **TECHNOLOGY**

#### 147 IMAGING

# Transparent tissues bring biology into focus

How tissue-clearing and expansion are revealing life's inner workings

# CAREERS

# 151 MENTORSHIP

#### A chance to grow

Four scientists describe how to be a great supervisor

# NEWS IN FOCUS

#### 13 GENE EDITING

Scientist who claims to have edited babies' genes reveals more details

#### 15 MOON EXPLORATION

China gears up to send spacecraft to the far side of the Moon

#### 16 ENVIRONMENT

Venice grapples with an anti-flooding system that threatens its marine life

#### 17 IRAN

Satellite images depict a capital city sinking fast into the ground

#### 18 ARCHAEOLOGY

Geologists unravel the stories told by bullet holes in Jordan's heritage sites

#### **FEATURES**

#### ASTRONOMY

# Formative years

Images of newborn planets are challenging theories of how worlds take shape PAGE 20



#### 24 PUBLIC HEALTH

#### Africa's silent epidemic

Tackling the burden of hepatitis B virus in sub-Saharan countries

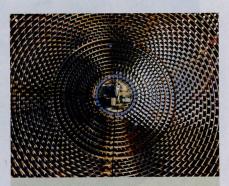
#### **SPOTLIGHT**

## **SO1 CELLULAR ENGINEERING**

# Engineering the stuff of life

Researchers take a multidisciplinary approach to manipulating cell function

## COMMENT



# **CLIMATE MEETING**

# Zero emissions

All sectors must work harder to decarbonize the planet, say Christiana Figueres et al. PAGE 27

# 30 CLIMATE MODELS

# Global warming will happen faster than we think

Yangyang Xu, Veerabhadran Ramanathan & David G. Victor Three factors are combining to hasten temperature rise

### 32 CARBON STORAGE

# Put more carbon in soils to meet Paris climate pledges

Cornelia Rumpel et al.
Eight steps to increase the power of soil as a sink globally

#### **BOOKS & ARTS**

# 36 COMMUNITY

How luxe is your laboratory?
Kendall Powell

## 37 BOOKS IN BRIEF

#### CORRESPONDENCE

39 Plan S will hit learned societies /
Researchers to speak up at climate
summit / Brazil's politics puts food
security at risk / Road pricing is no easy
fix / Helmholtz the mentor

#### **FUTURES**

# 154 A beginner's guide to space travel and seafood

Steven Fischer

# CONTENTS

6 December 2018 / Vol 564 / Issue No 7734

### RESEARCH

#### **NEW ONLINE**

41 Papers published this week at nature.com

### **NEWS & VIEWS**

**42 GEOCHEMISTRY** 

The rocky road to biomolecules An amino acid can be made naturally without requiring biological input John A Baross SEE ARTICLE P.59

**CONDENSED-MATTER PHYSICS** Elusive spin textures discovered Merons and antimerons seen in a chiral magnet Seonghoon Woo SEE LETTER P.95

CELL BIOLOGY Exit route evolved into entry path in plants A plant protein-import system has its origins in bacterial protein export Danny J Schnell SEE LETTER P.125

PARTICLE PHYSICS Long-sought decay of the Higgs boson seen Observation of the Higgs-boson decay to bottom quarks **Boris Tuchming** 

METABOLISM Reducing oxygen consumption in fat Intracellular oxygen demand increases hypoxia in expanding fat tissue Nolwenn Joffin & Philipp E Scherer

**ENVIRONMENTAL SCIENCE** Ammonia maps make history High-precision maps of ammonia emissions derived from satellite data Mark A Sutton & Clare M Howard **SEE LETTER P.99** 

**DEVELOPMENTAL BIOLOGY** Location matters for insulinproducing cells Extracellular cues affect the development of the cells that make insulin Francesca M Spagnoli SEE LETTER P.114

- **CLIMATE SCIENCES Change in future** climate due to Antarctic meltwater B Bronselaer et al.
- **GEOCHEMISTRY Abiotic synthesis of** amino acids in the recesses of the oceanic lithosphere B Ménez et al. SEE N&V P.42
- 64 GENETICS Amphioxus functional



# Cellular ushers

In vertebrates, haematopoietic stem and progenitor cells (HSPCs) act as the source for all blood cells. Weijun Pan and colleagues show that macrophage-like cells in zebrafish embryos usher HSPCs to dedicated niches, where the latter are stored ready to generate blood cells. PAGE 119

genomics and the origins of vertebrate gene regulation F Marlétaz et al.

- IMMUNOLOGY PtdIns4P on dispersed trans-Golgi network mediates NLRP3 inflammasome activation J Chen & Z J Chen
- STRUCTURAL BIOLOGY Type 9 secretion system structures reveal a new protein transport mechanism F Lauber, J C Deme, S M Lea & B C Berks

## **LETTERS**

- 83 PARTICLE PHYSICS An experiment to search for dark-matter interactions using sodium iodide detectors The COSINE-100 Collaboration
- **ATOMIC PHYSICS Atomic clock** \* performance enabling geodesy below the centimetre level W F McGrew et al.
- OPTICAL PHYSICS Extreme-ultraviolet refractive optics L Drescher et al.
- CONDENSED-MATTER PHYSICS Transformation between meron and skyrmion topological spin textures in a chiral magnet XZYu et al. SEE N&V P.43

- **ENVIRONMENTAL SCIENCE Industrial** and agricultural ammonia point sources exposed
  - M Van Damme et al. SEE N&V P.49
- 104 CLIMATE SCIENCES Nonlinear rise in Greenland runoff in response to post-industrial Arctic warming L D Trusel et al.
- 109 NEUROSCIENCE The hippocampus is crucial for forming non-hippocampal long-term memory during sleep A Sawangjit et al.
- 114 CELL SIGNALLING Mechanosignalling via integrins directs fate decisions of pancreatic progenitors A Mamidi et al. SEE N&V P.50
- 119 STEM CELLS VCAM-1\* macrophages guide the homing of HSPCs to a vascular niche D Li et al.
- 125 CELL BIOLOGY TIC236 links the outer and inner membrane translocons of the chloroplast Y-L Chen et al. SEE N&V P.45
- 130 IMMUNOLOGY FBXO38 mediates PD-1 ubiquitination and regulates anti-tumour immunity of T cells X Meng et al.
- 136 DEVELOPMENTAL BIOLOGY Stella safeguards the oocyte methylome by preventing de novo methylation mediated by DNMT1 Y Li et al.
- 141 DEVELOPMENTAL BIOLOGY CDK12 regulates DNA repair genes by suppressing intronic polyadenylation S J Dubbury, P L Boutz & P A Sharp

# **ENVIRONMENTAL SCIENCE**

# NH<sub>3</sub> hotspots

Satellite observations identify point sources of ammonia emissions. PAGE 99

