

CONTENTS

15 November 2018 / Vol 563 / Issue No 7731

THIS WEEK

EDITORIALS

293 POLITICS

A boost for Palestinian science

Offer support and collaboration to help colleagues in troubled regions

293 HEALTH RESEARCH

Mutual benefit

More can be done to reap the benefits of clinical-trial participation

294 POLICY

Welcome change

US mid-term elections provide hope for evidence-based policy

WORLD VIEW

295 **If you can't build well, then build nothing at all**

William Laurance

Develop global guidelines for smart, sustainable infrastructure

RESEARCH HIGHLIGHTS

296 SELECTIONS FROM THE SCIENTIFIC LITERATURE



Dairy-empire roots / Atomic speed record / Bitcoin mining / Thinning snow blankets / Heart models that beat

SEVEN DAYS

298 THE NEWS IN BRIEF

Pipeline project blocked / Nuclear-power vote / Statistical star / Feral-horse culls / Language barriers

CAREERS

431 INTERDISCIPLINARY RESEARCH

Turning a passion into a job

The benefits of fusing research with outside pursuits

433 COLUMN

Lab listener

James Turner describes work on mental-health first aid

NEWS IN FOCUS

301 POLICY

China punishes biomedical companies that breach data-sharing rules



302 POLITICS

Scientists gain ground in US Congress

303 GENETICS

DNA tracks migration of earliest settlers in the Americas

304 INSTITUTIONS

Sanger Institute stands by conclusions of bullying investigation

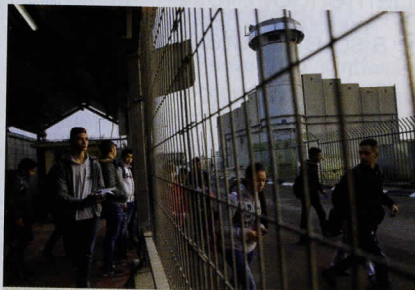
305 NEUROSCIENCE

See-through mice reveal details about injury response

306 AGRICULTURE

Deadly bacterium spreads through Italy's olive groves

FEATURES



POLITICS

Palestinian science

How researchers strive to create a solid base in a troubled region **PAGE 308**

312 HEALTH RESEARCH

A question of control

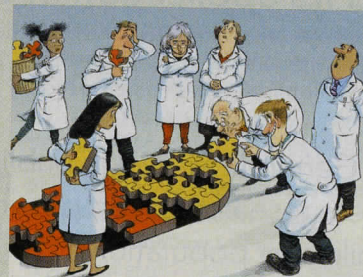
Clinical-trial researchers struggle to harness the power and effects of social media

COMMENT

DRUG DEVELOPMENT

Use failures to progress

Share negative results to drive research forward, argue Enrica Alteri & Lorenzo Guizzaro **PAGE 317**



BOOKS & ARTS

320 HISTORY

From quantum spin to wartime spy

Davide Castelvecchi

321 ARCHAEOLOGY

Ancient cities rescued from rubble, bit by bit

Laura Spinney

322 ENVIRONMENTAL RE-ENGINEERING

Lake Lazarus: rewilding the US west

Amy Maxmen

323 BOOKS IN BRIEF

CORRESPONDENCE

325 Mentors and networks / PI salaries / Lab agreements / Flexitarian diets / 3D-print specimen copies

OBITUARY

326 **Kuen Charles Kao (1933–2018)**

Polina Bayvel

FUTURES

436 **Say it with mastodons**

Marissa Linggen



CONTENTS

15 November 2018 / Vol 563 / Issue No 7731

RESEARCH

NEW ONLINE

327 Papers published this week at nature.com

NEWS & VIEWS

328 FORUM REGENERATION

Defining adult stem cells

Comparing dedicated and facultative stem cells

Pura Muñoz-Cánoves; Meritxell Huch

329 ASTRONOMY

A key piece in the exoplanet puzzle

The detection of a low-mass exoplanet on a relatively wide orbit

Rodrigo F Díaz [SEE LETTER P.365](#)

331 MICROBIOLOGY

Gut microbes alter fly walking activity

Fruit flies that lack the bacterium *Lactobacillus brevis* are hyperactive

Angela E Douglas [SEE LETTER P.402](#)

332 METABOLISM

A back door to improved health

Increased NAD⁺ synthesis protects mice against liver and kidney diseases

Samir M Parikh [SEE ARTICLE P.354](#)

333 MEDICAL RESEARCH

HIV rebound prevented in monkeys

A strategy to prevent HIV rebound after antiretroviral treatment ceases

Sharon R Lewin [SEE ARTICLE P.360](#)

335 EARTH SCIENCE

Water takes a deep dive into the Mariana Trench

The Pacific plate carries sea water deep into Earth's interior

Donna J Shillington [SEE LETTER P.389](#)

336 ORGANIC CHEMISTRY

From hydrocarbons to precious chemicals

Cross-coupling reactions for making aliphatic carbon-carbon bonds

James P Morken [SEE LETTER P.379](#)

337 HUMAN DEVELOPMENT

The landscape of early pregnancy

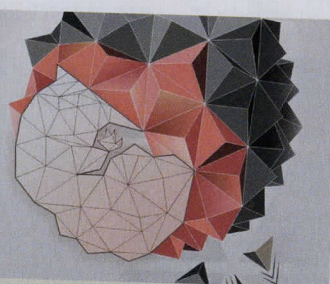
A molecular map of the human fetal-maternal interface in pregnancy

Sumati Rajagopalan & Eric O Long
[SEE ARTICLE P.347](#)

ARTICLES

339 **CLIMATE CHANGE** Anthropogenic influences on major tropical cyclone events

C M Patricola & M F Wehner



ON THE COVER

Secrets of pregnancy

The cellular changes that occur early in pregnancy lay the foundations for reproductive success. Sarah Teichmann and colleagues present a single-cell atlas of the interface that forms between the mother and fetus, which should help to identify the causes of problems such as pre-eclampsia and stillbirth. [PAGES 337 & 347](#)

347 **HUMAN DEVELOPMENT** Single-cell reconstruction of the early maternal-fetal interface in humans

R Vento-Tormo et al. [SEE N&V P.337](#)

354 **METABOLISM** De novo NAD⁺ synthesis enhances mitochondrial function and improves health

E Katsyuba et al. [SEE N&V P.332](#)

360 **MEDICAL RESEARCH** Antibody and TLR7 agonist delay viral rebound in SHIV-infected monkeys

E N Borducchi et al. [SEE N&V P.333](#)

LETTERS

365 **ASTRONOMY** A candidate super-Earth planet orbiting near the snow line of Barnard's star

I Ribas et al. [SEE N&V P.329](#)

369 **QUANTUM PHYSICS** Emergence of multi-body interactions in a fermionic lattice clock

A Goban et al.

374 **CONDENSED-MATTER PHYSICS** Three-dimensional collective charge excitations in electron-doped copper oxide superconductors

M Hepting et al.

379 **ORGANIC CHEMISTRY** Catalytic enantioconvergent coupling of secondary and tertiary electrophiles with olefins

Z Wang, H Yin & G C Fu [SEE N&V P.336](#)

384 **ATMOSPHERIC SCIENCE** Urbanization exacerbated the rainfall and flooding caused by hurricane Harvey in Houston

W Zhang, G Villarini, G A Vecchi & J A Smith

389 **EARTH SCIENCE** Water input into the Mariana subduction zone estimated from ocean-bottom seismic data

C Cai, D A Wiens, W Shen & M Eimer
[SEE N&V P.335](#)

393 **BIOMECHANICS** Remarkable muscles, remarkable locomotion in desert-dwelling wildebeest

N A Curtin et al.

397 **NEUROSCIENCE** Dopamine enhances signal-to-noise ratio in cortical-brainstem encoding of aversive stimuli

C M Vander Weele et al.

402 **MICROBIOLOGY** A gut microbial factor modulates locomotor behaviour in *Drosophila*

C E Schretter et al. [SEE N&V P.331](#)

407 **CELL BIOLOGY** Distinct proteostasis circuits cooperate in nuclear and cytoplasmic protein quality control

R S Samant, C M Livingston, E M Sontag & J Frydman

412 **MARINE CHEMISTRY** The metabolite dimethylsulfoxonium propionate extends the marine organosulfur cycle

K Thume et al.

416 **BIOCHEMISTRY** Metal-free ribonucleotide reduction powered by a DOPA radical in *Mycoplasma* pathogens

V Srinivas et al.

421 **PLANT SCIENCES** Structures of the intermediates of Kok's photosynthetic water oxidation clock

J Kern et al.

426 **STRUCTURAL BIOLOGY** Cryo-EM structures of a human ABCG2 mutant trapped in ATP-bound and substrate-bound states

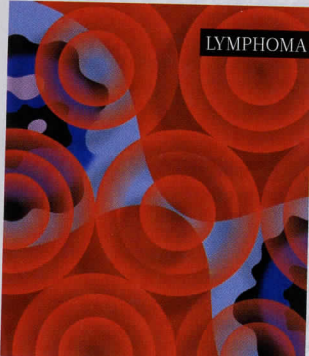
I Manolaridis et al.

OUTLOOK

Supplement to 15 November 2018 / Vol 563 / Issue No 7731

LYMPHOMA

natureOUTLOOK



LYMPHOMA

Produced with support from:



Immune cells
switch sides

Turn to page 326

S37 EDITORIAL

Lymphoma

Herb Brody

S38 DIAGNOSTICS

Know thy enemy

The promise of liquid biopsies

S42 IMMUNOTHERAPY

Gene therapy delivers hope

Chimeric antigen receptor T-cell therapy offers a final shot at a cure

S44 THERAPY

The cost of beating cancer

Those who survive face further risks

S46 THERAPEUTICS

A life-changing innovation

Targeted drugs have revolutionized lymphoma treatment



Scientists are creating vaccines against the cancer-linked Epstein-Barr virus (see page S52).

S48 STEM CELLS

Painful rejection

Tackling graft-versus-host disease

S50 ANIMAL MODELS

The model dog

Human and canine diseases are similar

S52 IMMUNOLOGY

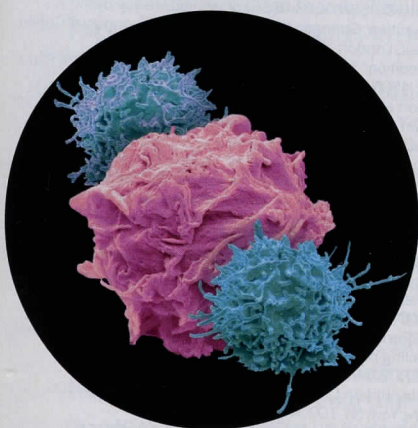
Dormant but dangerous

The Epstein-Barr virus and cancer

S55 LYMPHOMA

4 big questions

The challenges that still lie ahead




**MORE
ONLINE**

NATURE.COM

- For more on chimeric antigen receptor T cells in lymphoma, visit: go.nature.com/2f9tfom
- To read about transplants and lymphoma-like conditions, visit: go.nature.com/2qqfdvg

COLLECTION

- Visit our online edition, which includes an exclusive collection of the latest research papers on drugs for lymphoma and ways to avoid treatment complications: go.nature.com/2jupqdo