

***NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH
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October, 2019

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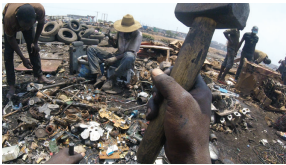
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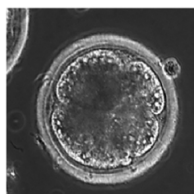
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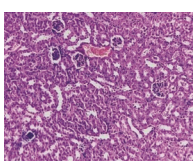
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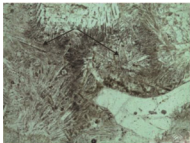
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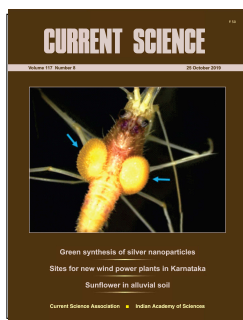
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Editor's Picks for October

Does Social Capital in the Workplace Predict Job Performance, Work Engagement, and Psychological Well-Being? A Prospective Analysis

Clausen, Thomas; Meng, Annette; Borg, Vilhem

Journal of Occupational and Environmental Medicine. 61(10):800-805, October 2019.

The Effects of Exposure Time on Systemic Inflammation in Subjects With Exposure to Zinc- and Copper-Containing Brazing Fumes

Brand, Peter; Beilmann, Viktor; Thomas, Katharina; More

Journal of Occupational and Environmental Medicine. 61(10):806-811, October 2019.

Utilization of an Employee Behavioral Health Program and Its Effects on Outcomes for Depression and Anxiety Disorders

Maeng, Daniel; Cornell, Ann E.; Nasra, George S.

Journal of Occupational and Environmental Medicine. 61(10):812-817, October 2019.

Current Issue Highlights

ORIGINAL ARTICLES

Turning Intention Into Participation in Occupational Health Promotion Courses? The Moderating Role of Organizational, Intrapersonal, and Interpersonal Factors

Krick, Annika; Felfe, Jörg; Klug, Katharina

Journal of Occupational and Environmental Medicine. 61(10):779-799, October 2019.

Does Social Capital in the Workplace Predict Job Performance, Work Engagement, and Psychological Well-Being? A Prospective Analysis

Clausen, Thomas; Meng, Annette; Borg, Vilhem

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FAST TRACK ARTICLE

Firefighters' Physical Activity and Waist Circumference as Predictors of

Barry, Allison M.; Lyman, Katie J.; Dicks, Nathan D.; More

Journal of Occupational and Environmental Medicine. 61(10):849-853, October 2019.

ORIGINAL ARTICLE

Determinants of Managerial Preventive Actions in Relation to Common Mental Disorders at Work: A Cross-Sectional Study Among Swedish Managers

van de Voort, Iris; de Rijk, Angelique; Hensing, Gunnel; More

Journal of Occupational and Environmental Medicine. 61(10):854-862, October 2019.

OCCUPATIONAL MEDICINE FORUM

"How Can Climate Change Impact the Workplace and Worker Health?" Part 3: Air Pollution, Greenhouse Gases, and Cardiorespiratory Health

Journal of Occupational and Environmental Medicine. 61(10):e427-e428, October 2019.

LETTERS TO THE EDITOR

Work-Related Trypanosoma cruzi Exposures

Budnick, Lawrence D.; Bocco, Bryan W.; Montgomery, Susan P.

Journal of Occupational and Environmental Medicine. 61(10):e429-e431, October 2019.

Is Aspirin an Effective Preventive Medicine for Firefighting-Induced Acute Inflammation?

Zhang, Yang

Journal of Occupational and Environmental Medicine. 61(10):e432, October 2019.

Nature

Volume 574 Issue 7776, 3 October 2019

This Week

Editorial

- Editorial | 01 October 2019

The Chinese Academy of Sciences at 70

Over the past few decades, the academy's investments have made it one of the world's richest. Could its financial autonomy be a model for others?

- Editorial | 01 October 2019

A kinder research culture is possible

Wellcome is right to call out hyper-competitiveness in research and question the focus on excellence. But other funders must follow its move.

- Editorial | 02 October 2019

Let fishers in Africa and Asia keep more of their catches

Fish farms are depriving children of essential micronutrients.

World View

- World View | 01 October 2019

We are all complicit in harassment and abuse

To combat bad behaviour, researchers must collectively create ways to take responsibility, says Virginia Valian.

- Virginia Valian

Research Highlights

- Research Highlight | 27 September 2019

Catastrophic landslides had a surprising cause: rice farming

Crop irrigation saturated soil, helping to set off Indonesian slides that killed thousands of people.

- Research Highlight | 25 September 2019

Bones reveal a jumbo crocodile hiding in plain sight

Analysis reveals that specimens of New Guinean freshwater crocodile belong to two species rather than one.

- Research Highlight | 24 September 2019

The child's toy that helps to make valuable electronic circuits

Balloon technique throws circuit manufacturers a curve.

- Research Highlight | 25 September 2019

Why minnows offer hope in battling 'stomach flu' virus

Small and easy to keep, zebrafish larvae provide a useful system for studying norovirus.

- Research Highlight | 27 September 2019

Staid to showy: galaxies undergo ultra-quick makeovers

Sedate objects 'change their look' after the abrupt awakening of their black holes.

- Research Highlight | 24 September 2019

Cats truly bond to their people

A test shows that a majority of felines are well attached to their caregivers.

- Research Highlight | 25 September 2019

Maths tackles an eternal question: where to park?

Two strategies for choosing a parking spot save far more time than a third, according to researchers' estimates.

Research

News & Views

- News & Views | 02 October 2019

Leapfrog to speciation boosted by mother's influence

It has now been found that mothers of a species of frog affect the behaviour of their offspring — influencing female mating preferences and aggression between males. Such behaviours might lead to the formation of new species.

- Machteld Verzijden
- News & Views | 02 October 2019

Two-dimensional semiconductors host high-temperature exotic state

The phenomenon of Bose–Einstein condensation is typically limited to extremely low temperatures. The effect has now been spotted at much higher temperatures for particles called excitons in atomically thin semiconductors.

- Andrey Chaves & David Neilson
- News & Views | 25 September 2019

How the global fish market contributes to human micronutrient deficiencies

Analysis of the nutrient composition of fish caught around the globe reveals locations where the retention of fish for consumption by local populations could help to tackle human disease caused by nutrient deficiencies.

- Daniel Pauly
- News & Views | 02 October 2019

Double-click enables synthesis of chemical libraries for drug discovery

Operationally simple chemical reactions, termed click reactions, are widely used in many scientific fields. A streamlined synthesis of compounds called azides looks set to expand the role of click chemistry still further.

- Joseph J. Topczewski & En-Chih Liu
- News & Views | 18 September 2019

Flies' colour preferences depend on the time of day

Behavioural and genetic experiments have revealed that fruit flies prefer green light over other colours in the morning and evening, and always avoid blue. These colour preferences rely on different mechanisms.

- Charlotte Helfrich-Förster

Matters Arising

- Matters Arising | 02 October 2019

One neuron versus deep learning in aftershock prediction

- Arnaud Mignan & Marco Broccardo
- Matters Arising | 02 October 2019

Reply to: One neuron versus deep learning in aftershock prediction

- Brendan J. Meade

Reviews

- Review Article | 02 October 2019

Harnessing innate immunity in cancer therapy

The authors review recent developments in our understanding of the antitumour effects of the innate immune system and how this system could be harnessed in the clinic.

- Olivier Demaria, Stéphanie Cornen & Eric Vivier

Collection:

- [Cancer at Nature Research](#)

Articles

- Article | 18 September 2019

FPR1 is the plague receptor on host immune cells

The receptor FPR1 on human immune cells interacts with *Yersinia pestis*, mutations in this receptor provide resistance against plague in humans and *Fpr1* deficiency enhances survival in mice.

- Patrick Osei-Owusu, Thomas M. Charlton & Olaf Schneewind
- Article | 25 September 2019

Treatment of type 2 diabetes with the designer cytokine IC7Fc

The chimeric cytokine IC7Fc combines the beneficial effects of the cytokines IL-6 and CNTF on weight loss and metabolism in mice, with no obvious side effects in mice and non-human primates.

- Maria Findeisen, Tamara L. Allen & Mark A. Febbraio

Letters

- Letter | 02 October 2019

Two major accretion epochs in M31 from two distinct populations of globular clusters

There are two distinct kinematic populations of globular clusters in Messier 31 (M31, the Andromeda galaxy) with rotation axes perpendicular to each other, suggesting that they arose from merger events separated by billions of years.

- Dougal Mackey, Geraint F. Lewis & Zhen Wan

- Letter | 23 September 2019

Constraints on the superconducting order parameter in Sr₂RuO₄ from oxygen-17 nuclear magnetic resonance

¹⁷O nuclear magnetic resonance measurements on Sr₂RuO₄ reveal a drop of the Knight shift in the superconducting state, contradicting previous work and imposing tight constraints on the order parameter symmetry of the system.

- A. Pustogow, Yongkang Luo & S. E. Brown

- Letter | 02 October 2019

Evidence of high-temperature exciton condensation in two-dimensional atomic double layers

Condensation of interlayer excitons at temperatures above 100 kelvin is demonstrated in a van der Waals heterostructure consisting of two-dimensional atomic double layers of transition metal chalcogenides.

- Zefang Wang, Daniel A. Rhodes & Kin Fai Mak
- Letter | 25 September 2019

PdMo bimetalene for oxygen reduction catalysis

PdMo bimetalene, a highly curved and sub-nanometre-thick nanosheet of a palladium–molybdenum alloy, is an efficient and stable electrocatalyst for the oxygen reduction and evolution reactions under alkaline conditions.

- Mingchuan Luo, Zhonglong Zhao & Shaojun Guo
- Letter | 02 October 2019

Modular click chemistry libraries for functional screens using a diazotizing reagent

A ‘click’ reaction is developed for the simple and rapid formation of azides from primary amines, and is used to prepare a library of over 1,200 azides for subsequent use in the existing triazole annulation click reaction.

- Genyi Meng, Taijie Guo & Jiajia Dong
- Letter | 02 October 2019

Environmental flow limits to global groundwater pumping

Estimates for when critical environmental streamflow limits will be reached—with potentially devastating economic and environmental effects—are obtained using a global model that links groundwater pumping with the groundwater flow to rivers.

- Inge E. M. de Graaf, Tom Gleeson & Marc F. P. Bierkens
- Letter | 25 September 2019

Harnessing global fisheries to tackle micronutrient deficiencies

Nutrient content analyses of marine finfish and current fisheries landings show that fish have the potential to substantially contribute to global food and nutrition security by alleviating micronutrient deficiencies in regions where they are prevalent.

- Christina C. Hicks, Philippa J. Cohen & M. Aaron MacNeil
- Letter | 02 October 2019

Imprinting sets the stage for speciation

Tadpoles of strawberry poison frogs (*Oophaga pumilio*) are shown to imprint on adult coloration, affecting both male aggression biases and female preferences and setting the stage for speciation by sexual selection.

- Yusan Yang, Maria R. Servedio & Corinne L. Richards-Zawacki
- Letter | 11 September 2019

Early Pleistocene enamel proteome from Dmanisi resolves *Stephanorhinus* phylogeny

Palaeoproteomic analysis of dental enamel from an Early Pleistocene *Stephanorhinus* resolves the phylogeny of Eurasian Rhinocerotidae, by enabling the reconstruction of molecular evolution beyond the limits of ancient DNA preservation.

- Enrico Cappellini, Frido Welker & Eske Willerslev
- Letter | 18 September 2019

Daytime colour preference in *Drosophila* depends on the circadian clock and TRP channels

Innate colour preference in adult fruit flies changes with the time of day, and depends on rhodopsins 1 and 7, TRP channels and the circadian clock.

- Stanislav Lazopulo, Andrey Lazopulo & Sheyum Syed
- Letter | 25 September 2019

Modelling human hepato-biliary-pancreatic organogenesis from the foregut–midgut boundary

Juxtaposition of region-specific gut spheroids derived from human pluripotent stem cells in the absence of extrinsic factors results in development of segregated hepato-biliary-pancreatic anlagen that recapitulate early morphogenetic events.

- Hiroyuki Koike, Kentaro Iwasawa & Takanori Takebe
- Letter | 18 September 2019

Stunted microbiota and opportunistic pathogen colonization in caesarean-section birth

Delivery via caesarean section, maternal antibiotic prophylaxis and colonization by opportunistic pathogens associated with the hospital environment affect the composition of the gut microbiota of children from birth until infancy.

- Yan Shao, Samuel C. Forster & Trevor D. Lawley
- Letter | 25 September 2019

Analysis of the B cell receptor repertoire in six immune-mediated diseases

An analysis of the B cell receptor repertoire in six immune-mediated diseases reveals that there are substantial differences in clonality, isotype use, class switching and use of the IGHV genes between diseases.

- R. J. M. Bashford-Rogers, L. Bergamaschi & K. G. C. Smith
- Letter | 30 September 2019

The Drug Rediscovery protocol facilitates the expanded use of existing anticancer drugs

Clinical benefit was observed in 34% of a cohort of 215 patients with cancer who received treatment with anticancer drugs outside of their approved label, in the Drug Rediscovery protocol trial.

- D. L. van der Velden, L. R. Hoes & E. E. Voest
- Letter | 25 September 2019

Crystal structure of heliorhodopsin

A crystal structure of *Thermoplasma* archaeon heliorhodopsin at 2.4 Å resolution shows that it adopts a similar fold to that of type I rhodopsin—despite the low sequence identity—but there are also several marked differences that provide insights into heliorhodopsin function.

- Wataru Shihoya, Keiichi Inoue & Osamu Nureki

Volume 574 Issue 7777, 10 October 2019

This Week

Editorial

- Editorial | 08 October 2019

Canada's next prime minister must commit to a sustainable future

Justin Trudeau's Liberal Party has struggled to live up to its promises on the environment. Whoever wins the coming election can and must do better.

- Editorial | 08 October 2019

Mahatma Gandhi and sustainable science

The champion of India's freedom movement was an innovator and supporter of sustainable science.

- Editorial | 09 October 2019

Let independent panel shape Africa's largest hydropower dam

Researchers are assessing the environmental risks posed by a dam on the Nile. The countries involved should let them finish the job.

World View

- World View | 09 October 2019

Banish hunger on university campuses

For World Food Day, Esther Ngumbi calls on institutions of higher education to help students know where their next meal is coming from.

- Esther Ngumbi

Research Highlights

- Research Highlight | 27 September 2019

A galactic grouping dates to the dawn of the Universe

Telescopes detect a 'protocluster' that had already formed less than one billion years after the Big Bang.

- Research Highlight | 01 October 2019

Extraordinary fossil reveals sharks' family roots

A fish species dated to about 383 million years ago is the earliest known member of the group that includes sharks.

- Research Highlight | 04 October 2019

Glowing nanoparticles can stop heart cells beating — or set them racing

Particles are triggered by infrared light and could be embedded deep in the body.

- Research Highlight | 03 October 2019

Liver tumours' odd metabolisms might be their weak spot

People with a certain type of liver cancer die sooner if they have higher levels of some metabolic proteins.

- Research Highlight | 01 October 2019

Bacteria that plague hospital patients gain a potent weapon

An easily transmitted piece of DNA cranks up the virulence of *Klebsiella* bacteria, a major cause of infections in hospitals.

- Research Highlight | 30 September 2019

Even meat lovers go veggie when plant-heavy meals abound

Dining-hall data suggest that a rise in vegetarian options leads customers to embrace meat-free meals.

- Research Highlight | 02 October 2019
Water shortages loom for Asia's new power plants

Climate change could force prospective coal-burning facilities to cut output.

Research

News & Views

- News & Views | 07 October 2019
Getting to grips with how birds land stably on complex surfaces

Tree-dwelling birds can land on perches that vary in size and texture. Force measurements and video-footage analysis now reveal that birds rely on rapid and robust adjustments of their toe pads and claws to land stably.

- Andrew A. Biewener
- News & Views | 09 October 2019
Micro-engineered liquid flow dissolves solids without dispersing them

Microfluidic devices have revolutionized biological assays, but complex set-ups are required to prevent the unwanted mixing of reagents in the liquid samples being analysed. A simpler solution has just been found.

- Robert Hołyst & Piotr Garstecki
- News & Views | 25 September 2019
Early Europeans bottle-fed babies with animal milk

The foods used to supplement or replace breast milk in infants' diets in prehistoric times aren't fully understood. The finding that ancient feeding vessels from Europe had residues of animal milk offers a clue.

- Siân E. Halcrow
- News & Views | 02 October 2019
Fungi accelerate pancreatic cancer

The impact of fungi on human health is under-studied and underappreciated. One genus of fungus, *Malassezia*, has now been linked to the progression of pancreatic cancer.

- Ivy M. Dambuza & Gordon D. Brown
- News & Views | 08 October 2019
From the archive

How *Nature* reported a satellite TV system in India in 1969, and an explorer who learnt survival techniques from indigenous Arctic groups in 1919.

- News & Views | 09 October 2019

Determining whether the worst earthquake has passed

When a big earthquake occurs, it is hard to tell if it will be followed by a larger quake or by only smaller ones. A method has been developed that aims to distinguish between these scenarios while events are still unfolding.

- Emily E. Brodsky

Perspectives

- Perspective | 09 October 2019 | Open Access

The human body at cellular resolution: the NIH Human Biomolecular Atlas Program

HuBMAP supports technology development, data acquisition, and spatial analyses to generate comprehensive molecular and cellular three-dimensional tissue maps.

- Michael P. Snyder, Shin Lin & James Anderson

Articles

- Article | 09 October 2019

Real-time discrimination of earthquake foreshocks and aftershocks

Changes in the average size distribution of earthquakes are used to discriminate between foreshocks and aftershocks, and a traffic light classification is proposed for the real-time assessment of the probability of a subsequent larger event.

- Laura Gulia & Stefan Wiemer
- Article | 02 October 2019

Dynamics and genomic landscape of CD8⁺ T cells undergoing hepatic priming

CD8⁺ T cells that are primed by hepatocytes differentiate into dysfunctional T cells, which can be rescued by treatment with IL-2.

- Alexandre P. Bénéchet, Giorgia De Simone & Matteo Iannacone
- Article | 12 September 2019

Structural insights into the mechanism of human soluble guanylate cyclase

Cryo-electron microscopy structures of human soluble guanylate cyclase in inactive and activated states shed light on the activation mechanism of this enzyme by nitric oxide.

- Yunlu Kang, Rui Liu & Lei Chen

Letters

- Letter | 09 October 2019

Stellar mergers as the origin of magnetic massive stars

Simulated mergers of two massive stars provide a solution to the long-standing puzzle of the origin of strong magnetic fields in a subset of massive stars.

- Fabian R. N. Schneider, Sebastian T. Ohlmann & Volker Springel
- Letter | 09 October 2019

Analogue quantum chemistry simulation

An analogue quantum simulator based on ultracold atoms in optical lattices and cavity quantum electrodynamics is proposed for the solution of quantum chemistry problems and tested numerically for a simple molecule.

- Javier Argüello-Luengo, Alejandro González-Tudela & J. Ignacio Cirac
- Letter | 30 September 2019

Measuring the Berry phase of graphene from wavefront dislocations in Friedel oscillations

The Berry phase of graphene is measured in the absence of an applied magnetic field by observing dislocations in the Friedel oscillations formed at a hydrogen atom adsorbed on graphene.

- C. Dutreix, H. González-Herrero & V. T. Renard
- Letter | 09 October 2019

Tuning element distribution, structure and properties by composition in high-entropy alloys

In high-entropy alloys, atomic-resolution chemical mapping shows that swapping some of the atoms for larger, more electronegative elements results in atomic-scale modulations that produce higher yield strength, excellent strain hardening and ductility.

- Qingqing Ding, Yin Zhang & Qian Yu
- Letter | 09 October 2019

Self-coalescing flows in microfluidics for pulse-shaped delivery of reagents

Characterization of a capillary flow phenomenon termed self-coalescence leads to the development of scalable, compact microfluidic devices that could see application in diagnostics, high-throughput screening and biological assays.

- Onur Gökçe, Samuel Castonguay & Emmanuel Delamarche
- Letter | 30 August 2019

Constraints on global mean sea level during Pliocene warmth

Using phreatic overgrowths on speleothems, sea level during the mid-Piacenzian Warm Period, which was about two to three degrees Celsius warmer than the pre-industrial period, is shown to have been about 16 metres higher than today.

- Oana A. Dumitru, Jacqueline Austermann & Bogdan P. Onac
- Letter | 02 October 2019

The amplitude and origin of sea-level variability during the Pliocene epoch

Sea level varied by 13 ± 5 metres on average, but up to 25 metres, over glacial–interglacial cycles during the Pliocene epoch, due to partial collapses of Antarctic Ice Sheets.

- G. R. Grant, T. R. Naish & M. O. Patterson
- Letter | 25 September 2019

Diversity decoupled from ecosystem function and resilience during mass extinction recovery

After the Cretaceous/Palaeogene mass extinction event, nannoplankton communities exhibited volatility for 1.8 million years before a more stable community emerged, coinciding with restoration of the carbon cycle and a fully functioning biological pump between the surface and deep sea.

- Sarah A. Alvarez, Samantha J. Gibbs & Andy Ridgwell
- Letter | 25 September 2019

Milk of ruminants in ceramic baby bottles from prehistoric child graves

Small, spouted vessels found in Bronze and Iron Age graves of infants in Bavaria were used to feed the milk of domesticated animals to infants.

- J. Dunne, K. Rebay-Salisbury & R. P. Evershed
- Letter | 02 October 2019

The RIPK4–IRF6 signalling axis safeguards epidermal differentiation and barrier function

Signalling between the transcription factor IRF6 and the kinase RIPK4, in particular the phosphorylation of IRF6 by RIPK4, regulates epidermal differentiation and lipid metabolism, thereby maintaining the function of the epidermal barrier.

- Nina Oberbeck, Victoria C. Pham & Vishva M. Dixit
- Letter | 18 September 2019

Light-entrained and brain-tuned circadian circuits regulate ILC3s and gut homeostasis

Circadian circuits, entrained by light and tuned by the brain, regulate intestinal group 3 innate lymphoid cells in mice, along with epithelial reactivity, microbiome composition and lipid metabolism.

- Cristina Godinho-Silva, Rita G. Domingues & Henrique Veiga-Fernandes
- Letter | 25 September 2019

FHL1 is a major host factor for chikungunya virus infection

FHL1 is a key factor expressed by humans and mice that is required for chikungunya virus infection and is therefore a promising target for the development of therapies against chikungunya virus.

- Laurent Meertens, Mohamed Lamine Hafirassou & Ali Amara
- Letter | 02 October 2019

The fungal mycobiome promotes pancreatic oncogenesis via activation of MBL

In humans and mouse models, the mycobiome of pancreatic ductal adenocarcinoma tumours is markedly enriched in *Malassezia* species compared to that of normal pancreas, which implicates these pathogenic fungi in oncogenesis.

- Berk Aykut, Smruti Pushalkar & George Miller

- Letter | 02 October 2019

Inducing and exploiting vulnerabilities for the treatment of liver cancer

CDC7 inhibition selectively induces senescence in hepatocellular carcinoma cells with *TP53* mutations, which enables the selective apoptotic cell death of these senescent cells using inhibitors of mTOR signalling.

- Cun Wang, Serena Vegna & René Bernards

- Letter | 02 October 2019

Coordinated alterations in RNA splicing and epigenetic regulation drive leukaemogenesis

Analyses of transcriptomes from patients with acute myeloid leukaemia identified frequently co-occurring mutations of *IDH2* and *SRSF2*, which functional analyses showed to have distinct and coordinated leukaemogenic effects on the epigenome and RNA splicing.

- Akihide Yoshimi, Kuan-Ting Lin & Omar Abdel-Wahab

- Letter | 02 October 2019

Structure of the inner kinetochore CCAN complex assembled onto a centromeric nucleosome

Cryo-electron microscopy structures of the *Saccharomyces cerevisiae* inner kinetochore complex provide insights into the interdependencies of constituent subcomplexes and the mechanism of centromeric nucleosome recognition.

- Kaige Yan, Jing Yang & David Barford

Amendments & Corrections

- Author Correction | 26 September 2019

Author Correction: A rigorous electrochemical ammonia synthesis protocol with quantitative isotope measurements

- Suzanne Z. Andersen, Viktor Čolić & Ib Chorkendorff

- Author Correction | 30 September 2019

Author Correction: Global analysis of streamflow response to forest management

- Jaivime Evaristo & Jeffrey J. McDonnell

- Addendum | 30 September 2019

Editorial Expression of Concern: Global analysis of streamflow response to forest management

- Jaivime Evaristo & Jeffrey J. McDonnell

This Week

Editorial

- Editorial | 15 October 2019

Boosting inclusivity in the Nobels

After the euphoria of 2018, this year's Nobel prizes in chemistry, medicine and physics have again all been awarded to men. Here are three ways to encourage change.

- Editorial | 16 October 2019

Counting the hidden \$12-trillion cost of a broken food system

The world's food system costs trillions in poor health and ecological damage. On World Food Day, governments and researchers must commit to more-regular audits of these unseen expenses.

- Editorial | 16 October 2019

Protect the census

The humble census risks becoming a casualty of the rush to embrace big data. But it has the potential to save lives.

World View

- World View | 16 October 2019

Data on child deaths are a call for justice

To save young lives, governments must support families, respect women and tackle inequality, says Michelle Bachelet.

- Michelle Bachelet

Research Highlights

- Research Highlight | 07 October 2019

Anti-Muslim hostility could ebb owing to a simple measure

Carefully chosen questions prompt non-Muslims to assign less 'collective blame' to Muslims for violent attacks.

- Research Highlight | 08 October 2019

Rosy octopuses are more warty the deeper they dwell in the sea

Shallow-water residents have nearly smooth skin, but their deep-living brethren are covered in lumps and bumps.

- Research Highlight | 10 October 2019

Simmering inequity: a city's worst heat hits low-income residents

The burden of the 'urban heat-island' effect falls most heavily on economically disadvantaged neighborhoods.

- Research Highlight | 08 October 2019

A lethal virus carried by 'vampires' is rampaging across the Americas

Viral genomes suggest that rabies strains carried by vampire bats travel from South America to North America, and vice versa.

- Research Highlight | 08 October 2019

Europe's most active volcano reveals its strength through low rumbles

An analysis of sound waves from Mount Etna showcases a method that could aid volcano monitoring worldwide.

- Research Highlight | 10 October 2019

How treacherous brain cells aid cancer's invasion

The neural cells called astrocytes feed the brain's own fat to metastatic cancer cells.

- Research Highlight | 10 October 2019

Squashed nuclei undermine long-held doctrine of nuclear structure

Stable cadmium nuclei can change shape even when their energies are low.

Research

News & Views

- News & Views | 16 October 2019

Brain-to-pancreas signalling axis links nicotine and diabetes

The discovery of a signalling axis that connects nicotine responses in the brain with glucose metabolism by the pancreas sheds light on why cigarette smoking increases the risk of diabetes.

- Giuseppe Bruschetta & Sabrina Diano

- News & Views | 14 October 2019

Alterations to the circadian clock make brain tumours vulnerable

The body's circadian clock ensures the rhythmic expression of some genes across the day. The catalogue of genes under circadian control changes in an aggressive brain cancer — a discovery that might open up a new avenue for treatment.

- Guiomar Solanas & Salvador A. Benitah

- News & Views | 16 October 2019

Moderation of neural excitation promotes longevity

Signals emanating from the nervous system are potent modulators of longevity. It now seems that overall neural excitation is also a key determinant of lifespan.

- Nektarios Tavernarakis
- News & Views | 02 October 2019

Malaria mosquitoes go with the flow

The rapid return of mosquitoes to African semi-desert regions when the dry season ends was an unsolved mystery. A surprising solution to the puzzle is the long-range migration of mosquitoes on high-altitude winds.

- Nora J. Besansky
- News & Views | 16 October 2019

Sounds of a supersolid detected in dipolar atomic gases for the first time

Ultracold gases of dipolar atoms can exhibit fluid and crystalline oscillations at the same time, illuminating the ways in which different kinds of sound propagate in the quantum state of matter known as a supersolid.

- Sean M. Mossman

Matters Arising

- Matters Arising | 16 October 2019

Reversion after replacement of mitochondrial DNA

- Gavin Hudson, Yuko Takeda & Mary Herbert
- Matters Arising | 16 October 2019

Reply to: Reversion after replacement of mitochondrial DNA

- Eunju Kang, Amy Koski & Shoukhrat Mitalipov

Reviews

- Review Article | 16 October 2019

Subducting carbon

The processes that control the movement of carbon from microfossils on the seafloor to erupting volcanoes and deep diamonds, in a cycle driven by plate tectonics, are reviewed.

- Terry Plank & Craig E. Manning

Collections:

- [Deep Carbon](#)
- [150 years of Nature](#)

Articles

- Article | 16 October 2019 | Open Access
[Mapping 123 million neonatal, infant and child deaths between 2000 and 2017](#)
A high-resolution, global atlas of mortality of children under five years of age between 2000 and 2017 highlights subnational geographical inequalities in the distribution, rates and absolute counts of child deaths by age.
- Roy Burstein, Nathaniel J. Henry & Simon I. Hay
- Article | 16 October 2019
[Regulation of lifespan by neural excitation and REST](#)
Studies of humans, mice and nematodes reveal a conserved role of neural activity and the transcription factor REST in extended longevity.
- Joseph M. Zullo, Derek Drake & Bruce A. Yankner
- Article | 09 October 2019
[Decoding human fetal liver haematopoiesis](#)
Single-cell transcriptomic profiling of fetal liver, skin, kidney and yolk sac reveals the differentiation trajectories of human haematopoietic stem cells and multipotent progenitors, which are validated to produce an integrated map of fetal liver haematopoiesis.
- Dorin-Mirel Popescu, Rachel A. Botting & Muzlifah Haniffa
- Article | 16 October 2019
[Habenular TCF7L2 links nicotine addiction to diabetes](#)
The transcription factor TCF7L2 mediates two important responses to nicotine in the medial habenula region of the rodent brain: aversion to nicotine, and regulation of blood sugar levels through a polysynaptic habenula–pancreas circuit.
- Alexander Duncan, Mary P. Heyer & Paul J. Kenny

Letters

- Letter | 16 October 2019

Meridional flows in the disk around a young star

Three-dimensional gas velocities in the gapped disk around the young star HD 163296 show meridional flows from the surface of the disk towards its midplane at gap locations.

- Richard Teague, Jaehan Bae & Edwin A. Bergin
- Letter | 09 September 2019

Supersolid symmetry breaking from compressional oscillations in a dipolar quantum gas

Two distinct compressional oscillation modes are characterized in a dipolar Bose–Einstein condensate; this demonstrates the breaking of two symmetries owing to the coexisting superfluid and crystal properties of a supersolid.

- L. Tanzi, S. M. Roccuzzo & S. Stringari
- Letter | 09 September 2019

The low-energy Goldstone mode in a trapped dipolar supersolid

Observation of the collective mode responding to the superfluid stiffness—the low-energy Goldstone mode—provides direct evidence for phase rigidity, which is a key signature of supersolidity in an ultracold quantum gas.

- Mingyang Guo, Fabian Böttcher & Tilman Pfau
- Letter | 09 October 2019

A hexagonal planar transition-metal complex

A six-coordinate transition-metal complex with a hexagonal planar geometry is isolated and characterized.

- Martí Garçon, Clare Bakewell & Mark R. Crimmin
- Letter | 16 October 2019

Crosslinking ionic oligomers as conformable precursors to calcium carbonate

The crosslinking of oligomeric precursors, controlled by a capping agent, enables the production of moulded crystalline calcium carbonate with continuous structures.

- Zhaoming Liu, Changyu Shao & Ruikang Tang
- Letter | 16 October 2019

A large source of cloud condensation nuclei from new particle formation in the tropics

Widespread formation of new particles from condensable vapours observed in the tropical upper troposphere is an important source of cloud condensation nuclei in the lower troposphere, affecting cloud properties.

- Christina J. Williamson, Agnieszka Kupc & Charles A. Brock
- Letter | 02 October 2019

Windborne long-distance migration of malaria mosquitoes in the Sahel

Aerial sampling in the Sahel of Mali reveals large numbers of windborne malaria mosquitoes that had recently fed on blood and could cover hundreds of kilometres in a single night.

- Diana L. Huestis, Adama Dao & Tovi Lehmann
- Letter | 02 October 2019

Genome editing retraces the evolution of toxin resistance in the monarch butterfly

CRISPR–Cas9 engineering of the *Drosophila Atpa* gene (encoding the α -subunit of the sodium pump) is used to study the ability of mutations that evolved independently in several insect orders to confer resistance to keystone plant toxins.

- Marianthi Karageorgi, Simon C. Groen & Noah K. Whiteman
- Letter | 09 October 2019

Population imaging of neural activity in awake behaving mice

A genetically encoded fluorescent voltage indicator, SomArchon, is used to image changes in membrane voltage from many neurons simultaneously in multiple brain regions of awake, behaving mice.

- Kiryl D. Piatkevich, Seth Bensussen & Xue Han
- Letter | 16 October 2019

Organoid single-cell genomic atlas uncovers human-specific features of brain development

Species comparisons using single-cell transcriptomics and accessible chromatin profiling in stem cell-derived cerebral organoids are used to map dynamic gene-regulatory changes that are unique to humans.

- Sabina Kanton, Michael James Boyle & J. Gray Camp
- Letter | 09 October 2019

A sensor kinase controls turgor-driven plant infection by the rice blast fungus

The histidine–aspartate kinase Sln1 acts as a molecular sensor of turgor in appressoria of the rice blast fungus *Magnaporthe oryzae*, enabling penetration of the host leaf cuticle and plant infection.

- Lauren S. Ryder, Yasin F. Dagdas & Nicholas J. Talbot
- Letter | 11 September 2019

Cleavage of RIPK1 by caspase-8 is crucial for limiting apoptosis and necroptosis

Caspase-8 suppresses apoptosis and necroptosis in embryonic mice by cleaving RIPK1.

- Kim Newton, Katherine E. Wickliffe & Vishva M. Dixit
- Letter | 09 October 2019

Spliceosomal disruption of the non-canonical BAF complex in cancer

A range of *SF3B1* mutations promote tumorigenesis through the repression of BRD9, a core component of the non-canonical BAF complex, and correcting *BRD9* mis-splicing in these *SF3B1*-mutant cells suppresses tumour growth.

- Daichi Inoue, Guo-Liang Chew & Robert K. Bradley

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- Editorial | 23 October 2019

A new look for *Nature*

The journal has been redesigned for clearer research communication in the digital age.

- Editorial | 23 October 2019

A precarious milestone for quantum computing

Quantum computing will suffer if supremacy is overhyped. Everyday quantum computers are still decades away.

- Editorial | 23 October 2019

Young universities show leadership

Thriving new institutions can share lessons in building research and publishing capacity.

World View

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To save Brazil's rainforest, boost its science

My country's government is squeezing research and pushing the rainforest to the brink.

- Carlos A. Nobre

Research Highlights

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How to improve a huge super-resolution microscope: shrink it

Physicists redesign an enormous and costly imaging device to make it smaller and cheaper.

- Research Highlight | 14 October 2019

The comet that came in from interstellar space

The short-tailed 2I/Borisov is only the second known visitor to the Solar System from another star system.

- Research Highlight | 17 October 2019

One stem cell morphs into a mouse embryo's forerunner

A sphere of cells that blossoms from only one stem cell can implant in a mouse uterus and form multiple tissues.

- Research Highlight | 15 October 2019

Extreme winter leads to an Arctic reproductive collapse

Unprecedented snowfall stymied breeding for birds and other creatures in northern Greenland in 2018.

- Research Highlight | 15 October 2019

Nuclear waste? These microbes might help with the cleanup

Bacteria discovered in a Mexican lake accumulate two radioactive isotopes in their cells.

- Research Highlight | 16 October 2019

Don't knock wood: an ordinary material goes high-tech

A wooden chip imprinted with microscopic patterns serves as a grid of lenses.

- Research Highlight | 16 October 2019

[A land-speed record for ants set in Saharan dunes](#)

World's fastest ants zip along at 85 centimetres per second, at times with all 6 legs off the ground at once.

Research

News & Views

- News & Views | 23 October 2019

[Quantum computing takes flight](#)

A programmable quantum computer has been reported to outperform the most powerful conventional computers in a specific task — a milestone in computing comparable in importance to the Wright brothers' first flights.

- William D. Oliver

- News & Views | 23 October 2019

[Gut microbes regulate neurons to help mice forget their fear](#)

Microorganisms in the gut influence fear-related learning. The results of a study that reveals some of the mechanistic underpinnings of this phenomenon promise to boost our understanding of gut–brain communication.

- Drew D. Kiraly

- News & Views | 21 October 2019

[A fresh mechanism for how buckyballs form in space](#)

The spectroscopic fingerprints of buckyballs have been observed in space, but questions remain about how these large molecules form. Laboratory experiments have revealed a possible mechanism.

- Alessandra Candian

- News & Views | 23 October 2019

[Light trapping gets a boost](#)

The ability of structures called optical resonators to trap light is often limited by scattering of light off fabrication defects. A physical mechanism that suppresses this scattering has been reported that could lead to improved optical devices.

- Kirill Koshelev & Yuri Kivshar

- News & Views | 23 October 2019

Histone lactylation links metabolism and gene regulation

Cells regulate gene expression in part through the chemical labelling of histone proteins. Discovery of a label derived from lactate molecules reveals a way in which cells link gene expression to nutrient metabolism.

- Luke T. Izzo & Kathryn E. Wellen
- News & Views | 23 October 2019

Early tetrapods had an eye on the land

Fossil finds that can provide clues about how aquatic vertebrates evolved into land dwellers are elusive. But the ancient bones of a newly discovered species of tetrapod now provide some crucial missing evidence.

- Nadia B. Fröbisch & Florian Witzmann

Articles

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Identification of strontium in the merger of two neutron stars

Reanalysis of the spectra associated with the merger of two neutron stars identifies strontium, spectroscopically establishing the origin of the heavy elements created by rapid neutron capture and proving that neutron stars comprise neutron-rich matter.

- Darach Watson, Camilla J. Hansen & Elena Pian
- Article | 23 October 2019

Topologically enabled ultrahigh- Q guided resonances robust to out-of-plane scattering

Bound states in the continuum are merged in momentum space by varying the periodicity of the photonic crystal lattice, giving high-quality-factor guided resonances that are robust to out-of-plane scattering.

- Jicheng Jin, Xuefan Yin & Chao Peng
- Article | 23 October 2019

Quantum supremacy using a programmable superconducting processor

Quantum supremacy is demonstrated using a programmable superconducting processor known as Sycamore, taking approximately 200 seconds to sample one instance of a quantum circuit a million times, which would take a state-of-the-art supercomputer around ten thousand years to compute.

- Frank Arute, Kunal Arya & John M. Martinis
- Article | 23 October 2019

An antiaromatic-walled nanospace

The construction of a self-assembled nanocage composed of four metal ions and six antiaromatic walls is demonstrated, and the effect of antiaromaticity on the host–guest properties is investigated.

- Masahiro Yamashina, Yuya Tanaka & Jonathan R. Nitschke
- Article | 23 October 2019

Site-specific allylic C–H bond functionalization with a copper-bound N-centred radical

A Cu-bound nitrogen-centred radical is used to control site-specific and enantioselective allylic C–H cyanations of molecules with synthetic and medicinal relevance, such as tri- and tetrasubstituted alkenes.

- Jiayuan Li, Zhihan Zhang & Guosheng Liu
- Article | 23 October 2019

Similar scaling laws for earthquakes and Cascadia slow-slip events

A new catalogue of slow-slip events on the Cascadia megathrust shows that a cubic moment–duration scaling law is likely, with scaling properties strikingly similar to regular earthquakes.

- Sylvain Michel, Adriano Gualandi & Jean-Philippe Avouac
- Article | 23 October 2019

Morphology of the earliest reconstructable tetrapod *Parmastega aelidae*

Three-dimensionally preserved fossils of *Parmastega aelidae*, a newly described tetrapod from the earliest Famennian (Late Devonian) of Russia, provide detailed insights into the morphology and palaeobiology of the earliest tetrapods.

- Pavel A. Beznosov, Jennifer A. Clack & Per Erik Ahlberg
- Article | 23 October 2019

The landscape of somatic mutation in normal colorectal epithelial cells

Genome sequencing of hundreds of normal colonic crypts from 42 individuals sheds light on mutational processes and driver mutations in normal colorectal epithelial cells.

- Henry Lee-Six, Sigurgeir Olafsson & Michael R. Stratton
- Article | 23 October 2019

Somatic mutations and clonal dynamics in healthy and cirrhotic human liver

Whole-genome sequencing of liver microdissections from five healthy individuals and nine with cirrhosis demonstrates the effects of liver disease

on the genome, including increased rates of mutation, complex structural variation and different mutational signatures.

- Simon F. Brunner, Nicola D. Roberts & Peter J. Campbell
- Article | 23 October 2019

The microbiota regulate neuronal function and fear extinction learning

A diverse intestinal microbiota is required for mice to undergo extinction-related neuronal plasticity and normal fear extinction learning.

- Coco Chu, Mitchell H. Murdock & David Artis
- Article | 23 October 2019

Bacterial biodiversity drives the evolution of CRISPR-based phage resistance

The biotic environment can fundamentally alter bacteria and phage interactions, and influence the evolution of resistance mechanisms.

- Ellinor O. Alseth, Elizabeth Pursey & Edze R. Westra
- Article | 23 October 2019

Heterogeneity in old fibroblasts is linked to variability in reprogramming and wound healing

Fibroblasts from old mice are heterogeneous, which affects the ability of these fibroblasts to reprogram into induced pluripotent stem cells in vitro and influences wound healing rate in vivo.

- Salah Mahmoudi, Elena Mancini & Anne Brunet
- Article | 23 October 2019

A glucose-sensing neuron pair regulates insulin and glucagon in *Drosophila*

A pair of glucose-sensing neurons identified in the brain of *Drosophila melanogaster* regulates secretion of adipokinetic hormone and *Drosophila* insulin-like peptide 2, suggesting that these neurons have key roles in maintenance of glucose homeostasis.

- Yangkyun Oh, Jason Sih-Yu Lai & Greg S. B. Suh
- Article | 23 October 2019

VISTA is an acidic pH-selective ligand for PSGL-1

V-domain immunoglobulin suppressor of T cell activation (VISTA) selectively engages P-selectin glycoprotein ligand-1 (PSGL-1) and suppresses T cells at acidic pH similar to those in tumour microenvironments, thereby mediating resistance to anti-tumour immune responses.

- Robert J. Johnston, Linhui Julie Su & Alan J. Korman
- Article | 23 October 2019

Stabilization of chromatin topology safeguards genome integrity

Super-resolution microscopy demonstrates how changes in the 3D organization of chromatin protect DNA against excessive degradation following damage.

- Fena Ochs, Gopal Karemore & Claudia Lukas
- Article | 23 October 2019

Metabolic regulation of gene expression by histone lactylation

The lactylation of lysine residues on histones in mammalian cells is stimulated by hypoxia and bacterial challenges, and increased histone lactylation induces genes involved in wound healing.

- Di Zhang, Zhanyun Tang & Yingming Zhao
- Article | 23 October 2019

Structural basis of species-selective antagonist binding to the succinate receptor

High-resolution crystal structures of the rat succinate receptor SUCNR1 in an inactive conformation, and the humanized rat SUCNR1 bound to an antagonist, provide insights into the structure of these receptors and the species selectivity of antagonist binding.

- Matthias Haffke, Dominique Fehlmann & Veli-Pekka Jaakola

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Europe's incoming research chief must act to head off budget cuts

As Carlos Moedas prepares to leave his post as the European Union's research commissioner, his successor Mariya Gabriel must push for a deal that protects collaboration.

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Beware the UK government's Brexit promises

Government offers of new funds for UK scientists could be unaffordable.

- Editorial | 30 October 2019

Open data could save more tigers

India's government has a duty to give researchers access to the raw data on this threatened species.

World View

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Contract cheating will erode trust in science

To combat academic dishonesty, focus on educational systems and not just individual offenders, says Tracey Bretag.

- Tracey Bretag

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Here come the lightning 'megaflashes'

A new eye in the sky is revealing monster lightning discharges, including a bolt that travelled more than 500 kilometres.

- Research Highlight | 21 October 2019

The giant toad that impersonates a deadly viper to fool predators

Is it a harmless Congolese giant toad? Or a lethal snake?

- Research Highlight | 23 October 2019

Why some songs delight the human brain

A computer model with a musical education helps to reveal the music that many people prefer.

- Research Highlight | 21 October 2019

A bird's ear-splitting shriek smashes the record for loudest song

The male white bellbird's voice is powerful enough to damage the hearing of the female he is trying to woo.

- Research Highlight | 21 October 2019

Humans are drying out Europe's ancient peat bogs

Climate change and peat cutting are altering ecosystems, some of them centuries old.

- Research Highlight | 28 October 2019

Weaponized cells seek and destroy HIV lurking in the body

Approach could allow people infected with HIV to set aside their medication — without risking a resurgence of the virus.

- Research Highlight | 25 October 2019

A ‘quantum knot’ unties itself

For the first time, researchers watch as a knot formed from an ultra-cold gas decays, forming a vortex.

Research

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- News & Views | 28 October 2019

Senescent cells feed on their neighbours

Chemotherapy-treated cancer cells that enter a non-dividing state called senescence can nevertheless boost cancer growth. The finding that these cells eat neighbouring cells reveals a mechanism that enables senescent cells to persist.

- Michael Overholtzer

Collection:

- **Cancer at Nature Research**

- News & Views | 30 October 2019

Ancient air challenges prominent explanation for a shift in glacial cycles

An analysis of air up to 2 million years old, trapped in Antarctic ice, shows that a major shift in the periodicity of glacial cycles was probably not caused by a long-term decline in atmospheric levels of carbon dioxide.

- Eric W. Wolff
- News & Views | 08 October 2019

Bacterial twist to an antiviral defence

The discovery of an antiviral defence system in bacteria that shares some components with a key antiviral defence pathway in animals provides insight into how this important response might have evolved.

- Karen L. Maxwell
- News & Views | 23 October 2019

Teamwork by different T-cell types boosts tumour destruction by immunotherapy

Immunotherapy treatment harnesses CD8 T cells of the immune system to kill tumour cells. The finding that CD4 helper T cells contribute to the success of this treatment in mice might offer a way to improve clinical outcomes.

- Jonathan L. Linehan & Lélia Delamarre

Collection:

- **Cancer at Nature Research**
- News & Views | 30 October 2019

Robust evidence of declines in insect abundance and biodiversity

Data are mounting that document widespread insect losses. A long-term research project now provides the strongest evidence of this so far, and demonstrates the value of standardized monitoring programmes.

- William E. Kunin

Articles

- Article | 30 October 2019

A 100-kiloparsec wind feeding the circumgalactic medium of a massive compact galaxy

Theory predicts that winds expel baryons from galaxies into intergalactic space; now optical observations of the massive, but compact, galaxy SDSS J211824.06+001729.4 show that it is ejecting an enormous ionized outflow of gas.

- David S. N. Rupke, Alison Coil & Paul H. Sell
- Article | 23 October 2019

Braess's paradox and programmable behaviour in microfluidic networks

Microfluidic systems controlled by a single driving pressure are programmed to exhibit complex flow-switching schemes and a fluid analogue of Braess's paradox by exploiting fluid inertia and network design.

- Daniel J. Case, Yifan Liu & Adilson E. Motter
- Article | 30 October 2019

Superconductors, orbital magnets and correlated states in magic-angle bilayer graphene

The fabrication of magic-angle twisted bilayer graphene devices with highly uniform twist angles enables the observation of new superconducting domes, orbital magnets and Chern insulating states.

- Xiaobo Lu, Petr Stepanov & Dmitri K. Efetov
- Article | 30 October 2019
- Polymers with controlled assembly and rigidity made with click-functional peptide bundles**
- Designed tetrameric peptide bundles covalently connected end-to-end yield rigid, semiflexible and kinked chains, as well as hydrogel networks, providing a platform for synthetic biomaterials.

- Dongdong Wu, Nairiti Sinha & Darrin J. Pochan
- Article | 30 October 2019
- Two-million-year-old snapshots of atmospheric gases from Antarctic ice**
- Analysis of two-million-year-old ice from Antarctica provides a direct comparison of atmospheric gas levels before and after the shift from glacial cycles of 100 thousand years to 40-thousand-year cycles around one million years ago.

- Yuzhen Yan, Michael L. Bender & John A. Higgins
- Article | 14 October 2019
- Widespread global increase in intense lake phytoplankton blooms since the 1980s**
- Analyses show that the peak intensity of summertime phytoplankton blooms has increased in 71 large lakes globally over the past three decades, revealing a worldwide exacerbation of bloom conditions.

- Jeff C. Ho, Anna M. Michalak & Nima Pahlevan
- Article | 30 October 2019
- Arthropod decline in grasslands and forests is associated with landscape-level drivers**
- Analyses of a dataset of arthropod biomass, abundance and diversity in grassland and forest habitats in Germany for the period 2008–2017 reveal that drivers of arthropod declines act at the landscape level.

- Sebastian Seibold, Martin M. Gossner & Wolfgang W. Weisser
- Article | 23 October 2019
- Evolution of the new head by gradual acquisition of neural crest regulatory circuits**
- Analysis of gene expression in the neural crest of vertebrate embryos supports the idea that gene regulatory circuits that define the cranial neural crest evolved gradually from a more trunk-like identity.

- Megan L. Martik, Shashank Gandhi & Marianne E. Bronner
- Article | 23 October 2019 | Open Access

One thousand plant transcriptomes and the phylogenomics of green plants

The One Thousand Plant Transcriptomes Initiative provides a robust phylogenomic framework for examining green plant evolution that comprises the transcriptomes and genomes of diverse species of green plants.

- James H. Leebens-Mack, Michael S. Barker & Gane Ka-Shu Wong
- Article | 23 October 2019

Dietary salt promotes cognitive impairment through tau phosphorylation

A high-salt diet in mice induces cognitive impairment through a signalling cascade that culminates in increased phosphorylation of tau.

- Giuseppe Faraco, Karin Hochrainer & Costantino Iadecola
- Article | 18 September 2019

Cyclic GMP–AMP signalling protects bacteria against viral infection

cGAMP signalling in bacteria mediates anti-phage defence, as part of a genetic system suggested to be the ancient ancestor of the animal cGAS–STING innate immune pathway.

- Daniel Cohen, Sarah Melamed & Rotem Sorek
- Article | 23 October 2019

MHC-II neoantigens shape tumour immunity and response to immunotherapy

In a mouse tumour model, immunotherapy-induced rejection of tumour cells requires presentation of both MHC class I and MHC class II antigens, which activate CD4⁺ and CD8⁺ T cells, respectively.

- Elise Alspach, Danielle M. Lussier & Robert D. Schreiber
- Article | 23 October 2019

Engineering orthogonal signalling pathways reveals the sparse occupancy of sequence space

Engineered two-component signalling proteins in *Escherichia coli* have residue specificities different to their parent proteins and are orthogonal to all extant paralogues, demonstrating that sequence space is not densely occupied.

- Conor J. McClune, Aurora Alvarez-Buylla & Michael T. Laub
- Article | 09 October 2019

Recurrent noncoding U1 snRNA mutations drive cryptic splicing in SHH medulloblastoma

Highly recurrent hotspot r.3A>G mutations are identified in U1 splicesomal small nuclear RNAs in about 50% of Sonic hedgehog medulloblastomas, which result in disrupted RNA splicing and the activation of oncogenes.

- Hiromichi Suzuki, Sachin A. Kumar & Michael D. Taylor
- Article | 09 October 2019

The U1 spliceosomal RNA is recurrently mutated in multiple cancers

A highly recurrent A>C somatic mutation in U1 small nuclear RNA, which alters the splicing pattern of genes that include known drivers of cancer, is identified in several types of tumour.

- Shimin Shuai, Hiromichi Suzuki & Lincoln D. Stein
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Alcohol metabolism contributes to brain histone acetylation

Acetate that is produced from the breakdown of alcohol contributes to histone acetylation in the brain, indicating that there is a direct link between alcohol metabolism and gene expression.

- P. Mews, G. Egervari & S. L. Berger
- Article | 23 October 2019

Structural basis for enzymatic photocatalysis in chlorophyll biosynthesis

Crystal structures of cyanobacterial protochlorophyllide oxidoreductases reveal the basis of the photocatalytic activities of this enzyme, through the role of its active site in enabling the light-driven reduction of protochlorophyllide.

- Shaowei Zhang, Derren J. Heyes & Nigel S. Scrutton

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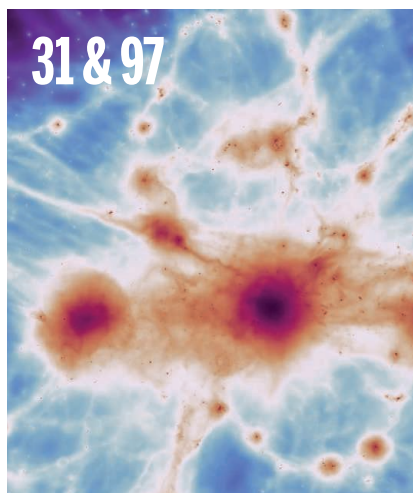
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Human beings are social animals, and language is central to our existence. Both the large human brain and the language it enables have influenced our lives, but which

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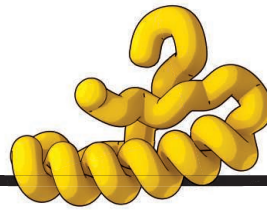
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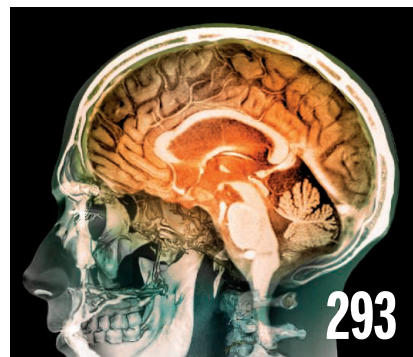
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A colony of the protozoan species *Choanoflagella flexa*. As a choanoflagellate, *C. flexa* is one of the closest living relatives of animals. This species forms cup-shaped colonies that quickly invert

their curvature in response to light-to-dark transitions by undergoing collective cell contractions. This behavior may offer insight into the evolutionary origin of tissue bending in animals. See pages 300 and 326. *Image: Thibaut Brunet (University of California Berkeley)/Howard Hughes Medical Institute)*

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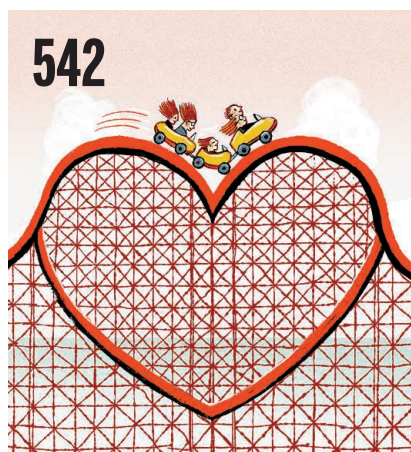
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Earthworms are major components of our world's soils and drive important ecosystem services. However, the main factors affecting their global diversity and abundance have been largely unknown until

now. Climate is the main environmental factor driving earthworm biodiversity patterns, with higher local diversity and abundance occurring in temperate regions. Despite the lower local diversity in the tropics, across the entire region there may be more species overall. See pages 425 and 480.

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Hereditary Thrombotic Thrombocytopenic Purpura

J.A. Kremer Hovinga and J.N. George

N Engl J Med 2019;381:1653-1662

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Calcinosis in Systemic Sclerosis

A. Valido and I. Cordeiro
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Posterior-Wall Myocardial Infarction

A. Briosa e Gala and J. Rawlins
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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Case 33-2019: A 35-Year-Old Woman with Cardiopulmonary Arrest during Cesarean Section

S.N. Bernstein and Others
N Engl J Med 2019;381:1664-1673

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C.M. O'Connor and C. deFilippi
N Engl J Med 2019;381:1675-1676

Clopidogrel Pharmacogenetics — Why the Wait?

D.M. Roden
N Engl J Med 2019;381:1677-1678

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J. Woodcock and P. Marks

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Beta-Blockers in COPD — A Controversy Resolved?

W. MacNee

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R.A. Stern

DOI: 10.1056/NEJMe1912071 | October 21, 2019

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T. Ezashi, D.J. Schust, and L.C. Schulz

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Case 22-2019: A 65-Year-Old Woman with Myopathy



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R.H. Goldstein and R.P. Walensky

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C. Gardner and A. Kleinman

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V.J. Dzau and Others

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M.B. Buntin

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M. Kalra

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S.A. Brown and Others

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Nintedanib in Progressive Fibrosing Interstitial Lung Diseases

K.R. Flaherty and Others

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Gilteritinib or Chemotherapy for Relapsed or Refractory *FLT3*-Mutated AML

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Final Analysis of a Trial of M72/AS01_E Vaccine to Prevent Tuberculosis

D.R. Tait and Others

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Brief Report: Drug-Resistant *E. coli* Bacteremia Transmitted by Fecal Microbiota Transplant

Z. DeFilipp and Others

DOI: 10.1056/NEJMoa1910437 | October 30, 2019

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Discrimination, Abuse, Harassment, and Burnout in Surgical Residency Training

Y.-Y. Hu and Others

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Schizophrenia

S.R. Marder and T.D. Cannon

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Rat Bite Fever

S. Giorgiutti and N. Lefebvre

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Purple Urine after Catheterization

L. Plaçais and C. Denier

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Case 34-2019: A 16-Year-Old Boy with Jaundice

B.K. Alverson, A. Kilcoyne, A.M. Friedmann, and A.R. Sohani

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Toward Automated Insulin Delivery

D. Bruttomesso

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Understanding Progressive Fibrosing Interstitial Lung Disease through Therapeutic Trials

H.J. Goldberg
N Engl J Med 2019;381:1775-1777 | Published Online September 29, 2019

Fecal Microbiota Transplantation for Dysbiosis — Predictable Risks

M.J. Blaser
DOI: 10.1056/NEJMe1913807 | October 30, 2019

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Real-Time Digital Surveillance of Vaping-Induced Pulmonary Disease

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Antibacterial Envelope to Prevent Cardiac Implantable Device Infection

Vitamin D Supplementation and Prevention of Type 2 Diabetes

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Donor Screening for Fecal Microbiota Transplantation

DOI: 10.1056/NEJMc1913670 | October 30, 2019

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Everolimus-Eluting Stents or Bypass Surgery for Left Main Coronary Artery Disease