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Ali D. Malay, Naoyuki Miyazaki[...] & Jonathan G. Heddle

## Nature

Volume 569, Issue 7757, 23 May 2019

1. **Cell competition in the developing mouse epithelium involves apoptosis and engulfment when the epithelium has only one layer, but switches to involve asymmetric cell division and differentiation of ‘loser’ cells as the epithelium becomes stratified.**  
Stephanie J. Ellis, Nicholas C. Gomez[...] & Elaine Fuchs
2. **The original Cancer Cell Line Encyclopedia (CCLE) is expanded with deeper characterization of over 1,000 cell lines, including genomic, transcriptomic, and proteomic data, and integration with drug-sensitivity and gene-dependency data.**  
Mahmoud Ghandi, Franklin W. Huang[...] & William R. Sellers
3. **The authors report a general strategy for in vivo protein activation using light-controlled proximal decaging directed by in silico screening.**  
Jie Wang, Yuan Liu[...] & Peng R. Chen
4. **High-fidelity convergent total synthesis is used to produce Escherichia coli with a 61-codon synthetic genome that uses 59 codons to encode all of the canonical amino acids.**  
Julius Fredens, Kaihang Wang[...] & Jason W. Chin
5. **Observations that molecular gas in NGC 300 is spatially uncorrelated with high-mass stars are attributed to rapid evolution, with molecular clouds quickly destroyed by stellar feedback, and low star-formation efficiency.**  
J. M. Diederik Kruijssen, Andreas Schrub[...] & Ewine F. van Dishoeck
6. **Insights into the thermal and rheological history of Mars are generated by considering the interplay between the thermochemistry of the planet and the orbital evolution of its closest satellite, Phobos.**  
Henri Samuel, Philippe Lognonné[...] & Valéry Lainey
7. **A lanthanum hydride compound at a pressure of around 170 gigapascals is found to exhibit superconductivity with a critical temperature of 250 kelvin.**  
P. Drozdov, P. P. Kong[...] & M. I. Eremets
8. **Two-qubit logic gates in a silicon-based system are shown (using randomized benchmarking) to have high gate fidelities of operation and are used to generate Bell states, a step towards solid-state quantum computation.**  
W. Huang, C. H. Yang[...] & A. S. Dzurak
9. **Evidence of the three-dimensional quantum Hall effect and a magnetic-field-driven quantum phase transition are observed in zirconium pentatelluride crystals.**  
Fangdong Tang, Yafei Ren[...] & Liyuan Zhang
10. **Slow compression of ice at low temperature results in the sequential formation of a series of crystalline phases, challenging theories that connect amorphous ice to supercooled liquid water.**  
Chris A. Tulk, Jamie J. Molaison[...] & Dennis D. Klug



11. **Emissions from eastern China account for approximately 40 to 60 per cent of the global rise in emissions of trichlorofluoromethane (CFC-11), which may be a result of new production and use.**  
M. Rigby, S. Park[...] & D. Young
12. **A continuous, multi-century record of subarctic Atlantic marine productivity shows that a marked decline in net primary productivity has occurred across the subarctic Atlantic basin over the past two centuries.**  
Matthew B. Osman, Sarah B. Das[...] & Eric S. Saltzman
13. **Micro-computed tomography and magnetic resonance imaging of a growth series of the coelacanth *Latimeria chalumnae* traces the ontogeny of the brain and neurocranium, which sheds light on neurocranial evolution in sarcopterygian fishes.**  
Hugo Dutel, Manon Galland[...] & Marc Herbin
14. **Patient data from six clinical trials are used to compare the genomic landscapes of breast cancer metastases with those of primary tumours, revealing an increase in mutational burden and clonal diversity.**  
François Bertucci, Charlotte K. Y. Ng[...] & Fabrice André
15. **The SR-B1 receptor partners with DOCK4 and RAC1 to drive the uptake and transcytosis of LDL in endothelial cells, thereby promoting atherosclerosis in mice.**  
Linzhang Huang, Ken L. Chambliss[...] & Philip W. Shaul
16. **NAD metabolic pathway choice in cancer is largely dependent on the tissue of origin, with implications for the development of precision treatments.**  
Sudhir Chowdhry, Ciro Zanca[...] & Paul S. Mischel
17. **A single-cell approach is used to follow the heritable stochastic changes to DNA methylation that occur in primary chronic lymphocytic leukaemia and healthy B cells, allowing the tracing of cell lineage histories and evolution during treatment with ibrutinib.**  
Federico Gaiti, Ronan Chaligne[...] & Dan A. Landau
18. **An algal TET dioxygenase homologue, CMD1, uses vitamin C as a glycerol donor to modify 5-methylcytosine and helps to regulate gene transcription in response to high light levels.**  
Jian-Huang Xue, Guo-Dong Chen[...] & Guo-Liang Xu

## Nature

Volume 569, Issue 7758, 30 May 2019

1. **Glaciers in the high mountains of Asia provide a uniquely drought-resilient source of water, supplying summer meltwater sufficient for the basic needs of around 200 million people.**  
Hamish D. Pritchard
2. **The Inflammatory Bowel Disease Multi'omics Database includes longitudinal data encompassing a multitude of analyses of stool, blood and biopsies of more than 100 individuals, and provides a comprehensive description of host and microbial activities in inflammatory bowel diseases.**  
Jason Lloyd-Price, Cesar Arze[...] & Curtis Huttenhower
3. **Deep profiling of transcriptomes, metabolomes, cytokines, and proteomes, alongside changes in the microbiome, in samples from individuals with and without prediabetes reveal insights into inter-individual variability and associations between changes in the microbiome and other factors.**  
Wenyu Zhou, M. Reza Sailani[...] & Michael Snyder
4. **In a mouse model of prostate cancer, neural progenitors from the central nervous system that express doublecortin infiltrate tumours and metastases, and can generate new adrenergic neurons in tumours.**  
Philippe Mauffrey, Nicolas Tchitchek[...] & Claire Magnon
5. **In *Saccharomyces cerevisiae*, Ubx2 promotes clearing trapped precursor proteins from the channel of the translocase of the outer membrane, in a translocation-associated degradation pathway that maintains the protein import capacity of mitochondria.**  
Christoph U. Mårtensson, Chantal Priesnitz[...] & Thomas Becker
6. **The merger of two white dwarfs created a massive, hot, luminous, rotating and magnetized star with a lifetime of several thousand years, which will collapse into a type Ic supernova.**  
Vasilii V. Gvaramadze, Götz Gräfenner[...] & Olga I. Spiridonova

7. **The spectrum of Hawking radiation is measured in an analogue black hole composed of rubidium atoms, confirming Hawking's prediction that Hawking radiation is thermal with a temperature given by the surface gravity.**  
Juan Ramón Muñoz de Nova, Katrine Golubkov[...] & Jeff Steinhauer
8. **An array of superconducting qubits in an open one-dimensional waveguide is precisely controlled to create an artificial quantum cavity-atom system that reaches the strong-coupling regime without substantial decoherence.**  
Mohammad Mirhosseini, Eunjong Kim[...] & Oskar Painter
9. **Tactile patterns obtained from a scalable sensor-embedded glove and deep convolutional neural networks help to explain how the human hand can identify and grasp individual objects and estimate their weights.**  
Subramanian Sundaram, Petr Kellnhofer[...] & Wojciech Matusik
10. **An approach in which quaternary centres are leveraged to improve synthetic planning can lead to shorter and optimized syntheses, demonstrated here on a series of polycyclic terpenes.**  
Pengfei Hu, Hyung Min Chi[...] & Scott A. Snyder
11. **The authors identify a role for genome architecture reorganization in anterior dorsal cerebellar vermis granule neurons in learning a conditioned startle paradigm in mice.**  
Tomoko Yamada, Yue Yang[...] & Azad Bonni
12. **Hypoxia in the shoot meristem of Arabidopsis links the regulation of metabolic activity to development by inhibiting proteolysis of a substrate of the N-degron pathway, which controls class-III homeodomain-leucine zipper transcription factors.**  
Daan A. Weits, Alicja B. Kunkowska[...] & Francesco Licausi
13. **A molecular model of STING-mediated signalling is proposed, as structural analysis identifies a crucial motif for the binding of TBK1 to STING, and a separate model involved in IRF-3 binding.**  
Baoyu Zhao, Fenglei Du[...] & Pingwei Li
14. **The authors find that stromal methyltransferase nicotinamide N-methyltransferase (NNMT) regulates the transition of normal fibroblasts to cancer-associated fibroblasts through histone methylation and promotes ovarian cancer growth and metastasis.**  
Mark A. Eckert, Fabian Coscia[...] & Ernst Lengyel
15. **Spatial genome organization into lamina-associated domains is first established in the mouse zygote immediately after fertilization without inheritance from the maternal germline—with the paternal and maternal pronucleus exhibiting different organization, which subsequently converges prior to implantation of the embryo.**  
Máté Borsos, Sara M. Perricone[...] & Jop Kind
16. **MRG-1 indirectly promotes anchoring of chromatin in differentiated intestinal cells in Caenorhabditis elegans by sequestering the histone acetyltransferase CBP-1/p300.**  
Daphne S. Cabianca, Celia Muñoz-Jiménez[...] & Susan M. Gasser

## Nature

Volume 570, Issue 7759, 06 June 2019

1. **The rise of continents and the accumulation of sediments in trenches since about three billion years ago has had a crucial role in the emergence and evolution of plate tectonics on Earth.**  
Stephan V. Sobolev & Michael Brown
2. **Whole-ecosystem manipulations of Caribbean islands occupied by brown anoles, involving the addition of competitors (green anoles) and/or top predators (curly-tailed lizards), demonstrate that predator introductions can alter the ecological niches and destabilize the coexistence of competing prey species.**  
Robert M. Pringle, Tyler R. Kartzinell[...] & Rowan D. H. Barrett
3. **The dopamine projection from midbrain dopamine cells to the nucleus accumbens is essential for normal motivation, yet motivation-related changes in nucleus accumbens dopamine release occur independently of dopamine cell firing.**  
Ali Mohebi, Jeffrey R. Pettibone[...] & Joshua D. Berke
4. **Exome-sequencing analyses of a large cohort of patients with type 2 diabetes and control individuals without diabetes from five ancestries are used to identify gene-level associations of rare variants that are associated with type 2 diabetes.**  
Jason Flannick, Josep M. Mercader[...] & Michael Boehnke

5. **A multi-channel molecular recording technique is applied as a lineage tracer to assemble cell-fate maps from fertilization through gastrulation in the mouse, providing insights into ontogeny in a complex multicellular organism.**  
Michelle M. Chan, Zachary D. Smith[...] & Jonathan S. Weissman
6. **Emission from the 1.3-millimetre hydrogen recombination line reveals a rotating disk of cool gas 0.004 parsecs in radius around the supermassive black hole at the centre of our Galaxy.**  
Elena M. Murchikova, E. Sterl Phinney[...] & Roger D. Blandford
7. **Ultrathin freestanding crystalline films of transition-metal oxide perovskites are fabricated and transferred to various substrates, proving their potential for exploring emergent 2D correlated phases.**  
Dianxiang Ji, Songhua Cai[...] & Xiaoqing Pan
8. **The epitaxial growth of large single-crystal hexagonal boron nitride monolayers on low-symmetry copper foils is demonstrated.**  
Li Wang, Xiaozhi Xu[...] & Kaihui Liu
9. **The stability of both colloidal quantum dots and perovskites can be improved by combining them into a hybrid material in which matched lattice parameters suppress the formation of undesired phases.**  
Mengxia Liu, Yuelang Chen[...] & Edward H. Sargent
10. **Synchrotron Mössbauer source spectroscopy is used to reveal that haematite remains magnetic in cold subducting slabs at the depth of the transition zone in the Earth's mantle, with implications for the locations of magnetic poles during inversions of the Earth's magnetic field.**  
Kupenko, G. Aprilis[...] & C. Sanchez-Valle
11. **Lineage tracing, biophysical modelling and intestinal transplantation approaches are used to demonstrate that, in the mouse fetal intestinal epithelium, cells are highly plastic with respect to cellular identity and, independent of LGR5 expression and cell position, can contribute to the adult stem cell compartment.**  
Jordi Guiu, Edouard Hannezo[...] & Kim B. Jensen
12. **Disruption of the CARMA1–BCL10–MALT1 (CBM) signalosome causes Treg cells to produce IFN $\gamma$  and develop dominant anti-tumour activity in synergy with anti-PD-1 treatment, and in the absence of autoimmunity.**  
Mauro Di Pilato, Edward Y. Kim[...] & Thorsten R. Mempel
13. **A common aneuploidy gene-expression signature is identified in yeast that is suggestive of hypo-osmotic stress, and which leads to cells that exhibit increased plasma-membrane stress and impaired endocytosis.**  
Hung-Ji Tsai, Anjali R. Nelli[...] & Rong Li
14. **A screen of 23 transcriptional cofactors for their ability to activate 72,000 candidate core promoters in *Drosophila melanogaster* identified distinct compatibility groups, providing insight into mechanisms that underlie the selective activation of transcriptional programs.**  
Vanja Haberle, Cosmas D. Arnold[...] & Alexander Stark

## Nature

Volume 570, Issue 7760, 13 June 2019

1. **Analyses of 34 ancient genomes from northeastern Siberia, dating to between 31,000 and 600 years ago, reveal at least three major migration events in the late Pleistocene population history of the region.**  
Martin Sikora, Vladimir V. Pitulko[...] & Eske Willerslev
2. **Fine-scale estimates of the prevalence of HIV in adults across sub-Saharan Africa reveal substantial within-country variation and local differences in both the direction and rate of change in the prevalence of HIV between 2000 and 2017.**  
Laura Dwyer-Lindgren, Michael A. Cork[...] & Simon I. Hay
3. **Cryo-electron microscopy and mutation experiments demonstrate that the inactive SHMT2 dimer—and not the pyridoxal-5'-phosphate-bound tetramer—binds to BRISC, which reveals a mechanism for the regulation of deubiquitylases and inflammatory signalling.**  
Miriam Walden, Lei Tian[...] & Elton Zeqiraj
4. **Experiment overturns Bohr's view of quantum jumps, demonstrating that they possess a degree of predictability and when completed are continuous, coherent and even deterministic.**  
Z. K. Mineev, S. O. Mundhada[...] & M. H. Devoret

5. **Bose–Einstein condensates are transported at hypersonic speeds over a distance of 15 cm in a neutral-atom accelerator ring while preserving their internal coherence.**  
Saurabh Pandey, Hector Mas[...] & Wolf von Klitzing
6. **Recombination of excitons to produce molecular light emission is made more efficient by controlling electron spin within the molecule to produce spin-triplet excitons only, without the usual accompanying spin-singlet excitons.**  
Kensuke Kimura, Kuniyuki Miwa[...] & Yousoo Kim
7. **Unstructured light controls the elastic monopole moments of nematic liquid-crystal colloidal particles and switches them to quadrupoles, with like-charged monopoles attracting and oppositely charged ones repelling, enabling reconfigurable dynamic self-assembly.**  
Ye Yuan, Qingkun Liu[...] & Ivan I. Smalyukh
8. **A hydrolytic enzyme with a non-canonical organocatalytic mechanism was generated by introducing Nd-methylhistidine into a designed active site using engineered translation components, allowing optimization of enzyme performance using laboratory evolution.**  
Ashleigh J. Burke, Sarah L. Lovelock[...] & Anthony P. Green
9. **Isotope data from polar firn and ice are used to constrain the increase in tropospheric ozone between 1850 and 2005 ad.**  
Laurence Y. Yeung, Lee. T. Murray[...] & Jérôme Chappellaz
10. **Broadening activation energy distributions and increasing radiocarbon ages reveal the global importance of mineral protection in promoting organic carbon preservation.**  
Jordon D. Hemingway, Daniel H. Rothman[...] & Valier V. Galy
11. **Morphological, ultrastructural and spectroscopic analyses identify a fungal affinity for microfossils in shale from Arctic Canada, which pushes back the date for this kingdom to 1,010–890 million years ago.**  
Corentin C. Loron, Camille François[...] & Emmanuelle J. Javaux
12. **DNA analysis of ancient individuals and modern populations suggests that the population history of North America can be explained by the admixture of two ancestral lineages—Palaeo-Eskimos and First Peoples.**  
Pavel Flegontov, N. Ezgi Altinisik[...] & Stephan Schiffels
13. **The RNA-cleaving Cas13 degrades both host and bacteriophage transcripts, thereby rendering infected cells dormant and broadly resistant to phage-mediated lysis.**  
Alexander J. Meeske, Sandra Nakandakari-Higa & Luciano A. Marraffini
14. **Distinct subsets of fibroblasts, which differ in their expression of thymus cell antigen 1 (THY1), are responsible for inflammation and tissue damage in mouse models of arthritis.**  
Adam P. Croft, Joana Campos[...] & Christopher D. Buckley
15. **The cryo-electron microscopy structure of the bacteriophage  $\phi$ 6 dsRNA genome shows that the genome is packaged in a spooled manner that is more similar to dsDNA viruses than to other dsRNA viruses.**  
Serban L. Ilca, Xiaoyu Sun[...] & Juha T. Huiskonen
16. **Cryo-electron microscopy structures of the herpesvirus capsid including the viral genome reveal ordered DNA structures and structural features of the capsid that suggest possible mechanisms for viral genome encapsidation.**  
Yun-Tao Liu, Jonathan Jih[...] & Z. Hong Zhou

## Nature

Volume 570, Issue 7761, 20 June 2019

1. **Measurements collected during recent polynya events in the Southern Ocean reveal that these sea ice openings formed as a result of weakened stratification and severe storms and were sustained by deep overturning.**  
Ethan C. Campbell, Earle A. Wilson[...] & Lynne D. Talley
2. **The CRISPR–Cas9-mediated generation of germline-transmissible mutations of SHANK3 in cynomolgus macaques (*Macaca fascicularis*) forms the basis of a non-human-primate model of autism spectrum disorder and Phelan–McDermid syndrome.**  
Yang Zhou, Jitendra Sharma[...] & Shihua Yang
3. **Single-cell transcriptomics from 48 individuals with varying degrees of Alzheimer’s disease pathology demonstrates that gene-expression changes in Alzheimer’s disease are both cell-type specific and shared, and that transcriptional responses show sexual dimorphism.**  
Hansruedi Mathys, Jose Davila-Velderrain[...] & Li-Huei Tsai

4. **A cryo-electron microscopy structure of human NLRP3 in complex with the mitotic kinase NEK7 provides insights into the interactions that mediate the activation of the NLRP3 inflammasome.**  
Humayun Sharif, Li Wang[...] & Hao Wu
5. **Perfect transmission of electrons through a finite potential barrier between a normal metal and a topological superconducting state is demonstrated, as evidenced by an exact doubling of conductance in point contact measurements.**  
Seunghun Lee, Valentin Stanev[...] & Ichiro Takeuchi
6. **A bulk photovoltaic effect is observed in devices based on tungsten disulfide, and is enhanced if the devices take the form of polar nanotubes, showing the importance of reducing crystal symmetry to a polar structure in achieving higher efficiencies.**  
Y. J. Zhang, T. Ideue[...] & Y. Iwasa
7. **A tunable interlayer twist that evolves naturally during synthesis of van der Waals nanowires made from layered crystals of germanium sulfide could produce new electronic structure and correlation phenomena.**  
Peter Sutter, Shawn Wimer & Eli Sutter
8. **Experiments demonstrate a class of van der Waals nanowires, made from layered crystals of the semiconductor germanium sulfide, in which a tunable interlayer twist evolves naturally during synthesis.**  
Yin Liu, Jie Wang[...] & Jie Yao
9. **Standing-wave optics can be used to control microfibril and cavity formation in polymer films and the resulting porous layered structures can produce tunable structural colour, enabling inkless 'printing' of images.**  
Masateru M. Ito, Andrew H. Gibbons[...] & Easan Sivaniah
10. **Numerical modelling of rotating turbulent convective flows shows that the length scale of convection in planetary cores is set by the flow speed and not by the fluid viscosity.**  
Céline Guervilly, Philippe Cardin & Nathanaël Schaeffer
11. **Seafloor-derived planktonic foraminifera communities of pre-industrial age are compared with communities from sediment-trap time series and show that Anthropocene communities of a globally distributed zooplankton group differ from their unperturbed pre-industrial state.**  
Lukas Jonkers, Helmut Hillebrand & Michal Kucera
12. **Population genetic modelling shows that mate preferences encoded on sex chromosomes can drive the evolution of extremely male-costly traits.**  
Pavitra Muralidhar
13. **An in situ hybridization approach is used to visualize mitochondrial DNA germline selection in *Drosophila*, revealing the role of mitochondrial fragmentation in the selection against deleterious mutations.**  
Toby Lieber, Swathi P. Jeedigunta[...] & Thomas R. Hurd
14. **Analyses of fragmentation patterns of cell-free DNA in the blood of patients with cancer and healthy individuals using a machine learning algorithm provide a proof-of-principle approach for the early detection and screening of human cancer.**  
Stephen Cristiano, Alessandro Leal[...] & Victor E. Velculescu
15. **Proteins designed de novo by players of the online protein-folding game Foldit can be expressed in *Escherichia coli* and adopt the designed structure in solution.**  
Brian Koepnick, Jeff Flatten[...] & David Baker
16. **Attractions between heterochromatic regions are essential for phase separation of the active and inactive genome in inverted and conventional nuclei, whereas chromatin-lamina interactions are necessary to build the conventional genomic architecture from these segregated phases.**  
Martin Falk, Yana Feodorova[...] & Leonid A. Mirny
17. **A time-resolved cryo-electron microscopy approach is used to visualize, at near-atomic resolution and on a sub-second timescale, short-lived intermediate states of a fundamental biomolecular reaction.**  
Sandip Kaledhonkar, Ziao Fu[...] & Joachim Frank

- 1. Analysis of forest-management studies finds that forest removal is more likely to increase streamflow in areas with greater water storage between the surface and bedrock, and that forest planting is more likely to decrease streamflow in drier climates.**  
Jaivime Evaristo & Jeffrey J. McDonnell
- 2. High-throughput genetic analyses combined with mass spectrometry reveal that the gene products of diverse human gut bacteria affect a wide range of oral drugs, as well as drug metabolism in mice.**  
Michael Zimmermann, Maria Zimmermann-Kogadeeva[...] & Andrew L. Goodman
- 3. The immunogen RC1 facilitates recognition of the V3-glycan patch on the envelope of HIV-1 and elicits specific serological responses in mice and macaques, making it a possible priming immunogen for sequential vaccination strategies in humans.**  
Amelia Escolano, Harry B. Gristick[...] & Michel C. Nussenzweig
- 4. Analysis of growth dynamics in a dataset from 107 patients with chronic lymphocytic leukaemia (CLL) reveals both exponential and logistic patterns of growth, which are associated with differences in genetic attributes and clinical outcomes.**  
Michaela Gruber, Ivana Bozic[...] & Catherine J. Wu
- 5. A parametrically driven 30-micrometre-long silicon nanostring oscillator emits stationary path-entangled microwave radiation, squeezing the joint field operators of two thermal modes by 3.4 decibels below the vacuum level.**  
S. Barzanjeh, E. S. Redchenko[...] & J. M. Fink
- 6. A machine-learning approach is used to train artificial neural networks to analyse experimental scanning tunnelling microscopy image arrays of quantum materials.**  
Yi Zhang, A. Mesaros[...] & Eun-Ah Kim
- 7. Sustained flight of an insect-sized flapping-wing aerial vehicle weighing just 259 milligrams that does not need to fly tethered to an off-board power supply is demonstrated.**  
Noah T. Jafferis, E. Farrell Helbling[...] & Robert J. Wood
- 8. A copper oxide high-temperature superconductor magnet generates a direct-current magnetic field of 45.5 tesla—the highest value reported so far—using a design that enables operation at high current densities.**  
Seungyong Hahn, Kwanglok Kim[...] & David C. Larbalestier
- 9. Atomic electron tomography captures crystal nucleation in four dimensions in FePt nanoparticles, with the observed early-stage nucleation not consistent with classical nucleation theory.**  
Jihan Zhou, Yongsoo Yang[...] & Jianwei Miao
- 10. A protocol for the electrochemical reduction of nitrogen to ammonia enables isotope-sensitive quantification of the ammonia produced and the identification and removal of contaminants.**  
Suzanne Z. Andersen, Viktor Colic[...] & Ib Chorkendorff
- 11. Two-photon calcium imaging of a large population of dopamine neurons in the ventral tegmental area of mice performing a virtual-reality navigation task reveals the organization principles of the dopamine system.**  
Ben Engelhard, Joel Finkelstein[...] & Ilana B. Witten
- 12. Genetic analyses of ancestrally diverse populations show evidence of heterogeneity across ancestries and provide insights into clinical implications, highlighting the importance of including ancestrally diverse populations to maximize genetic discovery and reduce health disparities.**  
Genevieve L. Wojcik, Mariaelisa Graff[...] & Christopher S. Carlson
- 13. Comparison of transcriptomes, cell fates and behaviour of three primary cell types from the sponge *Amphimedon queenslandica* with choanoflagellates and other unicellular holozoans suggests that the first animal cells transitioned between multiple states.**  
Shunsuke Sogabe, William L. Hatleberg[...] & Bernard M. Degnan
- 14. Single-cell RNA-sequencing analysis demonstrates that individual human brain organoids generate the cellular diversity of the cerebral cortex with organoid-to-organoid variability that is comparable to that of individual endogenous brains.**  
Silvia Velasco, Amanda J. Kedaigle[...] & Paola Arlotta
- 15. Group 3 innate lymphoid cells are recruited to the lung and involved in the immune response to infection with tuberculosis in humans and mice, as a reduction in group 3 innate lymphoid cells in the lung impaired early immune control of *Mycobacterium tuberculosis* in mice.**

Amanda Ardain, Racquel Domingo-Gonzalez[...] & Shabaana A. Khader

- 16. A synthetic gene circuit implementing an integral feedback topology is shown to achieve robust perfect adaptation in living cells--mathematical analysis proves this topology is necessary for adaptation in networks with noisy dynamics.**

Stephanie K. Aoki, Gabriele Lillacci[...] & Mustafa Khammash

- 17. Cryo-electron microscopy structures of the yeast 60S ribosomal subunit in complex with Vms1 provides insights into the roles of proteins in the ribosome-associated quality control pathway.**

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## **Outlook on Agriculture**

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