



COVER

Detail from *The Last Automat III* by Max Ferguson. Sluggish operation of the reward circuitry in the brain may lead individuals to eat calorie-dense foods (such as pie) to try to compensate, placing them at risk for obesity. See page 449.

Image: The Last Automat III, 2003 (oil on panel); Max Ferguson/Bridgeman Art Library/Getty Images

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Cell Signaling

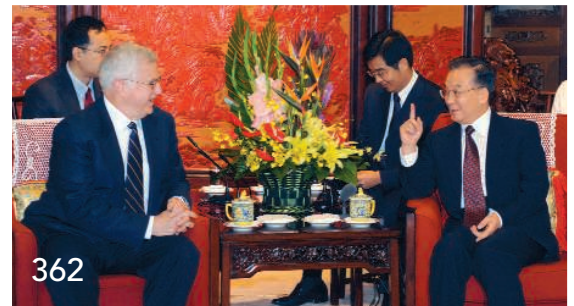
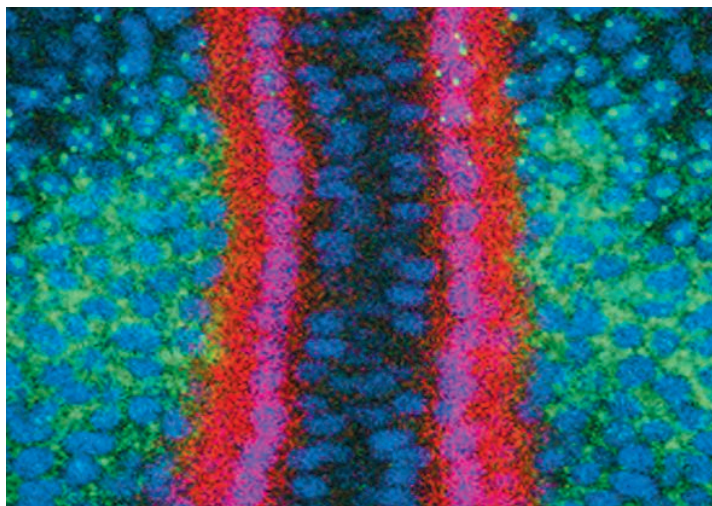
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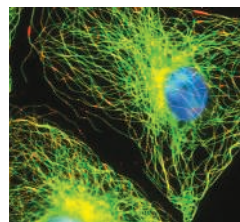
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BIOCHEMISTRY

Structure and Molecular Mechanism of a Nucleobase-Cation-Symport-1 Family Transporter

S. Weyand et al.

The structure of a membrane transporter in an open state suggests that in- and out-facing cavities reciprocally open and close coordinated by two transmembrane segments.

10.1126/science.1164440

ASTRONOMY

The Fermi Gamma-Ray Space Telescope Discovers the Pulsar in the Young Galactic Supernova Remnant CTA 1

G. Kanbach et al.

The Fermi Space Telescope has detected a gamma-ray pulsar associated with a young supernova remnant, implying that such stars may be unidentified gamma-ray sources.

10.1126/science.1165572

CELL BIOLOGY

Detection of GTP-Tubulin Conformation in Vivo Reveals a Role for GTP Remnants in Microtubule Rescues

A. Dimitrov, M. Quesnoit, S. Moutel, I. Cantaloube, C. Poüs, F. Perez

GTP-bound tubulin is found at microtubule ends in living cells and also within microtubules, where it may promote repolymerization and avert microtubule collapse.

10.1126/science.1165401

ASTRONOMY

Observation of Pulsed γ -Rays Above 25 GeV from the Crab Pulsar with MAGIC

The MAGIC Collaboration

The MAGIC telescope has detected higher-energy, pulsed gamma rays from the Crab pulsar and a threshold suggesting that they are emitted from the outer magnetosphere.

10.1126/science.1164718

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Reanalysis of archived samples of an experiment simulating production of organic molecules in volcanic gases by lightning shows that they contain many amino acids. >> Science Podcast

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Revealed by an Epistasis Map in Fission Yeast

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Comparison of genetic wiring in two types of yeast reveals that protein complexes are conserved, but the interactions between them can change radically between species.

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Current-Induced Spin-Wave Doppler Shift 410

V. Vlaminck and M. Bailleul

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Manipulation Using Atomic Force Microscopy

Y. Sugimoto et al.

Atoms of tin and silicon are reversibly and controllably exchanged between the tip of an atomic force microscope and a substrate, allowing atomic patterning of a surface.

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Hydrocarbons and Targeted Liquid-Fuel Classes

E. L. Kunkes et al.

A set of two reactors, one that breaks down biomass sugars and a second that directs chain formation, can synthesize various hydrocarbon fuels.

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 The shift of water nuclear magnetic resonance peaks relative to those of lipids provides an accurate thermometer of internal temperatures, for example, in a mouse.

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Molecular Layering of Fluorinated Ionic Liquids at a Charged Sapphire (0001) Surface 424
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 Reflections of high-energy x-rays reveal that when in contact with a sapphire surface, and likely other surfaces, an ionic liquid forms alternating layers of cations and anions.

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 Two small, weakly bound objects in the outer solar system orbit each other more than 100,000 kilometers apart, a distance that challenges ideas for how such binaries form.

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M. D. Wilson et al.
 An aneuploid mouse carrying a human chromosome shows that genetic sequence can dominate epigenetic, cellular, and organismal effects in determining transcriptional regulation and gene expression.
 >> *Perspective p. 380*

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Surface Sites for Engineering Allosteric Control in Proteins 438
J. Lee et al.
 Two allosterically regulated proteins can be engineered to interact so that when light activates one, it triggers the enzymatic output (dihydrofolate reductase) of the other.

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P. J. Choi, L. Cai, K. Frieda, X. S. Xie
 A stochastic process, in which a regulatory repressor dissociates from either one or two DNA sites, determines which of two phenotypes is seen in genetically identical bacteria.

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Remeasuring the Double Helix 446
R. S. Mathew-Fenn, R. Das, P. A. B. Harbury
 Pieces of DNA in solution are much softer than DNA under tension and unexpectedly stretch large amounts over several helical turns.

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Relation Between Obesity and Blunted Striatal Response to Food Is Moderated by Taq1A A1 Allele 449
E. Stice, S. Spoor, C. Bohon, D. M. Small
 Individuals whose reward centers of the brain respond sluggishly after eating prefer calorie-dense foods, which may account for their greater propensity to gain weight. >> *Science Podcast*

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Innate Immunity in *Caenorhabditis elegans* Is Regulated by Neurons Expressing NPR-1/GPCR 460
K. L. Styer et al.
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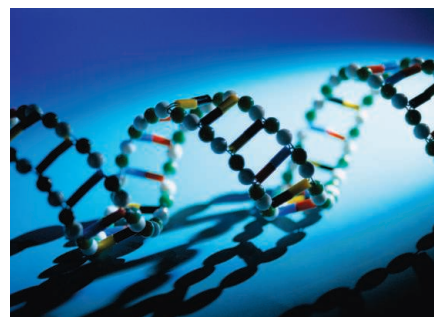
Scientists parse four species of earthworm from one, despite similarities in appearance.

Unconscious Brain Still Registers Pain

Some brain-injury patients may be hurting even if they can't show it.

The Come-Hither Voice

Pitch of a woman's voice rises during ovulation.



Building a synthetic biology career.

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Special Feature: Opportunities in Synthetic Biology

E. Pain

Synthetic biology may be in its infancy, but the field is growing rapidly and gaining support. >> [Science Podcast](#)

Getting Ready for Synthetic Biology

E. Pain

Synthetic biology offers new opportunities for scientists willing to challenge their ways of thinking and doing research.

A Multidisciplinary Approach to Life

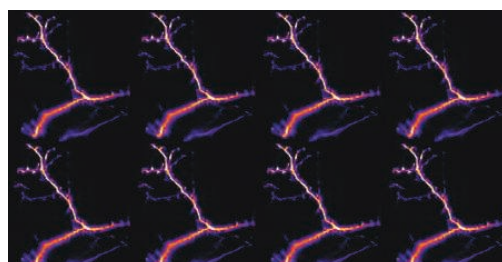
E. Pain

A microbiologist, a mechanical engineer, and a chemist tell *Science Careers* how they ended up in synthetic biology.

Science Careers Podcast

K. Travis

Hear three scientists talk about their career paths and the future of synthetic biology research.



VILIP1 interacts with P2X2 receptors in dendrites.

SCIENCE SIGNALING

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RESEARCH ARTICLE: Regulation of P2X2 Receptors by the Neuronal Calcium Sensor VILIP1

S. Chaumont, V. Compan, E. Toulme, E. Richler, G. D. Housley, F. Rassendren, B. S. Khakh

Optics and electrophysiology reveal the dynamics of an ATP-gated ion channel signaling complex.

RESEARCH ARTICLE: BDNF Selectively Regulates GABA_A Receptor Transcription by Activation of the JAK/STAT Pathway

I. V. Lund, Y. Hu, Y. H. Raol, R. S. Benham, R. Faris, S. J. Russek, A. R. Brooks-Kayal

Brain-derived neurotrophic factor regulates a GABA receptor subunit through the repressor ICER.

PERSPECTIVE: Acetylation of MKP-1 and the Control of Inflammation

H. Chi and R. A. Flavell

Toll-like receptor signaling is inhibited by acetylated MKP-1, a mitogen-activated protein kinase phosphatase.

PREVIEW

Get a sneak peek at articles coming up in the 21 October issue related to this week's *Science* special issue on cell signaling.

>> [Cell Signaling section p. 389](#) and www.sciencemag.org/cellsignaling08/

SCIENCE PODCAST

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