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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### 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

### LETTERS

**Quantifying Coauthor Contributions**
C. H. Sekercioglu

**Biofuels: Clarifying Assumptions**
V. Khosla

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### BOOKS ET AL.

**Fixing Climate**
What Past Climate Changes Reveal About the Current Threat—and How to Counter It
W. S. Broecker and R. Kunzsig, reviewed by K. Caldeira

**Earth: The Sequel**
The Race to Reinvent Energy and Stop Global Warming
F. Krupp and M. Horn, reviewed by F. T. Manheim

**Uncle Phil and the Atomic Bomb**
J. Abelson and P. H. Abelson, reviewed by C. T. Prewitt

**La forêt danse** (The Dancing Forest)
B. Lainé

### POLICY FORUM

When Embryonic Stem Cell Lines Fail to Meet Consent Standards
J. Sugarman and A. W. Siegel

### PERSPECTIVES

**It’s the Sequence, Stupid!**
H. A. Coller and L. Kruglyak

**In Praise of Pores**
P. Colombo

**Toward Pore-Free Ceramics**
G. L. Messing and A. J. Stevenson

**Transforming Light**
V. M. Shalaev

**A New Spin on the Doppler Effect**
R. D. McMichael and M. D. Stiles

**RNA Computing in a Living Cell**
E. Shapiro and B. Gil

### GEOCHEMISTRY

**The Miller Volcanic Spark Discharge Experiment**
A. P. Johnson et al.

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](http://science.sciencemag.org/)

### GENETICS

**Conservation and Rewiring of Functional Modules Revealed by an Epistasis Map in Fission Yeast**
A. Roguev et al.

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.

### PHYSICS

**Current-Induced Spin-Wave Doppler Shift**
V. Vlaminck and M. Bailleul

A current-induced shift in the frequency of propagating spin waves provides a simple technique to probe spin-polarized currents in engineering spintronic devices. [>> Perspective p. 386](http://science.sciencemag.org/)

### CHEMISTRY

**Catalytic Conversion of Biomass to Monofunctional 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.
**REPORTS CONTINUED...**

**CHEMISTRY**

Accurate Temperature Imaging Based on Intermolecular Coherences in Magnetic Resonance

G. Galiana, R. T. Branco, E. R. Jenista, W. S. Warren

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.

**CHEMISTRY**

Molecular Layering of Fluorinated Ionic Liquids at a Charged Sapphire (0001) Surface

M. Mezger et al.

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.

**MATERIALS SCIENCE**

Evolution of Block Copolymer Lithography to Highly Ordered Square Arrays

C. Tang et al.

The addition of hydrogen bonding units to two block copolymers leads to a template with square patterns that can be used for manufacturing integrated circuits.

**PLANETARY SCIENCE**

The Extreme Kuiper Belt Binary 2001 QW$_{32}$

J.-M. Petit et al.

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.

**GENETICS**

Species-Specific Transcription in Mice Carrying Human Chromosome 21

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.

**BIOCHEMISTRY**

Surface Sites for Engineering Allosteric Control in Proteins

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.

**BIOCHEMISTRY**

A Stochastic Single-Molecule Event Triggers Phenotype Switching of a Bacterial Cell

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.

**BIOCHEMISTRY**

Remeasuring the Double Helix

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.

**NEUROSCIENCE**

Relation Between Obesity and Blunted Striatal Response to Food Is Moderated by TagI A1 Allele

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

**CELL BIOLOGY**

Phosphorylation Networks Regulating JNK Activity in Diverse Genetic Backgrounds

C. Bakal et al.

Data from an RNA interference screen, combined with genetic interaction analysis, allow construction of a comprehensive kinase cellular signaling network in Drosophila.

**CELL BIOLOGY**

Higher-Order Cellular Information Processing with Synthetic RNA Devices

M. N. Win and C. D. Smolke

The intrinsic ribozyme of a simple RNA-based Boolean logic device that can be engineered into cells is activated when it is bound by two particular molecules. >> Perspective p. 387

**IMMUNOLOGY**

Innate Immunity in Caenorhabditis elegans Is Regulated by Neurons Expressing NPR-1/GPCR

K. L. Styer et al.

In the worm Caenorhabditis elegans, sensory neurons surprisingly can inhibit innate immune responses, in part through the mitogen-activated protein kinase (MAPK) signaling pathway.
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Don’t Judge a Worm by Its Color
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.

VILIP1 interacts with P2X2 receptors in dendrites.

SCIENCE SIGNALING
www.sciencesignaling.org
THE SIGNAL TRANSDUCTION KNOWLEDGE ENVIRONMENT
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 GABAA Receptor Transcription by Activation of the JAK/STAT Pathway
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/

Building a synthetic biology career.

SCIENCE CAREERS
www.sciencecareers.org/career_development
FREE CAREER RESOURCES FOR SCIENTISTS
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.

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