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### CHEMISTRY

**Linked Reactivity at Mineral-Water Interfaces Through Bulk Crystal Conduction**  
*S. V. Yanina and K. M. Rosso*

A current flow through a hematite crystal couples dissolution and growth reactions at different surfaces, a finding likely relevant to a broad range of semiconducting minerals.  
10.1126/science.1154833

### PHYSICS

**Frequency Ratio of Al⁺ and Hg⁺ Single-Ion Optical Clocks; Metrology at the 17th Decimal Place**  
*T. Rosenband et al.*

Precise measurements of the frequency ratio of two optical clocks indicate that the fine-structure constant is fine and constant to an uncertainty of 10⁻¹⁷.  
10.1126/science.1154622

### MEDICINE

**Oncogenic CARD11 Mutations in Human Diffuse Large B Cell Lymphoma**  
*G. Lenz et al.*

One type of non-Hodgkin’s lymphoma is caused by mutations in a scaffolding protein that inappropriately activate an inflammatory signaling pathway.  
10.1126/science.1153629

### GEOCHEMISTRY

**Comment on “Early Archaean Microorganisms Preferred Elemental Sulfur, Not Sulfate”**  
*H. Bao, T. Sun, I. Kohl, Y. Peng*

Response to Comment on “Early Archaean Microorganisms Preferred Elemental Sulfur, Not Sulfate”  
*P. Philippot et al.*

Full text at [www.sciencemag.org/cgi/content/full/319/5868/1336b](http://www.sciencemag.org/cgi/content/full/319/5868/1336b)

### ECOLOGY

**Dimethylsulfoniopropionate as a Foraging Cue for Reef Fishes**  
*J. L. DeBose, S. C. Lema, G. A. Nevitt*

Reef fish locate desirable feeding opportunities by recognizing dimethylsulfoniopropionate, which is released by coral reef algae in response to foraging by fish.

### PSYCHOLOGY

**Antisocial Punishment Across Societies**  
*B. Herrmann, C. Thöni, S. Gächter*

Retaliation against those who enforce the social norms of civic cooperation and rule of law varies among cultures and is more pronounced where social norms are weaker.  
>> Perspective p. 1345

### CLIMATE CHANGE

**Long-Term Sea-Level Fluctuations Driven by Ocean Basin Dynamics**  
*R. D. Müller, M. Sdrolias, C. Gaina, B. Steinberger, C. Heine*

Considering changes in the shape of the ocean basins implies that global sea level fell by ~250 meters since 140 to 80 million years ago, a larger drop than implied in a recent study.

### PHYSICS

**Fiber-Optical Analog of the Event Horizon**  
*T. G. Philbin et al.*

An optical analog of the event horizon of a gravitational black hole can be produced with light pulses propagating along an optical fiber, providing a tractable experimental system.  
>> News story p. 1321
A drug for controlling cholesterol may be useful as an antibiotic because of unexpected structural similarities among critical proteins.

C.-I. Liu

Staphylococcus aureus

A Cholesterol Biosynthesis Inhibitor Blocks Growth Hormone Auxin Triggers its Degradation

H. Szemenyei, M. Hannon, J. A. Long

Repression During TOPLESS Mediates Auxin-Dependent Transcriptional Pathways and May Contribute to Diabetes

R. Dentin, S. Hedrick, J. Xie, J. Yates III, M. Montminy

Competing Glycosylation and Phosphorylation of a Single Amino Acid in a Transcriptional Coactivator Regulate Nutrient- and Energy-Sensing Pathways and May Contribute to Diabetes

C. McNamara

Streptococcus Coiled-Coil Irregularities and Instabilities in Group A Streptococcus M1 Are Required for Virulence

A. Kong et al.

A variant of a human gene associated with high rates of recombination in males and low rates in females is an ortholog of a nematode gene essential for recombination.

High-resolution Mapping of Crossovers Reveals Extensive Variation in Fine-Scale Recombination Patterns Among Humans

G. Coop, X. Wen, C. Ober, J. K. Pritchard, M. Przeworski

High-density genotyping of individuals from 82 families shows unexpected variation in the number of meiotic crossovers and in the relative activity of recombination hotspots.

Sequence Variants in the RNF212 Gene Associate with Genome-Wide Recombination Rate

A. Kong et al.

Mutating a cell-surface virulence protein on strep bacteria stabilizes its structure, minimizing its inflammatory side effects and potentially making it a better vaccine.

A rubbery polymer coated with nanofibers that segregate upon addition of a solvent can rapidly stiffen and relax, like the inner skin of a sea cucumber.

J. R. Capadona et al.

A drug for controlling cholesterol may be useful as an antibiotic because of unexpected structural similarities among critical proteins.

P. M. Winkler et al.

Experiments mimicking aerosol formation show that organic vapors tend to condense on any nanometer-scale particles, particularly negatively charged ones, rather than forming pure nuclei.

V. Polyak, C. Hill, Y. Asmerom

Dating of cave deposits that form at the water table implies that incision of the Grand Canyon began in the west 17 million years ago and only accelerated in the east recently.

G. H. Jones et al.

Observations of a large shadow in electrons and particles behind Rhea imply that it has a small ring system formed from dust lofted into orbit by impacts.

H. Szemenyei, M. Hannon, J. A. Long

A transcriptional co-repressor is part of the protein complex that inhibits developmental gene activation in Arabidopsis until the growth hormone auxin triggers its degradation.

L. Jiang et al.

A computationally designed enzyme acts as a retro-aldolase that splits a carbon-carbon bond in a nonnatural substrate.

A drug for controlling cholesterol may be useful as an antibiotic for multi-drug-resistant Staphylococcus because of unexpected structural similarities among critical proteins.

J. R. Capadona et al.

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A drug for controlling cholesterol may be useful as an antibiotic for multi-drug-resistant Staphylococcus because of unexpected structural similarities among critical proteins.
EXTRACELLULAR MATRIX STIFFNESS REGULATES THE EQUILIBRIUM BETWEEN STORAGE AND RELEASE OF MATRIX-BOUND TGF-β.

R. G. Wells and D. E. Discher

Extracellular matrix stiffness regulates the equilibrium between storage and release of matrix-bound transforming growth factor–β.

GLOSSARY

Find out what MVE, SFRP, and LCR mean in the world of cell signaling.
Science 319 (5868), 1303-1414.