COVER
False-color image of a section of the Semarkona meteorite. The round objects are chondrules; the large one near the bottom center is about 2 millimeters across. Magnesium-rich minerals (olivine and pyroxene) appear red, sodium-rich glass appears yellow, and the iron-rich material surrounding the chondrules includes matrix (greenish) and sulfides, metal, and oxides (blue). The sodium in the glass suggests that the chondrules formed in extremely dusty environments in the early solar system. See page 1617.
Image: Jeffrey Grossman/USGS

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Drugs, Industry, and Academia by Garret A. FitzGerald

PERSPECTIVES continued >>
High-Resolution Greenland Ice Core Data Show Abrupt Climate Change Happens in Few Years
J. P. Steffensen et al.
Greenland’s climate flipped to a different state within 1 to 3 years more than once during the last deglaciation.
10.1126/science.1157707

Censoring of Autoreactive B Cell Development by the Pre-B Cell Receptor
R. A. Keenan et al.
A protein that helps newly rearranged antibody chains arrive at the cell surface of immature immune cells is found to help delete cells with potential autoreactivity.
10.1126/science.1157533

Comment on “Athabasca Valles, Mars: A Lava-Draped Channel System”
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full text at www.sciencemag.org/cgi/content/full/320/5883/1588b

Response to Comment on “Athabasca Valles, Mars: A Lava-Draped Channel System”
W. L. Jaeger et al.
full text at www.sciencemag.org/cgi/content/full/320/5883/1588c

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Auxin Gradients Are Associated with Polarity Changes in Trees
E. M. Kramer et al.
In quaking aspen trees that have been injured, gradients of the hormone auxin redirect the wood grain as the wound heals.

Strong Limit on a Variable Proton-to-Electron Mass Ratio from Molecules in the Distant Universe
M. T. Murphy, V. V. Flambaum, S. Muller, C. Henkel
Absorbed radio emissions from a distant quasar provide an estimate of a fundamental constant, the proton/electron mass ratio, over time and limit its possible variations.

Iron Isotope Fractionation During Magmatic Differentiation in Kilauea Iki Lava Lake
F.-Z. Teng, N. Dauphas, R. T. Helz
Iron isotopes fractionated between crystals and melt during crystallization of a lava lake, despite temperatures exceeding 1000° Celsius, perhaps influenced by differing iron oxidation.
>> Perspective p. 1600
RESEARCH ARTICLES CONTINUED...

CLIMATE CHANGE
Natural Variability of Greenland Climate, Vegetation, and Ice Volume During the Past Million Years
A. de Vernal and C. Hillaire-Marcel
A 1-million-year pollen record shows that the southern part of the Greenland ice sheet melted enough during some past warm episodes so that forests grew.

Elevation Changes in Antarctica Mainly Determined by Accumulation Variability
M. M. Helsen et al.
Satellite data since 1995, corrected for the conversion of snow to denser ice, imply that ice sheets grew slowly in the East Antarctic but decreased around the Amundsen Sea.

EVOLUTION
Natural Selection Shapes Genome-Wide Patterns of Copy-Number Polymorphism in Drosophila melanogaster
J. J. Emerson, M. Cardoso-Moreira, J. O. Borevitz, M. Long
A high-resolution analysis of gene copy number in Drosophila species shows that most variations are deleterious but a few for resistance to toxins are being positively selected.

Phylogeny-Aware Gap Placement Prevents Errors in Sequence Alignment and Evolutionary Analysis
A. Löytynoja and N. Goldman
An algorithm that treats insertions and deletions as distinct events in genomic data improves sequence alignments, allowing more accurate phylogenetic studies.

CELL BIOLOGY
A Molecular Clutch Disables Flagella in the Bacillus subtilis Biofilm
K. M. Blair et al.
One bacterial protein synthesized during the production of a biofilm matrix acts as a clutch to disable the flagellum while the microbe is constrained in the biofilm.

Phylogenetic Clusters Comprise a Diverse Family of Bacterial Type IV Effectors
X. Pan, A. Lührmann, A. Satoh, M. A. Laskowski-Arce, C. R. Roy
A microbial protein containing ankyrin repeats is injected into host cells through a specialized secretion system where it prevents microtubule-dependent vesicular fusion.

NEUROSCIENCE
Tuned Responses of Astrocytes and Their Influence on Hemodynamic Signals in the Visual Cortex
J. Schummers, H. Yu, M. Sur
Astrocytes in the visual cortex respond to visual stimuli, showing receptive field properties (response kinetics, orientation, and localization) similar to those of neurons.

MOLECULAR BIOLOGY
Proliferating Cells Express mRNAs with Shortened 3’ Untranslated Regions and Fewer MicroRNA Target Sites
R. Sandberg et al.
Dividing immune cells tend to synthesize messenger RNAs with shorter 3’ regulatory regions, possibly because less control is required over RNA functions.

EVOLUTION OF MAMMALS AND THEIR GUT MICROBES
Ankyrin Repeat Proteins Comprise a Diverse Family of Bacterial Type IV Effectors
X. Pan, A. Lührmann, A. Satoh, M. A. Laskowski-Arce, C. R. Roy
A microbial protein containing ankyrin repeats is injected into host cells through a specialized secretion system where it prevents microtubule-dependent vesicular fusion.

CELL BIOLOGY
Bora and the Kinase Aurora A Cooperatively Activate the Kinase Pkl1 and Control Mitotic Entry
A. Seki, J. A. Coppinger, C.-Y. Jang, J. R. Yates III, G. Fang
Mitosis begins in mammalian cells when a protein accumulates between cell divisions and interacts with a second protein to initiate a cascade of kinase activation.
A heterotrimeric G protein.

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REVIEW: Dissociation of Heterotrimeric G Proteins in Cells  
N. A. Lambert

G proteins may function as activated heterotrimers, as well as dissociated subunits.

PERSPECTIVE: Does Contractile Ca\textsuperscript{2+} Control Calcineurin-NFAT Signaling and Pathological Hypertrophy in Cardiac Myocytes?  
S. R. Houser and J. D. Molkentin

Are calcium signaling pathways in the heart regulated by bulk cytoplasmic calcium or by calcium in specialized microdomains?

PERSPECTIVE: A Cunning Stunt—An Alternative Mechanism of Eukaryotic Translation Initiation  
S. J. Morley and M. J. Coldwell

Translation of cellular inhibitor of apoptosis 2 transcripts appears to involve a ribosome shunting mechanism, permitting translation in periods of stress.

SCIENCE ONLINE FEATURE

THE GONZO SCIENTIST: Slaying Monsters for Science  
An article and video highlight the first scientific conference held in Azeroth, the online universe of the role-playing game World of Warcraft.  
www.sciencemag.org/sciext/gonzoscientist/

How Is a Lizard Like a Motorcycle?  
Study answers century-old mystery of why lizards "pop a wheelie" while running.

Life Cooked Up in Outer Space?  
Meteorite fragments contain makings of DNA.

The Importance of Being Frightened  
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D. Jensen

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E. Pain

Physicist Sylvain Schwartz has won acclaim from both the private sector and the ivory tower.

Held-Over Feature: Sustaining Forests in a Changing World  
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Science Careers reviews career opportunities in forest ecology.

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