COVER
Steep terrain: To move a therapy from the research lab to the doctor’s office requires a huge investment in clinical trials, which are growing more costly and more complex every year. See the special section beginning on page 209.

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Clinical Trials

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Lemons, Oranges, and Complexity

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Reaction-Driven Restructuring of Rh-Pd and Pt-Pd Core-Shell Nanoparticles
F. Tao et al.
Reducing or oxidizing conditions segregates rhenium or palladium at the surface of Rh-Pd (but not Pt-Pd) nanoparticles, facilitating the tuning of their catalytic properties. 10.1126/science.1164170

SOCIETY
Multi-University Research Teams: Shifting Impact, Geography, and Stratification in Science
B. F. Jones, S. Wuchty, B. Uzzi
Over the past 30 years, scientific papers have become increasingly likely to be written by teams of authors from more than one of a small number of elite universities. 10.1126/science.1158357

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What Science Offers the Humanities Integrating Body and Culture E. Slingerland, reviewed by H. Fromm
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Fossil arthropods in 525-million-year-old rocks in China are preserved in a long chain, implying that some Cambrian animals exhibited social behavior, unlike later arthropods.

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A comprehensive assessment of all of Earth’s mammals shows that primary productivity drives species richness on land and sea and that 20 to 25 percent of species are under threat. 2008 News story p. 178

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A High Phase-Space-Density Gas of Polar Molecules K.-K. Ni et al.
Raman laser irradiation can cool a cloud of KRb molecules to ultralow translational, vibrational, and rotational temperatures, a step toward forming molecular condensates. 2008 Perspective p. 203

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Cavity Optomechanics with a Bose-Einstein Condensate F. Brennecke, S. Ritter, T. Donner, T. Esslinger
Coupling a Bose-Einstein condensate to an optical cavity holding a few trapped photons provides a sensitive probe of mechanical oscillations in the quantum regime.
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Carbon Nanotube Arrays with Strong Shear Binding-On and Easy Normal Lifting-Off
L. Qu, L. Dai, M. Stone, Z. Xia, Z. L. Wang
Like gecko feet, a disordered array of carbon nanotubes with curly entangled tops can grip vertical surfaces without slipping but can also release and reattach easily.

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Base Sequence and Higher-Order Structure Induce the Complex Excited-State Dynamics in DNA
N. K. Schwab and F. Temps
DNA dissipates ultraviolet light more effectively when it consists of a mixed sequence than when it is an extended run of the same nucleotide.

ECOLOGY
Implications of Magma Transfer Between Multiple Reservoirs on Eruption Cycling
D. Elsworth, G. Mattioli, J. Taron, B. Voight, R. Herd
Data from the Soufrière Hills volcano reveal how connected shallow and deep magma chambers led to three eruption cycles over 12 years and imply that activity may end soon.

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Laboratory Simulation of Volcano Seismicity
P. M. Benson et al.
Microseisms in a fractured rock sample in which pore water is experimentally decompressed replicate earthquakes seen in active volcanoes, explaining their origins.

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Northern Hemisphere Controls on Tropical Southeast African Climate During the Past 60,000 Years
J. E. Tierney et al.
Abrupt changes in precipitation and temperature resolved in a record spanning the past 60,000 years from Lake Tanganyika, East Africa, are coeval with Northern Hemisphere climate events.

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Natural Selection on a Major Armor Gene in Threespine Stickleback
R. D. H. Barrett, S. M. Rogers, D. Schluter
In stickleback fish transferred to fresh water, selection against the allele for the costly armor plating only partly explains the changes in allele frequencies over generations.

ECOLOGY
Global Warming, Elevated Range Shifts, and Lowland Biotic Attrition in the Wet Tropics
R. K. Colwell et al.
Global warming threatens to cause species loss in the lowland tropics, as species that move upward from low elevations are not replaced and those on mountain tops die out.

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Noncytotoxic Lytic Granule-Mediated CD8+ T Cell Inhibition of HSV-1 Reactivation from Neuronal Latency
J. E. Knickelbein et al.
Herpes virus in neurons can be kept in a latent state by T cells, which release granzyme B, an inhibitor of a protein necessary for viral gene expression.

MICROBIOLOGY
Environmental Genomics Reveals a Single-Species Ecosystem Deep Within Earth
D. Chivian et al.
DNA sequences in water samples from a depth of 2.8 kilometers in a volcano deep within Earth, where the oxygen has been replaced by hydrogen, indicate the presence of a single bacterial species.

MICROBIOLOGY
Vibrio cholerae RTX Cysteine Protease Domain and Small Molecule–Induced Allosteric Activation of the Cholera toxin becomes active inside an infected cell when a host lipid binds to it, allosterically exposing its active site, which allows autoproteolysis and thus infection.

IMMUNOLOGY
Small Molecule–Induced Allosteric Activation of the Vibrio cholerae RTX Cysteine Protease Domain
P. J. Lupardus, A. Shen, M. Bogoy, K. C. Garcia

IMMUNOLOGY
CTLA-4 Control over Foxp3+ Regulatory T Cell Function
K. Wing et al.
A protein in T regulatory cells controls their ability to dampen activation of the immune system by antigen-presenting cells, preventing autoimmune disease.

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J. M. Tarbell and E. E. Ebong

一个复杂的细胞外网络通过糖蛋白相互交流机械应力到内皮细胞。

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