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.
*Photo illustration: Kelly Buckheit Krause (images: Getty Images; Jupiter Images)*

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Clinical Trials

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Lemons, Oranges, and Complexity

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Allegations of Waste: The ‘Seeding’ Study
The Promise and Pitfalls of Clinical Trials Overseas
Making Clinical Data Widely Available
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Cholesterol Veers Off Script

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Pacific Northwest Sea Bird May Lose ‘Threatened’ Status

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Meeting of Research Leaders Spotlights African Development, Disaster Planning
Comprehensive Conservation Database Details Threats to Mammals

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Tax Credit Extension Is Silver Lining for Science

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Impacts Research Seen as Next Climate Frontier
From Remarkable Rescue to Restoration of Lost Habitat
Samurai Mathematician Set Japan Ablaze With Brief, Bright Light
Students Learn How, Not What, to Think About Difficult Issues
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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

SOCIOLGY
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

LETTERS
Declines in NIH R01 Research Grant Funding
H. G. Mandel and E. S. Vesell

A Call to Action for Coral Reefs
R. E. Dodge et al.

Neutralizing the Impact Factor Culture
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E. Slingerland, reviewed by H. Fromm

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W. A. Cresko

Biodiversity in a Warmer World
J.-C. Svenning and R. Condit

Volcanic Symphony in the Lab
L. Burlini and G. Di Toro

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PALEONTOLOGY
Collective Behavior in an Early Cambrian Arthropod
X.-G. Hou, D. J. Siveter, R. J. Aldridge, D. J. Siveter
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.

ECOLOGY
The Status of the World’s Land and Marine Mammals:
Diversity, Threat, and Knowledge
J. Schipper et al.
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. >> News story p. 178

PHYSICS
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. >> Perspective p. 203

REPORTS
APPLIED PHYSICS
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.
Regulatory T Cell Function

CHEMISTRY
Base Sequence and Higher-Order Structure Induce the Complex Excited-State Dynamics in DNA
N. K. Schwalb 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.

GEOPHYSICS
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.

CLIMATE CHANGE
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.

EVOLUTION
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, Elevational 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.

ECOLOGY
Impact of a Century of Climate Change on Small-Mammal Communities in Yosemite National Park, USA
C. Moritz et al.
Over the past 100 years, small mammals in Yosemite, California, show range contraction at high elevations and range expansion lower down, as well as rearranged communities.

IMMUNOLOGY
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.

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.

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 South African gold mine reveal the presence of a thermophilic microbe that can fix its own nitrogen and carbon.
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