EDITORIAL
Redefining Science Education
Bruce Alberts

NEWS OF THE WEEK
Acquittals in CJD Trial Divide French Scientists
Western U.S. Forests Suffer Death by Degrees
Debate Continues Over Rainforest Fate—With a Climate Twist
Confused Pelicans May Have Lingered Too Long Up North
Two Americans Win Japan Prize
European Pesticide Rules Promote Resistance, Researchers Warn
Scientists Puzzle Over Ebola-Reston Virus in Pigs
Educators Decry New Louisiana Policy
Proposed Regulatory Czar Has Long and Perplexing Track Record
U.S. Appellate Court Weighs ‘Obvious’ Patents
Photon Sieve Lights a Smooth Path to Entangled Quantum Weirdness

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A Word of Caution on the Coca-Cola Way
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Dead Pool
J. L. Powell, reviewed by J. Farmer
Don’t Sleep, There Are Snakes
D. L. Everett, reviewed by A. S. Calude

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Could Access Requirements Stifle Your Research?
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Where Bacteria and Languages Concur
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Teleporting a Quantum State to Distant Matter
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REVIEW
Membrane Fusion: Grappling with SNARE and SM Proteins
T. C. Südhof and J. E. Rothman

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COVER
Human cells infected with the protozoan parasite Toxoplasma gondii visualized by electron microscopy. In the foreground are parasites (yellow-green) rupturing out of a dying host cell (blue); in the background is an intact host cell containing a large parasite-filled vacuole. See page 530.

Image: Sasha Meshinchi, Michael Robinson, Bjorn Kafsack, and Vern Carruthers
Earth’s Degassing: A Missing Ethane and Propane Source
G. Etiope and P. Ciccioli
Natural gas seepage contributes far more methane, ethane, and propane to the atmosphere than formerly realized.

Language Phylogenies Reveal Expansion Pulses and Pauses in Pacific Settlement
R. D. Gray et al.
Geographical distribution of Austronesian languages reveals the rate and direction of migrations from Taiwan 5200 years ago.

An Entanglement Filter
R. Okamoto et al.
A useful tool for quantum information processing transmits entangled photons only when they have the same polarization.

Quantum Teleportation Between Distant Matter Qubits
S. Olmschenk et al.
Transporting quantum states between trapped ions one meter apart may enable local storage of information in quantum memories.

Femtosecond XANES Study of the Light-Induced Spin Crossover Dynamics in an Iron(II) Complex
Ch. Bressler et al.
X-ray absorption spectroscopy resolves the dynamics of spin-state interconversions, which take place in less than a picosecond, in a well-studied class of iron compounds.

Complementary Active Sites Cause Size-Selective Reactivity of Aluminum Cluster Anions with Water
P. J. Roach et al.
Water dissociates at similar active sites on anionic aluminum clusters that have different sizes and electronic structure.

Brown Clouds over South Asia: Biomass or Fossil Fuel Combustion?
O. Gustafsson et al.
Biomass burning accounts for at least one-half of carbon-rich aerosols in the Asian atmospheric brown cloud that forms each winter.

Genetic Interactions Between Transcription Factors Cause Natural Variation in Yeast
J. Gerke et al.
Adaptive differences in yeast sporulation arise from single-nucleotide mutations in transcription factors regulating sex.

Different T Cell Receptor Signals Determine CD8+ Memory Versus Effector Development
E. Teixeiro et al.
Point mutations in the T cell receptor decide the fate of killer T cells and the development of immunological memory.

Secondary Replicative Function of CD8+ T Cells That Had Developed an Effector Phenotype
O. Banard et al.
Killer T cells that developed during a primary antiviral response can become memory T cells in secondary infections.

Electron Cryomicroscopy of E. coli Reveals Filament Bundles Involved in Plasmid DNA Segregation
J. Salje et al.
The actin-like filaments that power movement of DNA during bacterial cell division form small bundles of three to five filaments near the nucleoid.

Alternative Zippering as an On-Off Switch for SNARE-Mediated Fusion
C. G. Giraud et al.
a structural motif in the protein complexin may act as a switch during membrane fusion.

Complexin Controls the Force Transfer from SNARE Complexes to Membranes in Fusion
A. Maximov et al.
The protein complexin may act as a force-transferring switch during membrane fusion.

Widespread Increase of Tree Mortality Rates in the Western United States
P. J. van Mantgem et al.
Regional warming is contributing to the recent acceleration of tree deaths seen in undisturbed forests of the western U.S.

The Sphingolipid Transporter Spns2 Functions in Migration of Zebrafish Myocardial Precursors
A. Kawahara et al.
Normal heart development in zebrafish requires the function of a lipid transporter in a membrane surrounding the yolk, a tissue outside of the embryo proper.

The Peopling of the Pacific from a Bacterial Perspective
Y. Moodley et al.
The geographical distribution of strains of a specific human pathogen helps to define patterns of colonization out of Taiwan.

Rapid Membrane Disruption by a Perforin-Like Protein Facilitates Parasite Exit from Host Cells
B. F. C. Kafsack et al.
The human and animal parasite that causes toxoplasmosis escapes from host cells by using a perforin-like protein to make holes in the intracellular vacuole in which it resides.
Proto-oncogenes. The mechanisms by which kinases activate themselves are still emerging.

PROTOCOL: Genome to Kinome—Species-Specific Peptide Arrays for Kinome Analysis
S. Jalal et al.
Marrying bioinformatics and phosphorylation assays enables the empirical analysis of kinomes of multiple species.

CONNECTIONS MAP: Neuro2A Differentiation by Gαo Pathway
A. Ma’ayan et al.
Neurite outgrowth can be stimulated by G protein–coupled receptors that signal through Gαo and Gαq proteins.

GLOSSARY
Find out what IRAP, Spred, and DOPA mean in the world of cell signaling.

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Mind Matters: Stress, an Uninvited Lab Visitor
I. Levine
Work-related stress is an insidious health hazard.

Lost in Translation
C. Rey
America needs more science writers of color, just as it needs more scientists of color.

Consulting Experience for Doctoral Students in France
E. Pain
A program launched by the French government allows Ph.D. students to sell their skills to nonacademic clients.

SCIENCE PODCAST
www.sciencecaremag.org/multimedia/podcast
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Download the 23 January Science Podcast to hear about increased tree mortality in the western U.S., human population history in the Pacific, how social networks influence health, and more.

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