False-colored scanning electron micrograph of the bacterial pathogen *Streptococcus pneumoniae* (typical length, ~1 micrometer), a major cause of pneumonia and meningitis. On page 430, Croucher et al. describe the use of whole-genome sequencing to track the global spread of a rapidly recombining *S. pneumoniae* lineage as it adapts to antibiotic use and vaccine introduction.

*Image: Dennis Kunkel Microscopy, Inc./Visuals Unlimited, Inc.*
**REVIEW**

426 The Newest Synthesis: Understanding the Interplay of Evolutionary and Ecological Dynamics
T. W. Schoener

**RESEARCH ARTICLES**

430 Rapid Pneumococcal Evolution in Response to Clinical Interventions
N. J. Croucher et al.
*Streptococcus pneumoniae* evades vaccines and drugs by high levels of recombination and rapid adaptation.

435 The Genetic Landscape of the Childhood Cancer Medulloblastoma
D. W. Parsons et al.
Genomic analysis of a childhood cancer reveals markedly fewer mutations than what is typically seen in adult cancers.

439 Rotational Symmetry Breaking in the Hidden-Order Phase of URu$_2$Si$_2$
R. Okazaki et al.
The mysterious hidden-order phase of a heavy-fermion compound may be an electronic nematic state.

442 High-Gain Backward Lasing in Air
A. Dogariu et al.
Focused ultraviolet light creates a distant “lasing spark” in air that can then be used for remote detection.

445 Magnetic Bistability of Molecules in Homogeneous Solution at Room Temperature
S. Venkataramani et al.
A photosensitive ligand is used to reversibly modulate the magnetic properties of a nickel compound.

448 Kinetic Isotope Effects for the Reactions of Muonic Helium and Muonium with H$_2$
D. G. Fleming et al.
Calculated reaction rates for two hydrogen isotopes, one 36 times heavier than the other, agree with experiments at 500 kelvin.

450 Enhanced Modern Heat Transfer to the Arctic by Warm Atlantic Water
R. F. Spielhagen et al.
Water flow from the Atlantic Ocean into the Arctic through the Fram Strait is warmer than at any time in the past 2000 years.

453 The Southern Route “Out of Africa”: Evidence for an Early Expansion of Modern Humans into Arabia
S. J. Armitage et al.
Artifacts in eastern Arabia dating to 100,000 years ago imply that modern humans left Africa early, as climate fluctuated.

456 Phosphorylation of ULK1 (hATG1) by AMP-Activated Protein Kinase Connects Energy Sensing to Mitophagy
D. F. Egan et al.
A protein kinase links energy stores to control of autophagy.

461 Effects of Experimental Seaweed Deposition on Lizard and Ant Predation in an Island Food Web
J. Piovia-Scott et al.
In a simple island ecosystem, a rare pulse of resource input alters the interaction between predator species.

463 Metagenomic Discovery of Biomass-Degrading Genes and Genomes from Cow Rumen
M. Hess et al.
Metagenomic sequencing of biomass-degrading microbes from cow rumen reveals new carbohydrate-active enzymes.

466 Cleavage of NIK by the API2-MALT1 Fusion Oncoprotein Leads to Noncanonical NF-kB Activation
S. Rosebeck et al.
An oncogenic fusion protein promotes lymphomagenesis by activating a noncanonical signaling pathway.

469 Intramembrane Cleavage of AMA1 Triggers *Toxoplasma* to Switch from an Invasive to a Replicative Mode
J. M. Santos et al.
Membrane proteins govern a change from invasion to replication of an intracellular parasite.

472 Big and Mighty: Preverbal Infants Mentally Represent Social Dominance
L. Thomsen et al.
Infants use size as a predictor in judging which contestant will win.

**REPORTS**

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RESEARCH ARTICLE: Genome-Wide RNAi Screen Reveals Disease-Associated Genes That Are Common to Hedgehog and Wnt Signaling
L. S. Jacob et al.
Loss of the kinase and tumor suppressor Stk11 (Lkb1) has opposite effects on Hh and Wnt signaling.

RESEARCH ARTICLE: V_{i}, Receptor–Mediated Autocrine Role of Somatodendritic Release of AVP in Rat Vasopressin Neurons Under Hypo-Osmotic Conditions
K. Sato et al.
The antidiuretic hormone arginine vasopressin (AVP) is also an autocrine signal that functions in cell volume regulation.

RESEARCH ARTICLE: Rho and Rho-Kinase Activity in Adipocytes Contributes to a Vicious Cycle in Obesity That May Involve Mechanical Stretch
Y. Hara et al.
Mechanical stretch activates Rho-kinase in adipocytes, promoting obesity and obesity-related complications.

PODCAST
Researchers discuss how mechanical stretch regulates signaling in adipocytes and in hypothalamic neurons.

MEETING REPORT: Dependence Receptors—From Basic Research to Drug Development
P. Mehlen and D. E. Bredesen

PERSPECTIVE: Control of DNMT1 Abundance in Epigenetic Inheritance by Acetylation, Ubiquitylation, and the Histone Code
C. Bronner

JOURNAL CLUB: The Role of L(uck) in T Cell Triggering
R. Berry

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Free Career Resources for Scientists
Science Blogging and Tenure
V. Raper
Can pretented scientists blog about science without damaging their careers?
http://scim.ag/dFDgml

A Loyal Fan of Women’s Health Research
K. Hede
Physician-scientist Rebecca Jackson’s enthusiasm for research is matched only by her passion for Ohio State football.
http://scim.ag/hPH8NJ

Experimental Error: Lies, Damned Lies, and Seminars
A. Ruben
For all the naive and gullible graduate students out there, here is a handy guide to what those speakers are really saying.
http://scim.ag/ezFy9K

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COMMENTARY: Between Confidentiality and Scientific Exchange—The Place of Publication in Drug Discovery and Pharmaceutical Research
M. Clozel
A combined preclinical and clinical publication might be the ideal approach in translational medicine.

RESEARCH ARTICLE: Uroporphyrinogen Decarboxylase Is a Radiosensitizing Target for Head and Neck Cancer
E. Ito et al.
Uroporphyrinogen decarboxylase inhibition sensitizes head and neck cancer to both radiotherapy and chemotherapy.

RESEARCH ARTICLE: Manipulating the Bioenergetics of Alloreactive T Cells Causes Their Selective Apoptosis and Arrests Graft-Versus-Host Disease
E. Gatta et al.
Bioenergetic properties differentiate alloreactive T cells from other proliferating cells and can be exploited to arrest GVHD in mice.

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