EDITORIAL
1042  Governance of Both Poles
Albert Grimaldi

NEWS OF THE WEEK
1046  Yes, There’s Ice on the Moon—But How Much, and What Use Is It?
1046  Belt-Tightening Could Claim Some Scientific Scalps
1047  Galactic Glare Reveals Birthplace of Cosmic Rays
>> Report p. 1080
1048  Splitting the Difference Between Oil Pessimists and Optimists
1049  Clean Pigs Offer Alternative to Stem Cell Transplants
1049  From Science’s Online Daily News Site
1050  University Head Zhu Qingshi Challenges Old Academic Ways
1051  Research Centers Promise a Break on Medical Patents in Developing Countries
1051  From the Science Policy Blog

NEWS FOCUS
1052  Eco-Alchemy in Alberta
>> Science Podcast
1056  Better Homes and Hearths, Neandertal-Style
Did Neandertals Dine In?
1058  Ninth International Plant Molecular Biology Congress
Chloroplast Shuffle
Steak With a Side of Beta-Glucans
A Question of Balance

LETTERS
1060  Getting His Goat
S. Levay
Cell Therapy Ahead for Parkinson’s Disease
O. Isacson

CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.
1063  The Age of Empathy
F. de Waal, reviewed by J. J. Bolhuis
1063  The Mathematics of Sex
S. J. Ceci and W. M. Williams, reviewed by R. T. Miller

POLICY FORUM
1065  New Science for Chemicals Policy
M. R. Schwarzman and M. P. Wilson

PERSPECTIVES
1067  Monitoring Earth’s Critical Zone
D. deB. Richter Jr. and M. L. Mobley
1068  The Hotter the Engine, the Better
J. H. Perepezko
1070  Hydrate Molecular Ballet
P. G. Debenedetti and S. Sarupria
>> Report p. 1095
1071  Solving the Maze
C. Feuillet and K. Eversole
>> Brevia p. 1078; Reports pp. 1112, 1115, and 1118
1072  MegaFaunal Decline and Fall
C. Johnson
>> Report p. 1100

REVIEW
1074  Controlling the Velocity of Light Pulses
R. W. Boyd and D. J. Gauthier

CONTENTS continued >>

COVER
An ear of Zea mays (maize) shows color variation among kernels. Maize is one of the most important crop species worldwide, a vital source of food and fuel, and a valuable model organism for genetic research. Reports starting on pages 1112 and 1115 describe the genome sequences of the B73 and Palomero Toluqueño varieties. See also the related Report (p. 1118), Brevia (p. 1078), and Perspective (p. 1071).

Photo: Kate Mathis/Getty Images

DEPARTMENTS
1040  This Week in Science
1043  Editors’ Choice
1044  Science Staff
1045  Random Samples
1131  New Products
1132  Science Careers
BREVIA

1078 The Palomero Genome Suggests Metal Effects on Domestication
J.-P. Vieille-Calzada et al.
Genes involved in metal tolerance likely played a role in maize domestication.
>> Perspective p. 1071; Reports pp. 1112, 1115, and 1118

1079 Strengthening Individual Memories by Reactivating Them During Sleep
J. D. Rudoy et al.
During sleep, memories can be influenced in a specific and systematic manner.
>> Science Podcast

REPORTS

1080 Detection of Gamma Rays from a Starburst Galaxy
F. Acero et al.
Detection of our nearest starburst galaxy at very high energies confirms this galaxy type as a new class of gamma-ray emitter.
>> News story p. 1047

1083 Shape-Controlled Colloidal Interactions in Nematic Liquid Crystals
C. P. Lapointe et al.
Polygons dispersed in a liquid crystal solvent form either dipolar or quadrupolar interactions, thus driving self-assembly.

1086 Atmospheric Sulfur in Archean Komatiite-Hosted Nickel Deposits
A. Bekker et al.
The source of sulfur in economic iron-nickel sulfide deposits is primarily derived from the atmosphere.

1089 Geophysical Detection of Relict Metasomatism from an Archean (~3.5 Ga) Subduction Zone
C.-W. Chen et al.
Seismic profiles of the Slave craton in Canada suggest that subduction is responsible for its formation.

1091 Nanoplasmatic Probes of Catalytic Reactions
E. M. Larsson et al.
Reactant concentrations can be measured as plasmon frequency shifts for model catalysts grown on nanoscale gold disks.

1095 Microsecond Simulations of Spontaneous Methane Hydrate Nucleation and Growth
M. R. Walsh et al.
An extended simulation uncovers the intricate steps whereby methane can be trapped in ice.
>> Perspective p. 1070

1098 Aragonite Undersaturation in the Arctic Ocean: Effects of Ocean Acidification and Sea Ice Melt
M. Yamamoto-Kawai et al.
Surface waters in the Canada Basin were undersaturated with respect to aragonite in 2008, earlier than predicted.

1100 Pleistocene Megafaunal Collapse, Novel Plant Communities, and Enhanced Fire Regimes in North America
J. L. Gill et al.
The decline in Pleistocene megafauna led to the formation of novel plant communities and increased fire.
>> Perspective p. 1072; Science Podcast

1103 High Symbiont Relatedness Stabilizes Mutualistic Cooperation in Fungus-Growing Termites
D. K. Aanen et al.
In symbioses of independently reproducing partners, a genetically uniform population of symbionts excludes cheating variants.

1106 Epicontinental Seas Versus Open-Ocean Settings: The Kinetics of Mass Extinction and Origination
A. I. Miller and M. Foote
Three major mass extinctions affected organisms inhabiting open-ocean-facing coasts much more so than those inhabiting shallow seas.

1109 A Periplasmic Reducing System Protects Single Cysteine Residues from Oxidation
M. Depuydt et al.
A thioredoxin-like enzyme controls the oxidation state of the bacterial periplasm.

1112 The B73 Maize Genome: Complexity, Diversity, and Dynamics
P. S. Schnable et al.
The sequence of the maize genome reveals it to be the most complex genome known to date.
>> Perspective p. 1071; Brevia p. 1078

1115 A First-Generation Haplotype Map of Maize
M. A. Gore et al.
In maize, recombination in the genome has been a limiting factor affecting evolution and breeding efforts.
>> Perspective p. 1071; Brevia p. 1078

1118 Paternal Dominance of Trans-eQTL Influences Gene Expression Patterns in Maize Hybrids
R. A. Swanson-Wagner et al.
Gene expression variation in maize hybrids is influenced by distant DNA sequences subject to paternal genomic imprinting.
>> Perspective p. 1071; Brevia p. 1078

1120 Symbiotic Nitrogen Fixation in the Fungus Gardens of Leaf-Cutter Ants
A. A. Pinto-Tomás et al.
Leaf-cutting ants engage in a mutualism with nitrogen-fixing bacteria that help fertilize their fungus gardens.

1127 The Schizophrenia Susceptibility Gene dysbindin Controls Synaptic Homeostasis
D. K. Dickman and G. W. Davis
The dysbindin protein is required for the modulation of presynaptic neurotransmitter release in Drosophila.

CONTENTS continued >>
SCIENCEEXPRESS
www.sciencexpress.org
Phosphorylation of H2A by Bub1 Prevents Chromosomal Instability Through Localizing Shugoshin
S. A. Rosbash et al.
Phosphorylation of the chromatin protein histone H2A plays a critical role in chromosome segregation during cell division.
10.1126/science.1180189
Overexpression of Alpha2A-Adrenergic Receptors Contributes to Type 2 Diabetes
A. H. Rosengren et al.
Sequence variations in an adrenergic receptor gene cause reduced insulin secretion and contribute to type 2 diabetes. 10.1126/science.1176827
Gigahertz Dynamics of a Strongly Driven Single Quantum Spin
G. D. Fuchs et al.
Fast spin-flips are observed in the nitrogen vacancy centers in diamond.
10.1126/science.1181193
Universality in Three- and Four-Body Bound States of Ultracold Atoms
S. E. Pollock et al.
The interactions involved in the formation of few-body bound states can be probed in a cloud of ultracold atoms.
10.1126/science.1182840
Direct Imaging of Bridged Twin Protoplanetary Disks in a Young Multiple Star
S. Mayama et al.
An infrared image taken with the Subaru Telescope reveals young binary stars and their circumstellar environments.
10.1126/science.1179679
SCIENCEONLINE
www.sciencenow.org
Highlights From Our Daily News Coverage
Mediation Halves Risk of Heart Attack
A relaxation technique may be as powerful as modern drugs.
A Silent Killer in Bangladesh Wells
Researchers discover the cause of arsenic contamination in the country’s aquifers.
Socially Awkward? Check Your Genes
Researchers link a single genetic difference to the ability to read others’ emotions.
RESEARCH ARTICLE: Tyrosine Phosphorylation Inhibits PKM2 to Promote the Warburg Effect and Tumor Growth
T. Hitosugi et al.
PERSPECTIVE: PKM2 Tyrosine Phosphorylation and Glutamine Metabolism Signal a Different View of the Warburg Effect
C. V. Dong
Aerobic glycolysis in cancer cells is associated with tyrosine phosphorylation of a metabolic enzyme.
PERSPECTIVE: Acetylation Goes Global—The Emergence of Acetylation Biology
K. L. Norris et al.
Proteomic analysis shows protein acetylation to be more prevalent than previously appreciated.
GLOSSARY
Discovered what TRPA, GJIC, and miR mean in the world of signaling.
http://www.sciencemag.org/blogs/sciencecareers
SCIENCECAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists
Audacity, Part 3: Funding
A. Sasso
What are the best strategies for funding high-risk, high-reward research?
Tooling Up: The Project Management Career Track
D. Jensen
Project management, as a career and a skill, requires detail management, good communication, and people skills.
The New Science Careers Communities
Science Careers Staff
Expand your professional network in MySciNet, a community for scientists from diverse backgrounds, and CTSciNet, the Clinical and Translational Science Network.
SCIENCEONLINE
www.scienceline.org/career
Integrating Medicine and Science
PERSPECTIVE: Researching Genetic Versus Nongenetic Determinants of Disease—A Comparison and Proposed Unification
J. Ioannidis et al.
Studies are needed that concurrently measure genotypes, nongenetic exposures, and outcomes.
SCIENCECAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists
Audacity, Part 3: Funding
A. Sasso
What are the best strategies for funding high-risk, high-reward research?
Tooling Up: The Project Management Career Track
D. Jensen
Project management, as a career and a skill, requires detail management, good communication, and people skills.
The New Science Careers Communities
Science Careers Staff
Expand your professional network in MySciNet, a community for scientists from diverse backgrounds, and CTSciNet, the Clinical and Translational Science Network.
SCIENCEONLINE
www.scienceline.org/career
Integrating Medicine and Science
PERSPECTIVE: Researching Genetic Versus Nongenetic Determinants of Disease—A Comparison and Proposed Unification
J. Ioannidis et al.
Studies are needed that concurrently measure genotypes, nongenetic exposures, and outcomes.
SCIENCECAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists
Audacity, Part 3: Funding
A. Sasso
What are the best strategies for funding high-risk, high-reward research?
Tooling Up: The Project Management Career Track
D. Jensen
Project management, as a career and a skill, requires detail management, good communication, and people skills.
The New Science Careers Communities
Science Careers Staff
Expand your professional network in MySciNet, a community for scientists from diverse backgrounds, and CTSciNet, the Clinical and Translational Science Network.
SCIENCEONLINE
www.scienceline.org/career
Integrating Medicine and Science
PERSPECTIVE: Researching Genetic Versus Nongenetic Determinants of Disease—A Comparison and Proposed Unification
J. Ioannidis et al.
Studies are needed that concurrently measure genotypes, nongenetic exposures, and outcomes.