EDITORIAL

647 Tackling Human Fungal Infections
Gordon D. Brown et al.
>> Science Podcast

NEWS OF THE WEEK

654 A roundup of the week’s top stories

NEWS & ANALYSIS

658 Europe Picks Jupiter Probe; Runners-Up Vow to Press On
659 Death of California Researcher Spurs Investigation
660 Venus’s Rare Sun Crossing May Aid Search for Exoplanets
661 Reprise of First Experiment Casts Doubt on Supersolid Helium

NEWS FOCUS

662 Primeval Land Rises From the Ashes
>> Science Podcast
664 Researchers Set Course to Blockade Ballast Invaders
A Foul Problem
666 With Novel Paint, Chemist Aims to Vanquish the Vinchuca

LETTERS

668 Conservation Concerns in the Deep
A. C. Hartmann and L. A. Levin
Presumed Guilt in the Anthrax Case
J. Guillemin
Response
D. A. Relman
668 NextGenVOICES
670 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.

671 How We Remember
M. E. Hasselmo, reviewed by L. L. Colgin
672 Harvest the Wind
P. Warburg, reviewed by D. Reicher

POLICY FORUM

673 ELSI 2.0 for Genomics and Society
J. Kaye et al.

PERSPECTIVES

675 FGF21 Takes a Fat Bite
C. Cantó and J. Auwerx
676 Understanding Earthquakes
P. Segall
>> Report p. 728
678 PARP-1 Activation—Bringing the Pieces Together
J.-P. Gagné et al.
>> Report p. 728
679 Intertwining Electron Tunneling with Light
M. H. Szymańska
>> Report p. 704
681 RNA Plays Meiotic Matchmaker
A. F. Dernburg
>> Report p. 732
682 The Ice Age Carbon Puzzle
E. Brook
>> Report p. 711

CONTENTS continued >>

DEPARTMENTS

643 This Week in Science
649 Editors’ Choice
652 Science Staff
751 New Products
752 Science Careers

COVER

Enhanced-color view of the “Snowman” craters (Marcia, Calpurnia, and Minucia) on the asteroid Vesta generated by combining imaging and topography data from NASA’s Dawn spacecraft. The 60-kilometer-wide Marcia crater (at bottom) is one of the youngest large craters on Vesta with a small central peak, as well as light and dark streaks on its walls. See the series of six Reports beginning on page 684.

Image generated using Dawn Framing Camera images: Lucille Le Corre (MPS), David O’Brien (PSI), Vishnu Reddy (MPS/UND); PI of Dawn mission: Christopher T. Russell (UCLA); Dawn Framing Camera leader: Andreas Nathues (MPS), significant contributions from Ralf Jaumann (DLR)
REPORTS

684  Dawn at Vesta: Testing the Protoplanetary Paradigm
C. T. Russell et al.
>> Science Podcast

687  Vesta’s Shape and Morphology
R. Jaumann et al.

690  The Violent Collisional History of Asteroid Vesta
S. Marchi et al.

694  The Geologically Recent Giant Impact Basins at Vesta’s South Pole
P. Schenk et al.

697  Spectroscopic Characterization of Mineralogy and Its Diversity Across Vesta
M. C. De Sanctis et al.

700  Color and Albedo Heterogeneity of Vesta from Dawn
V. Reddy et al.
Spacecraft data provide a detailed characterization of the second most massive asteroid in the solar system.

704  Coupling Quantum Tunneling with Cavity Photons
P. Cristofolini et al.
Optical coupling is used to control the tunneling of electrons between a pair of quantum wells.
>> Perspective p. 679

707  Under the Hood of the Earthquake Machine: Toward Predictive Modeling of the Seismic Cycle
S. Barbot et al.
Computational models predict the long-term recurrence of earthquakes along a segment of the San Andreas Fault.
>> Perspective p. 676

711  Carbon Isotope Constraints on the Deglacial CO2 Rise from Ice Cores
J. Schmitt et al.
The stable isotopic composition of the carbon in carbon dioxide over the last 24,000 years illuminates past carbon cycle behavior.
>> Perspective p. 682

714  Ancient Maya Astronomical Tables from Xultun, Guatemala
W. A. Saturno et al.
Wall paintings in a Mayan temple dating to the 9th century C.E. show calculations of Moon and, perhaps, planetary motion.
>> Science Podcast

717  A Stem Cell–Based Approach to Cartilage Repair
K. Johnson et al.
A chemical screen using mesenchymal stem cells identifies a small molecule, kartogenin, that can promote chondrogenesis.

721  Differential Diffusivity of Nodal and Lefty Underlies a Reaction-Diffusion Patterning System
P. Müller et al.
The inhibitor Lefty diffuses more widely than the activator Nodal.

724  Mechanical Control of Morphogenesis by Fat/Dachsous/Four-Jointed Planar Cell Polarity Pathway
F. Bosveld et al.
Polarized protocadherin and myosin induce an anisotropic tension at cell junctions and thereby shape epithelial tissue.

728  Structural Basis for DNA Damage–Dependent Poly(ADP-ribose)ylation by Human PARP-1
M.-F. Langelier et al.
An enzyme that binds to damaged DNA undergoes a structural reorganization that enhances its catalytic activity.
>> Perspective p. 678

732  Meiosis-Specific Noncoding RNA Mediates Robust Pairing of Homologous Chromosomes in Meiosis
D.-Q. Ding et al.
An RNA transcript helps to bring together homologous chromosomes during cell division.
>> Perspective p. 681

736  Epigenomic Enhancer Profiling Defines a Signature of Colon Cancer
B. Akhtar-Zaidi et al.
Methylation tags at long-distance gene regulatory elements provide a signature specific to cancer cells.

740  Recent Explosive Human Population Growth Has Resulted in an Excess of Rare Genetic Variants
A. Keinan and A. G. Clark
Genetic models that incorporate recent human population growth can better identify mutations in large samples.

744  Transcription-Independent Function of Polycomb Group Protein PSC in Cell Cycle Control
A. Mohd-Sarip et al.
A Polycomb group protein regulates the cell cycle by promoting cyclin B ubiquitylation and degradation.

CONTENTS continued >>
The Great Outdoors Is Good for Allergies

Teens living in more rural environments harbor more anti-inflammatory microbes on their skin.

D. J. McComas et al.

Evidence of Things Not Seen

N. W. Murray

Regulated Virulence Controls the Ability of a Pathogen to Compete with the Gut Microbiota

N. Kamada et al.

Secreted Kinase Phosphorylates Extracellular Proteins That Regulate Bimomineralization

V. S. Tagliabacci et al.

Vitamin K, Is a Mitochondrial Electron Carrier That Rescues Pink1 Deficiency

M. Vos et al.

Adding vitamin K rescues fruit flies bearing a mutation in a Parkinson’s disease gene homolog.

N.10.1221/science.1222195

Virulence or Competition?

V. Sperandio

10.1126/science.1223303

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

9 May issue: http://scim.ag/stm050912

RESEARCH ARTICLE: Mixed Chimerism and Growth Factors Augment β Cell Regeneration and Reverse Late-Stage Type 1 Diabetes

M. Wang et al.

FOCUS: Three Strikes and You’re Cured

A. S. Chong and G. I. Bell

Glucose tolerance can be restored in a mouse model of type 1 diabetes.

RESEARCH ARTICLE: The Predictive Capacity of Personal Genome Sequencing

N. J. Roberts et al.

FOCUS: What’s a Genome Worth?

I. S. Kohane and J. Shendure

Analysis of data from monoygotic twins assesses how well whole-genome sequencing can predict disease risk in the general population.

RESEARCH ARTICLE: Survivin Is a Therapeutic Target in Merkel Cell Carcinoma

R. Arora et al.

A targeted therapy for a virus-induced cancer involves blockade of the cellular oncoprotein survivin.

RESEARCH ARTICLE: Extended Survival of Glioblastoma Patients After Chemoprotective HSC Gene Therapy

J. E. Adair et al.

Gene therapy using P140K-modified hematopoietic progenitor cells is chemoprotective, enabling glioblastoma patients to withstand myelotoxic doses of chemotherapy.

Published by AAAS

www.sciencemag.org  SCIENCE VOL 336 11 MAY 2012