EDITORIAL
722 Speak Up for Science Funding
Alan I. Leshner and Mary Woolley

NEWS OF THE WEEK
726 A roundup of the week’s top stories

NEWS & ANALYSIS
728 Scientists Assess Damage From Sandy’s Deadly Punch
730 Did Pulses of Climate Change Drive the Rise and Fall of the Maya?
>> Report p. 788
731 Lung-on-a-Chip Breathes New Life Into Drug Discovery
732 As Drug Pilot Wraps Up, a Lively Debate About Its Future
733 Question of Martian Methane Is Still Up in the Air

NEWS FOCUS
734 Weather Forecasts Slowly Clearing Up
One Sandy Forecast a Bigger Winner Than Others
>> Science Podcast
738 Poor but Smart

LETTERS
740 Limits to Religious Conservation Efforts
B. Gong et al.
Credit Due to Peter Higgs
J. Ellis
Evolution’s Misleading Language
A. N. Burdett
742 TECHNICAL COMMENT ABSTRACTS
742 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.
743 Visible Empire
D. Bleichmar, reviewed by P. H. Smith
744 Measurement
P. Lockhart, reviewed by B. Finegold

POLICY FORUM
745 Law and Science Collide
Over Human Gene Patents
R. Cook-Deegan

PERSPECTIVES
748 A Decorated Virus Cannot Hide
R. W. Herzog and D. A. Ostrov
>> Report p. 795
749 Constraints on Sexual Selection
M. J. Wade
>> Report p. 802
750 Emerging Disease or Diagnosis?
S. K. Gire et al.
752 Driving the Formation of Molecular Knots
J. S. Siegel
>> Report p. 783
754 A Single-Molecule Engine
M. W. Bockrath
>> Report p. 779
755 Constraining Cloud Feedbacks
K. M. Shell
>> Report p. 792
756 Epigenetic Islands in a Genetic Ocean
D. Schübeler

ASSOCIATION AFFAIRS
758 Presidential Address: Transposable Elements, Epigenetics, and Genome Evolution
N. V. Fedoroff

CONTENTS continued >>

COVER
Masks on the facade of the Codz Poop Palace (Kabah site, Yucatan, Mexico). Kabah and other Maya sites in the Puuc region flourished during the Terminal Classic Period (800 to 1000 C.E.), while cities to the south collapsed as the climate became drier. Political collapse was part of a complex two-stage societal response to global climate change. See page 788.

Photo: Getty Images/DEA/G. Dagli Orti

DEPARTMENTS
720 This Week in Science
723 Editors’ Choice
724 Science Staff
825 New Products
826 Science Careers
**REVIEW**

768  Hepcidin and the Iron-Infection Axis  
H. Drakesmith and A. M. Prentice

**REPORTS**

773  An Interacting Binary System Powers Precessing Outflows of an Evolved Star  
H. M. J. Boffin et al.  
Spectra of a planetary nebula’s central star reveal a companion star responsible for launching the system’s rotating jets.

775  Polarity-Switching Top Coats Enable Orientation of Sub–10-nm Block Copolymer Domains  
C. M. Bates et al.  
A chemical reaction in a thin polymer film imposes orientational ordering of lamellar domains in an underlying film.

779  Driving a Macroscopic Oscillator with the Stochastic Motion of a Hydrogen Molecule  
C. Lotze et al.  
The random motion of an activated hydrogen molecule produces forces that drive periodic motions of a scanning probe cantilever.

783  Discovery of an Organic Trefoil Knot  
N. Ponnuswamy et al.  
Hydrophobic interactions appear to steer three molecular fragments into a knot, rather than a simpler ring geometry.

785  Tissint Martian Meteorite: A Fresh Look at the Interior, Surface, and Atmosphere of Mars  
H. Chennaoui Aoudjehane et al.  
A meteorite that fell in Morocco in July 2011 provides a sample to study processes that operated on Mars 700,000 years ago.

788  Development and Disintegration of Maya Political Systems in Response to Climate Change  
D. J. Kennett et al.  
A record of rainfall from a stalagmite in southern Belize provides a context for better understanding Maya civilization.

792  A Less Cloudy Future: The Role of Subtropical Subsidence in Climate Sensitivity  
J. T. Fasullo and D. L. Dixson  
Seasonal variations in tropospheric relative humidity may provide an observational constraint on climate sensitivity.

795  Coagulation Factor X Activates Innate Immunity to Human Species C Adenovirus  
K. Doronin et al.  
Tagging adenovirus with a serum protein prompts an immune response when the virus enters cells.

798  Germ Cell Migration Across Sertoli Cell Tight Junctions  
B. E. Smith and M. E. Hay  
Syncytial germ cell chains span a network of transient compartments to cross the blood-testis barrier in adult mice.

802  Bateman in Nature: Predation on Offspring Reduces the Potential for Sexual Selection  
J. Byers and S. Dunn  
The relationship between mate number and offspring output in male pronghorn confirms Bateman’s findings.

804  Corals Chemically Cue Mutualistic Fishes to Remove Competing Seaweeds  
D. L. Dixson and M. E. Hay  
Goby fish remove toxic algae from their coral habitat, becoming more distasteful to predators in the process.

807  A Core Metabolic Enzyme Mediates Resistance to Phosphine Gas  
D. I. Schlipalius et al.  
Mutations in a lipoic acid metabolism enzyme confer resistance to phosphine but also result in sensitivity to arsenite.

810  Optical Control of Protein Activity by Fluorescent Protein Domains  
X. X. Zhou et al.  
Shining light onto an engineered fluorescent protein controls the activity of domains fused to the protein.

815  Intramitochondrial Transport of Phosphatidic Acid in Yeast by a Lipid Transfer Protein  
M. Connerth et al.  
A lipid transfer protein, Ups1, controls the accumulation of cardiolipin in mitochondrial outer and inner membranes.

818  IRE1α Cleave Select microRNAs During ER Stress to Derepress Translation of Proapoptotic Caspase-2  
J.-P. Upton et al.  
Protein misfolding stimulates the destruction of microRNAs and the synthesis of an enzyme that promotes cell death.

822  Mitochondrial Network Size Scaling in Budding Yeast  
S. M. Rafelski et al.  
Yeast cells produce buds with uniform mitochondrial content, even as the aging mother cell loses out.
Kinetic Responses of β-Catenin Specify the Sites of Wnt Control
A. R. Hernandez et al.
10.1126/science.1228734

Acute Inflammation Initiates the Regenerative Response in the Adult Zebrafish Brain
N. Kyritsi et al.
10.1126/science.1228773

Cytoplasmic ATP Hydrolysis Powers Transport of Lipopolysaccharide Across the Periplasm in E. coli
S. Okuda et al.
10.1126/science.1228984

Robust Photogeneration of H₂ in Water Using Semiconductor Nanocrystals and a Nickel Catalyst
Z. Han et al.
10.1126/science.1227775

Comment and Response on “Glacial Survival of Boreal Trees in Northern Scandinavia”
Comment: H. H. Birk et al.
http://dx.doi.org/10.1126.science.1225345
Response: L. Parducci et al.
10.1126/science.1225476

The Innovative Cockatoo: Figaro Invents, Makes, and Uses a Tool
Even among birds, necessity is the mother of invention.
http://scim.ag/Innovative-Cockatoo

The Eternal Youth of Asteroid Vesta
The Dawn spacecraft shows how Vesta’s blemishes are removed, but why isn’t space aging it?
http://scim.ag/Eternal-Youth

Many-Eyed Monsters Prove the Eyes Have It
People seek out others’ eyes, even when they are not centered on the face.
http://scim.ag/Seek_Eyes

The Signal Transduction Knowledge Environment
6 November issue: http://scim.ag/ss110612

Key Roles for the Lipid Signaling Enzyme Phospholipase D1 in the Tumor Microenvironment During Tumor Angiogenesis and Metastasis
Q. Chen et al.

Tumor growth and metastasis are attenuated in mice lacking a lipid signaling enzyme.

Proliferative and Antia apoptotic Signaling Stimulated by Nuclear-Localized PKD1 Results in Oncogenesis
C. K. Kitani et al.

PKD1 in the nucleus drives oncogenesis in mice and correlates with human prostate tumor grade.

Sexy DEG/ENaC Channels Involved in Gustatory Detection of Fruit Fly Pheromones
C. W. Pikielny et al.

DEG/ENaC channels allow male fruit flies to “taste” their mates.

The adaptor Grb2 plays both positive and negative roles in FGF receptor signaling.

Integrating Medicine and Science
7 November issue: http://scim.ag/stm110712

A Human Disease Model of Drug Toxicity–Induced Pulmonary Edema in a Lung-on-a-Chip Microdevice
D. Huh et al.

A human lung-on-a-chip model of human pulmonary edema predicts the efficacy of a new drug being tested in animals.

An Orally Active TRPV4 Channel Blocker Prevents and Resolves Pulmonary Edema Induced by Heart Failure
K. S. Thorne et al.

Blocking TRPV4 ion channels expressed in the lung in vivo and in vitro resolves pulmonary edema induced by heart failure.

Improving Risk Assessment
D. M. Dambach and H. Uppal

induced by heart failure.

The benefits of public engagement justify the effort required to develop the necessary skills.

www.sciencemag.org/multimedia/podcast
Free Weekly Show for 9 November 2012
Listen to stories on coral symbiosis, climate change and the Maya, the challenges of weather forecasting, and more.

www.sciencecareers.org/career_magazine
Free Career Resources for Scientists

M. H. Lewis

Content Collection: Talking to the Public
E. Pain

Researchers are seeking faster, better ways to measure research output and impact.

www.scim.ag/SciCareers9November2012
Free Career Resources for Scientists

E. Quintana et al.

The ability of melanomas to produce circulating tumor cells and metastasize in immunocompromised mice correlates with their ability to form distant metastases in patients.

www.scim.ag/Innovative-Cockatoo

The Signal Transduction Knowledge Environment
6 November issue: http://scim.ag/ss110612

RESEARCH ARTICLE: Key Roles for the Lipid Signaling Enzyme Phospholipase D1 in the Tumor Microenvironment During Tumor Angiogenesis and Metastasis
Q. Chen et al.

PODCAST
M. A. Frohman and A. M. VanHook

Tumor growth and metastasis are attenuated in mice lacking a lipid signaling enzyme.

RESEARCH ARTICLE: Proliferative and Antia apoptotic Signaling Stimulated by Nuclear-Localized PKD1 Results in Oncogenesis
C. K. Kitani et al.

PKD1 in the nucleus drives oncogenesis in mice and correlates with human prostate tumor grade.

PERSPECTIVE: Sexy DEG/ENaC Channels Involved in Gustatory Detection of Fruit Fly Pheromones
C. W. Pikielny et al.

DEG/ENaC channels allow male fruit flies to “taste” their mates.

PERSPECTIVE: Grb2, A Double-Edged Sword of Receptor Tyrosine Kinase Signaling
A. A. Belov and M. Mohammadi

The adaptor Grb2 plays both positive and negative roles in FGF receptor signaling.

www.scim.ag/Innovative-Cockatoo

The Signal Transduction Knowledge Environment
6 November issue: http://scim.ag/ss110612

Key Roles for the Lipid Signaling Enzyme Phospholipase D1 in the Tumor Microenvironment During Tumor Angiogenesis and Metastasis
Q. Chen et al.

Tumor growth and metastasis are attenuated in mice lacking a lipid signaling enzyme.

RESEARCH ARTICLE: Proliferative and Antia apoptotic Signaling Stimulated by Nuclear-Localized PKD1 Results in Oncogenesis
C. K. Kitani et al.

PKD1 in the nucleus drives oncogenesis in mice and correlates with human prostate tumor grade.

PERSPECTIVE: Sexy DEG/ENaC Channels Involved in Gustatory Detection of Fruit Fly Pheromones
C. W. Pikielny et al.

DEG/ENaC channels allow male fruit flies to “taste” their mates.

PERSPECTIVE: Grb2, A Double-Edged Sword of Receptor Tyrosine Kinase Signaling
A. A. Belov and M. Mohammadi

The adaptor Grb2 plays both positive and negative roles in FGF receptor signaling.

www.scim.ag/Innovative-Cockatoo

The Signal Transduction Knowledge Environment
6 November issue: http://scim.ag/ss110612

Key Roles for the Lipid Signaling Enzyme Phospholipase D1 in the Tumor Microenvironment During Tumor Angiogenesis and Metastasis
Q. Chen et al.

Tumor growth and metastasis are attenuated in mice lacking a lipid signaling enzyme.

RESEARCH ARTICLE: Proliferative and Antia apoptotic Signaling Stimulated by Nuclear-Localized PKD1 Results in Oncogenesis
C. K. Kitani et al.

PKD1 in the nucleus drives oncogenesis in mice and correlates with human prostate tumor grade.

PERSPECTIVE: Sexy DEG/ENaC Channels Involved in Gustatory Detection of Fruit Fly Pheromones
C. W. Pikielny et al.

DEG/ENaC channels allow male fruit flies to “taste” their mates.

PERSPECTIVE: Grb2, A Double-Edged Sword of Receptor Tyrosine Kinase Signaling
A. A. Belov and M. Mohammadi

The adaptor Grb2 plays both positive and negative roles in FGF receptor signaling.

www.scim.ag/Innovative-Cockatoo

The Signal Transduction Knowledge Environment
6 November issue: http://scim.ag/ss110612

Key Roles for the Lipid Signaling Enzyme Phospholipase D1 in the Tumor Microenvironment During Tumor Angiogenesis and Metastasis
Q. Chen et al.

Tumor growth and metastasis are attenuated in mice lacking a lipid signaling enzyme.

RESEARCH ARTICLE: Proliferative and Antia apoptotic Signaling Stimulated by Nuclear-Localized PKD1 Results in Oncogenesis
C. K. Kitani et al.

PKD1 in the nucleus drives oncogenesis in mice and correlates with human prostate tumor grade.

PERSPECTIVE: Sexy DEG/ENaC Channels Involved in Gustatory Detection of Fruit Fly Pheromones
C. W. Pikielny et al.

DEG/ENaC channels allow male fruit flies to “taste” their mates.

PERSPECTIVE: Grb2, A Double-Edged Sword of Receptor Tyrosine Kinase Signaling
A. A. Belov and M. Mohammadi

The adaptor Grb2 plays both positive and negative roles in FGF receptor signaling.

www.scim.ag/Innovative-Cockatoo

The Signal Transduction Knowledge Environment
6 November issue: http://scim.ag/ss110612

Key Roles for the Lipid Signaling Enzyme Phospholipase D1 in the Tumor Microenvironment During Tumor Angiogenesis and Metastasis
Q. Chen et al.

Tumor growth and metastasis are attenuated in mice lacking a lipid signaling enzyme.

RESEARCH ARTICLE: Proliferative and Antia apoptotic Signaling Stimulated by Nuclear-Localized PKD1 Results in Oncogenesis
C. K. Kitani et al.

PKD1 in the nucleus drives oncogenesis in mice and correlates with human prostate tumor grade.

PERSPECTIVE: Sexy DEG/ENaC Channels Involved in Gustatory Detection of Fruit Fly Pheromones
C. W. Pikielny et al.

DEG/ENaC channels allow male fruit flies to “taste” their mates.

PERSPECTIVE: Grb2, A Double-Edged Sword of Receptor Tyrosine Kinase Signaling
A. A. Belov and M. Mohammadi

The adaptor Grb2 plays both positive and negative roles in FGF receptor signaling.

www.scim.ag/Innovative-Cockatoo

The Signal Transduction Knowledge Environment
6 November issue: http://scim.ag/ss110612

Key Roles for the Lipid Signaling Enzyme Phospholipase D1 in the Tumor Microenvironment During Tumor Angiogenesis and Metastasis
Q. Chen et al.

Tumor growth and metastasis are attenuated in mice lacking a lipid signaling enzyme.

RESEARCH ARTICLE: Proliferative and Antia apoptotic Signaling Stimulated by Nuclear-Localized PKD1 Results in Oncogenesis
C. K. Kitani et al.

PKD1 in the nucleus drives oncogenesis in mice and correlates with human prostate tumor grade.

PERSPECTIVE: Sexy DEG/ENaC Channels Involved in Gustatory Detection of Fruit Fly Pheromones
C. W. Pikielny et al.

DEG/ENaC channels allow male fruit flies to “taste” their mates.

PERSPECTIVE: Grb2, A Double-Edged Sword of Receptor Tyrosine Kinase Signaling
A. A. Belov and M. Mohammadi

The adaptor Grb2 plays both positive and negative roles in FGF receptor signaling.
Science 338 (6108), 720-825.