SPECIAL SECTION

Changing Oceans

INTRODUCTION
1497 Changing Oceans

NEWS
1498 Keeping Tabs on the Sea
1500 Ocean Acidification Unprecedented, Unsettling
1502 A Push for Quieter Ships
1504 Down on the Shrimp Farm
1506 The Dirt on Ocean Garbage Patches

EDITORIAL
1453 The Changing Oceans
John A. Church
>> Changing Oceans section p. 1497

NEWS OF THE WEEK
1462 Water Shortages Loom as Northern China’s Aquifers Are Sucked Dry
1462 Arecibo to Stay Open Under New NSF Funding Plan
1464 Fusion ‘Consolation Prize’ Gears Up for Show Time
1465 From the Science Policy Blog
1466 Endosulfan’s Exit: U.S. EPA Pesticide Review Leads to a Ban
1467 From Science’s Online Daily News Site

NEWS FOCUS
1468 Probing the Secrets of the Finest Fiddles
>> Science Podcast
1471 A Taste for Controversy

LETTERS
1474 Childhood’s Cures Haunted by Adulthood’s ‘Late Effects’
1476 The Invisible Hand Behind a Vast Carbon Reservoir

REVIEWS
1507 Deconstructing the Conveyor Belt
M. S. Lozier
1512 The Growing Human Footprint on Coastal and Open-Ocean Biogeochemistry
S. C. Doney
1517 Sea-Level Rise and Its Impact on Coastal Zones
R. J. Nicholls and A. Cazenave
1520 How Do Polar Marine Ecosystems Respond to Rapid Climate Change?
O. Schofield et al.
1523 The Impact of Climate Change on the World’s Marine Ecosystems
O. Hoegh-Guldberg and J. F. Bruno

POLICY FORUM
1485 Proposed U.S. Policy for Ocean, Coast, and Great Lakes Stewardship
J. Lubchenco and N. Sutley
>> Changing Oceans section p. 1497

PERSPECTIVES
1487 A Kantian View of Space
L. Palmer and G. Lynch
>> Reports pp. 1573 and 1576
1488 Tilting at Connections, from Pole to Equator
S. G. Philander
>> Research Article p. 1530; Report p. 1550
1489 Dating Pharaonic Egypt
H. J. Bruins
>> Report p. 1554
1491 A Drop of Quantum Matter
P. Nussenzveig and J. C. A. Barata
>> Report p. 1540
1492 The Great Indo-Pacific Communicator
D. W. Oppo and Y. Rosenthal

BOOKS ET AL.
1482 Agora A. Amenabar, director
Océans J. Perrin and J. Cluzaud, directors, reviewed by S. Firestein
1483 Takes on Hunters and Roads

CORRECTIONS AND CLARIFICATIONS
1480

TECHNICAL COMMENT ABSTRACTS
1480

CONTENTS continued >>

COVER
An aggressive storm that battered the coastal town of Blackpool, United Kingdom, in January 2007. Among other important changes now occurring in the marine environment, rising sea levels will create the need for increased protection from such severe storms. See the special section on our changing oceans beginning on page 1497.

Photo: Global Warming Images/Alamy

DEPARTMENTS
1449 This Week in Science
1455 Editors’ Choice
1458 Science Staff
1461 Random Samples
1584 New Products
1585 Science Careers
CONTENTS continued

1494 Paring MiRNAs Through Pairing
A. E. Pasquinelli
>> Research Article p. 1534; Report p. 1563

1495 HDL mir-ed Down by SREBP Introns
M. S. Brown et al.
>> Reports pp. 1566 and 1570

BREVIA
1529 Reassortment of Pandemic H1N1/2009 Influenza A Virus in Swine
D. Vijaykrishna et al.
Surveillance of pigs is important for tracking reassortment and emergence of influenza A viruses.
>> Science Podcast

RESEARCH ARTICLES
1530 Tropical Ocean Temperatures Over the Past 3.5 Million Years
T. D. Herbert et al.
Tropical sea surface temperatures were controlled more by atmospheric connections to glaciation cycles than by ocean circulation.
>> Perspective p. 1488; Report p. 1550

1534 Target RNA–Directed Trimming and Tailing of Small Silencing RNAs
S. L. Ameres et al.
Animal microRNAs have reduced complementarity to their targets to avoid their own degradation.
>> Perspective p. 1494; Report p. 1563

REPORTS
1540 Bose-Einstein Condensation in Microgravity
T. van Zoest et al.
Studies of atomic quantum states in free-fall conditions may provide ways to test predictions of general relativity.
>> Perspective p. 1491

1543 Hot-Electron Transfer from Semiconductor Nanocrystals
W. A. Tisdale et al.
Extraction of highly excited electrons formed in a light-absorbing material may make solar cells more efficient.

1547 Crossover from Single-Step Tunneling to Multistep Hopping for Molecular Triplet Energy Transfer
J. Vura-Weis et al.
Ultrafast absorption spectroscopy reveals a change in mechanism when sites for electron transfer become more distant.

1550 Subpolar Link to the Emergence of the Modern Equatorial Pacific Cold Tongue
A. Martinez-Garcia et al.
The eastern Pacific Ocean cold tongue appeared as Earth’s climate cooled and subpolar waters expanded in the Pleistocene.
>> Perspective p. 1488; Research Article p. 1530

1554 Radiocarbon-Based Chronology for Dynastic Egypt
C. Bronk Ramsey et al.
Many radiocarbon dates from short-lived plant remains provide a long and accurate chronology for ancient Egypt.
>> Perspective p. 1489

1558 Evolutionary Novelty Is Concentrated at the Edge of Coral Species Distributions
A. F. Budd and J. M. Pandolfi
Caribbean coral morphology documents that most coral evolution did not occur at the center of diversity of a species’ range.

1561 Identification of Germline Stem Cells in the Ovary of the Teleost Medaka
S. Nakamura et al.
Ongoing follicle production is maintained by stem cells in an adult fish ovary.

1563 Down-Regulation of a Host MicroRNA by a Herpesvirus saimiri Noncoding RNA
D. Cazalla et al.
A viral noncoding RNA regulates the level of a complementary host-cell microRNA.
>> Perspective p. 1494; Research Article p. 1534

1566 MicroRNA-33 and the SREBP Host Genes Cooperate to Control Cholesterol Homeostasis
S. H. Najafi-Shoushtari et al.

1570 MiR-33 Contributes to the Regulation of Cholesterol Homeostasis
K. J. Rayner et al.
A small noncoding RNA helps regulate cholesterol levels in mice.
>> Perspective p. 1495

1573 Development of the Hippocampal Cognitive Map in Preweanling Rats
T. J. Wills et al.
Some aspects of spatial cognition develop very early and may be determined innately.

1576 Development of the Spatial Representation System in the Rat
R. F. Langston et al.
Space and direction are already represented in specific neurons when rat pups navigate a location for the first time.
>> Perspective p. 1487
Biocatalytic Asymmetric Synthesis of Chiral Amines from Ketones Applied to Sitagliptin Manufacture
C. K. Savile et al.

An engineered enzyme offers substantial efficiency advantages in the production-scale synthesis of a drug.
10.1126/science.1188934

Probing the Superfluid–to–Mott-Insulator Transition at the Single-Atom Level
W. S. Bakr et al.

Imaging of atoms that were optically trapped in lattice sites reveals local dynamics of a quantum phase transition.
10.1126/science.1192368

A Septin Diffusion Barrier at the Base of the Primary Cilium Maintains Ciliary Membrane Protein Distribution
Q. Hu et al.

Signaling proteins are retained in the cilium by a diffusion barrier created by a member of the septin family.
10.1126/science.1191054

Sfrp5 Is an Anti-Inflammatory Adipokine That Modulates Metabolic Dysfunction in Obesity
N. Ouchi et al.

Fat cells secrete an anti-inflammatory factor that has beneficial effects on metabolic health.
10.1126/science.1188280

Integrative Modeling Defines the Nova Splicing-Regulatory Network and Its Combinatorial Controls
C. Zhang et al.

Network modeling reveals an RNA splicing network in the brain and uncovers complex mechanisms of regulation.
10.1126/science.1191150

SCIENCENOW
www.sciencenow.org
Highlights From Our Daily News Coverage

Was the New World Settled Twice?
Analysis of ancient skulls suggests a wave of migration before the ancestors of today's Native Americans.

Did a Deep Sea Once Cover Mars?
River deltas suggest a large, ancient ocean, but not all experts are convinced.

Better Rice Through Fungi
A bit of fungal cultivation helps rice plants grow up to five times as fast.

SCIENCESIGNALING
www.sciencesignal.org
The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: Ablation of the Kinase NDR1 Predisposes Mice to the Development of T Cell Lymphoma
H. Cornils et al.

The kinase NDR1 functions as a haploinsufficient tumor suppressor by ensuring proper apoptotic responses.

PROTOCOL: Analysis of Matrix-Dependent Cell Migration with a Barrier Migration Assay
S. Kroening and M. Goppelt-Streube

Removable plastic barriers allow quantification of cell migration without damaging either the surface proteins or the cells.

FUNDING SOURCES
Find opportunities to fund research and training in cell signaling.

GLOSSARY
Find out what ADPKD, CICR, and DHPR mean in the world of cell signaling.

SCIENCECAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists

Changing Oceans: Viewing Coral Reefs Through a Cultural Lens
H. Fields

Human geographer Josh Cinner studies how people and coral reefs interact.

>> Changing Oceans section p. 1497

Tooling Up: Be the Candidate
D. Jensen

Your chances of finding a job improve if you are considered a candidate and not just an applicant.

Psychologist Bridges Clinic and Lab to Untangle Schizophrenia’s Roots
B. Vostag

Deanna Barch is developing neuroimaging tools to consider a candidate and not just an applicant.

ScienceCareers Podcast
www.sciencemag.org/audio/podcast
Free Weekly Show
Download the 18 June Science Podcast to hear about reassortment of the H1N1/2009 influenza virus in swine, ocean noise, the physics of old violins, and more.

SCIENCEINSIDER
news.sciencemag.org/scienceinsider
Science Policy News and Analysis

Science (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2010 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): $146 (1346 allocated to subscription). Domestic institutional subscription (51 issues): $193. Foreign postage extra. Mexico, Caribbean (surface mail) $55; other countries (air service delivery) $58. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request. GST #1254 8812. Publications Mail Agreement Number 1069624. Printed in the U.S.A.
Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-6178. Single-copy sales: $10.00 current issue, $25.00 back issue prepaid includes surface postage; bulk rates on request. Authorization to photocopy material for internal or personal use as is permitted by the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that $20.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science is 0036-8075. Science is indexed in the Reader’s Guide to Periodical Literature and in several specialized indexes.
Editor's Summary

This copy is for your personal, non-commercial use only.

**Article Tools**
Visit the online version of this article to access the personalization and article tools:
http://science.sciencemag.org/content/328/5985

**Permissions**
Obtain information about reproducing this article:
http://www.sciencemag.org/about/permissions.dtl