SPECIAL SECTION

Breakthrough of the Year

INTRODUCTION

2013 Breakthrough of the Year

WINNER

Cancer Immunotherapy

RUNNERS-UP

Genetic Microsurgery for the Masses
CLARITY Makes It Perfectly Clear
Human Cloning at Last
Dishing Up Mini-Organs
Cosmic Particle Accelerators Identified
Newcomer Juices Up the Race to Harness Sunlight
To Sleep, Perchance to Clean
Your Microbes, Your Health
In Vaccine Design, Looks Do Matter

EDITORIAL

Cancer Immunotherapy
Marcia McNutt

NEWS OF THE WEEK

A roundup of the week’s top stories

NEWS & ANALYSIS

Mega-Eruptions Drove the Mother of Mass Extinctions
Money Woes Cloud Future of Workhorse U.S. Telescopes
U.S. Budget Deal Offers Researchers Some Sequester Relief
Amid Superconductor Debate, Clash of Physics Titans Resumes
Scientists Campaign Against Killer Robots
Swine Flu Connection Provides Clues About Narcolepsy

LETTERS

Sea-Level Rise by 2100
J. A. Church et al.

CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.

Knowledge in the Time of Cholera
O. Whooley, reviewed by J. H. Warner

EDUCATION FORUM

Open Learning at a Distance: Lessons for Struggling MOOCs
P. McAndrew and E. Scanlon

PERSPECTIVES

How Cooperation Defeats Cheats
C. N. Spottiswoode

A Common Pathway for a Rare Disease?
S. B. Vafai and V. K. Mootha

No Barriers to Cellulose Breakdown
A. Berlin

Genomic Clues to the Ancestral Flowering Plant
K. Adams

Enzyme Kinetics, Past and Present
X. S. Xie

Reformulating Table Salt Under Pressure
J. Ibáñez Insa

Ronning After the Adiponectin Receptors
W. L. Holland and P. E. Scherer

ON THE WEB THIS WEEK

Science Podcast
Listen to a special show on this year’s breakthrough, runners-up, and the top stories from our daily news site.

Science Translational Medicine
Research Article by A. K. De la Herrán-Arita et al.

AAAS News & Notes
New Products

AAAS News & Notes
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SCIENCE PRIZE ESSAY

1462 DNA Barcoding from NYC to Belize
S. E. Harris and M. Bellino

RESEARCH ARTICLES

1467 The Amborella Genome and the Evolution of Flowering Plants
Amborella Genome Project
The Amborella genome retains features of the ancestral angiosperm and illuminates flowering plant genomic evolution. Research Article Summary; for full text: http://dx.doi.org/10.1126/science.1241089

1468 Horizontal Transfer of Entire Genomes via Mitochondrial Fusion in the Angiosperm Amborella
D. W. Rice et al.
Much of the mitochondrial DNA genome of the flowering plant Amborella trichopoda originated from other organisms. >> Perspective p. 1456; Report p. 1516

1473 Constraining Exoplanet Mass from Transmission Spectroscopy
J. de Wit and S. Seager
The mass of an exoplanet can be derived based on the properties of its atmosphere.

1477 Crystal Structure of a Soluble Cleaved HIV-1 Envelope Trimer
J.-P. Julien et al.
Key structural features dictate how the HIV envelope protein functions and interacts with the human immune system.

1484 Cryo-EM Structure of a Fully Glycosylated Soluble Cleaved HIV-1 Envelope Trimer
D. Lymkim et al.

1490 Detection of Berry’s Phase in a Bulk Rashba Semiconductor
H. Murakawa et al.
Transport measurements indicate a nontrivial spin texture stemming from strong spin-orbit coupling in the material BiTeI.

1494 Photon-Mediated Interactions Between Distant Artificial Atoms
A. F. van Loo et al.
Interaction between two separated superconducting qubits can be mediated and controlled by microwaves.

1496 Relaxation Mechanism of the Hydrated Electron
M. H. Elkins et al.
Spectroscopy of excited-state hydrated electrons in a liquid jet implicates nonadiabatic relaxation.

1499 Dynamical Resonances Accessible Only by Reagent Vibrational Excitation in the F + HD→HF + D Reaction
T. Wang et al.
A protocol for efficient vibrational excitation enabled discovery of an unusual reaction trajectory in a well-studied system.

1502 Unexpected Stable Stoichiometries of Sodium Chlorides
W. Zhang et al.
Several phases in the Na-Cl system are stable at high pressures and temperatures. >> Perspective p. 1459

1506 Brood Parasitism and the Evolution of Cooperative Breeding in Birds
W. E. Fenney et al.
The skewed global distribution of cooperatively breeding birds may result from their coevolution with brood parasites. >> Perspective p. 1452

1508 C57BL/6N Mutation in Cytoplasmic FMRP Interacting protein 2 Regulates Cocaine Response
W. Kumar et al.
Acute locomotor responses to cocaine differ significantly in the most widely used inbred strains of laboratory mice.

1513 Revealing Nature’s Cellulase Diversity: The Digestion Mechanism of Caldicellulosiruptor bescii CelA
R. Brunecky et al.
Electron microscopy reveals that a cellulose-degrading enzyme operates by drilling down, as well as by roaming the surface.

1516 Assembly and Validation of the Genome of the Nonmodel Basal Angiosperm Amborella
S. Chamala et al.
Fluorescence in situ hybridization allows for next-generation sequencing of a large, difficult genome. >> Perspective p. 1456; Research Articles pp. 1467 and 1468

1518 CRL4 Complex Regulates Mammalian Oocyte Survival and Reprogramming by Activation of TET Proteins
C. Yu et al.
Continuing female fertility in mammals requires the function of a ubiquitin ligase complex in oocytes.

1521 Serial Femtosecond Crystallography of G Protein–Coupled Receptors
W. Liu et al.
The structure of a human serotonin receptor was solved using a free-electron laser to analyze microcrystals.

1524 mTOR Inhibition Alleviates Mitochondrial Disease in a Mouse Model of Leigh Syndrome
S. C. Johnson et al.
A drug in clinical use for other disorders delays progression of an untreatable mitochondrial disease in knockout mice. >> Perspective p. 1453