Cover
An artist’s conception of the antibiotic penicillin and some of the bacteria that have developed resistance to various antibiotics. A special section beginning on page 355 explores the rise and spread of so-called bad bugs and possible interventions.
Illustration: Chris Bickel/Science

Special Section
Drug Resistance

Introduction
Deadly Defiance

News
The Bacteria Fight Back
Collateral Damage: The Rise of Resistant C. difficile

Trench Warfare in a Battle With TB
Anti-TB Drugs: And Then There Were None

Perspectives
Antibiotics and Antibiotic Resistance Genes in Natural Environments
J. L. Martinez

Outwitting Multidrug Resistance to Antifungals
B. C. Monk and A. Goffeau

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News of the Week
Bush Takes a Final Swipe, and Salute, at CO2 Emission Curbs

Old Samples Trip Up Tokyo Team

New Policy Tries to Ease Security Restrictions

Stalled Trial for Autism Highlights Dilemma of Alternative Treatments

Caribbean Megaeruptions Drove a Global Ocean Crisis

Sciencescope
Two U.S. Labs Vie for Long-Delayed Exotic Nuclei Source

Survey Finds Citations Growing Narrower as Journals Move Online

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News Focus
Reinventing Rice to Feed the World
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Acoustics ’08 Meeting
Sound Science Maps Venetian Canals and Peruvian Ruins
Ultrasound Uses in Medicine Heat Up
Listening to Distant Ice Crack
Snapshots From the Meeting
PLANT SCIENCE

Plant Immunity Requires Conformational Changes of NPR1 via S-Nitrosylation and Thioredoxins
Y. Tada et al.

After a pathogen invades a plant, a protein, usually kept in a multimeric state by S-nitrosylation, is dissociated by thioredoxin, freeing the monomers for defense responses.

10.1126/science.1156970

GEOCHEMISTRY

Ferruginous Conditions Dominated Later Neoproterozoic Deep-Water Chemistry
D. E. Canfield et al.

Low sulfur input caused the deeper ocean to become anoxic and rich in ferrous iron 750 million years ago, a reversal from the more oxidizing conditions of the previous 1 billion years.

10.1126/science.1154499

TECHNICAL COMMENT ABSTRACTS

MICROBIOLOGY

Comment on "A 3-Hydroxypropionate/4-Hydroxybutyrate Autotrophic Carbon Dioxide Assimilation Pathway in Archaea"
T. J. G. Ettema and S. G. E. Andersson

full text at www.sciencemag.org/cgi/content/full/321/5887/342b

Response to Comment on "A 3-Hydroxypropionate/4-Hydroxybutyrate Autotrophic Carbon Dioxide Assimilation Pathway in Archaea"
I. A. Berg, D. Kockelkorn, W. Buckel, G. Fuchs

full text at www.sciencemag.org/cgi/content/full/321/5887/342c

BREVIA

OCEAN SCIENCE

Ice Scour Disturbance in Antarctic Waters
D. A. Smale et al.

Icebergs have increasingly scoured the coastlines along the West Antarctic Peninsula as its ice shelves and glaciers have waned, affecting benthic marine communities.

RESEARCH ARTICLE

NEUROSCIENCE

Identification of SLEEPLESS, a Sleep-Promoting Factor
K. Koh et al.

A search for genetic modulators of sleep in Drosophila identified a gene encoding a brain protein that is likely secreted and is required for recovery from sleep deprivation. >> News story p. 334

REPORTS

ASTRONOMY

Properties of Gamma-Ray Burst Progenitor Stars
P. Kumar, R. Narayan, J. L. Johnson

Analysis of the x-ray afterglow of intense gamma-ray bursts shows that the bursts result from consumption of the outer part of a dense star and define the star’s rotation rate.
A Subset of Cadherin Domains

H. O. Ishikawa et al.

A newly described type of protein kinase found in the Golgi phosphorylates signaling proteins on amino acids that are destined to be within extracellular domains.

CELL BIOLOGY

Four-jointed Is a Golgi Kinase That Phosphorylates a Subset of Cadherin Domains

A. M. Intlekofer

Anomalous Type 17 Response to Viral Infection by CD8+ T Cells Lacking T-bet and Eomesoderm

A. M. Intlekofer et al.

Two transcription factors cooperate to ensure the correct functioning of CD8+ T cells during the response to infection.

NEUROSCIENCE

Orbitofrontal Dysfunction in Patients with Obsessive-Compulsive Disorder and Their Unaffected Relatives

S. R. Chamberlain et al.

The abnormally low activation in the frontal cortex of individuals with obsessive compulsive disorder and their close relatives may confer a risk for the disease.

EVOLUTION

The Evolution and Distribution of Species Body Size

A. Clauset and D. H. Erwin

A model of evolutionary body-size changes that accounts for physical constraints and extinction risk reproduces the size distribution of land mammals from the Quaternary.

CLIMATE CHANGE

Patagonian Glacier Response During the Late Glacial–Holocene Transition

R. P. Ackert Jr. et al.

Dating of a glacial moraine in southern Patagonia implies that increased precipitation caused glacier growth after a period of Northern Hemisphere cooling 11,000 years ago.

SOCIOLGY

Electronic Publication and the Narrowing of Science and Scholarship

J. A. Evans

As journals become available electronically, scientists and scholars have more articles at their fingertips but cite relatively fewer, and these tend to be more recent.

MATERIALS SCIENCE

Observations of Intergranular Stress Corrosion Cracking in a Grain-Mapped Polycrystal

A. King et al.

Tomographic imaging reveals that some grain boundaries in stainless steel are resistant to stress corrosion cracking, which leads to sudden brittle failure.

CHEMISTRY

Measurement of the Elastic Properties and Intrinsic Strength of Monolayer Graphene

C. Lee, X. Wei, J. W. Kysar, J. Hone

Measurements of the elastic properties of graphene agree with calculations for a defect-free material and show that it is indeed stronger than other materials.

Measurement of the Distribution of Site Enhancements in Surface-Enhanced Raman Scattering

Y. Fang, N.-H. Seong, D. D. Dlott

The distribution of electric field–enhancing sites on a nanostructured substrate is measured by using the enhanced field to damage those sites.

APPLIED PHYSICS

High-Resolution Scanning X-ray Diffraction Microscopy

P. Thibault et al.

Analysis of differences in diffraction patterns at each point along an x-ray scan of a material allows imaging of a buried structure with a resolution of 50 nanometers.

MATERIALS SCIENCE

Observations of Intergranular Stress Corrosion

A. King et al.

Cracking in a Grain-Mapped Polycrystal

Tomographic imaging reveals that some grain boundaries in stainless steel are resistant to stress corrosion cracking, which leads to sudden brittle failure.

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A new drug discovery paradigm focuses on identifying and targeting cellular elements of the host that are exploited by pathogens.

GLOSSARY
Find out what DILP, HRE, and OGT mean in the world of cell signaling.

EVENTS
Check out the more than 50 cell signaling–related meetings happening in the second half of 2008.

“Baby Boom” in a Stellar Nursery
Astronomers discover an ancient galactic star factory on overdrive.

Science Careers Seeks Bloggers
J. Austin
We are looking for a few people with interesting things to say about their careers in science.