



COVER

A hot spring in Bali, Indonesia. The discovery of thriving microbial communities in such unexpected places has motivated investigation into the diversity and distribution of microbial life. The special issue beginning on page 1027 explores the microbial world.

Image: Sylvain Grandadam/Getty Images

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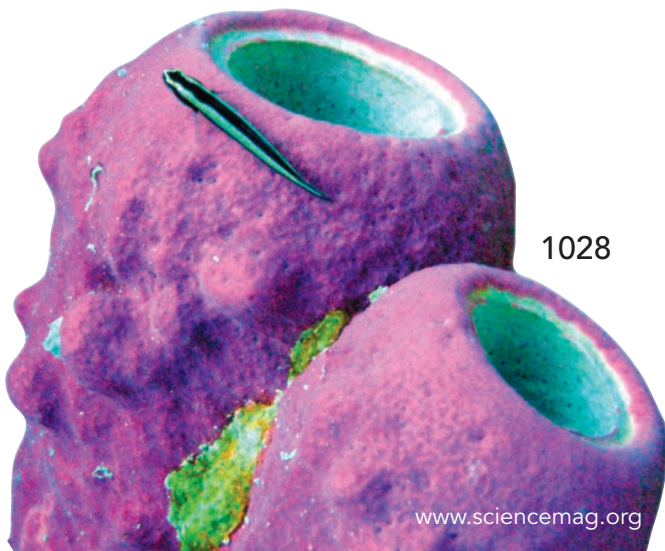
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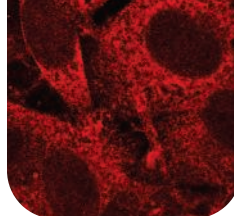
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SCIENCE EXPRESS

www.scienceexpress.org

CELL SIGNALING

The Rag GTPases Bind Raptor and Mediate Amino Acid Signaling to mTORC1

Y. Sancak et al.

Nutrients, specifically amino acids, are sensed by small guanosine triphosphatases, which bind to a signaling complex, moving it close to the nucleus where it initiates cell growth.

10.1126/science.1157535

MICROBIOLOGY

Evolution of Mammals and Their Gut Microbes

R. E. Ley et al.

Genomic sampling of the microbes in the feces of 60 mammals shows that herbivores harbor the most diversity and that individuals of the same species have the same flora.

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10.1126/science.1155725

CELL BIOLOGY

β -Arrestin-Mediated Localization of Smoothed to the Primary Cilium

J. J. Kovacs et al.

β -arrestin, which has several known roles in signaling systems, also links a key receptor to a motor protein so that the receptor can be transported to cilia for sensing environmental cues.

10.1126/science.1157983

CLIMATE CHANGE

Evidence for Upwelling of Corrosive "Acidified" Water onto the Continental Shelf

R. A. Feely et al.

As a result of anthropogenic CO₂ uptake, corrosive seawater undersaturated with calcium carbonate shoaled on the continental shelf of western North America in 2007.

10.1126/science.1155676

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full text at www.sciencemag.org/cgi/content/full/320/5879/1012b

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K. Emanuel

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MICROBIOLOGY

Extending the Sub-Sea-Floor Biosphere

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E. G. Roussel et al.

Prokaryotic cells and DNA from Archaea are present at depths greater than 1 kilometer in sediments below the ocean floor, where temperatures range up to 100° Celsius.

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- Virus Population Dynamics and Acquired Virus Resistance in Natural Microbial Communities** 1047
A. F. Andersson and J. F. Banfield

Fragments of viral genes found within Archaea and Bacteria genomes are part of an antiviral defense system and can be used to identify and track the viruses themselves.

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- Regulated Protein Denitrosylation by Cytosolic and Mitochondrial Thioredoxins** 1050

M. Benhar, M. T. Forrester, D. T. Hess, J. S. Stamler

Thioredoxins—known to be antioxidants—also remove nitrosyl groups from a protease to activate it and may also function in this way in other cellular regulatory systems. >> *Perspective p. 1019*

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- Inverse Temperature Dependence of Toughness in an Ultrafine Grain-Structure Steel** 1057
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A network of fine, fibrous grains formed at high temperatures substantially improves the strength and ductility of a low-alloy steel at low temperatures, where it is typically brittle. >> *Perspective p. 1022*

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M. J. Bierman, Y. K. A. Lau, A. V. Kvit, A. L. Schmitt, S. Jin

A screw dislocation drives the growth of a nanowire pine tree, in which branches regularly extend from the trunk in a spiral, confirming Eshelby's theory of dislocations.

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- Detection of Silica-Rich Deposits on Mars** 1063
S. W. Squyres et al.

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- Formation of Box Canyon, Idaho, by Megaflood: Implications for Seepage Erosion on Earth and Mars** 1067
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M. Ghildiyal et al.

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- Resource Partitioning and Sympatric Differentiation Among Closely Related Bacterioplankton** 1081

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N. Bouatia-Naji et al.

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X. Du et al.

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- The Right and the Good: Distributive Justice and Neural Encoding of Equity and Efficiency** 1092

M. Hsu, C. Anen, S. R. Quartz

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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 © 2008 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): \$144 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$770; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. **Printed in the U.S.A.**

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Genetically modified primates may be better than mice for studying neurological disorders.

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One of the universe's most extreme objects just got a bit stranger.

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New strategy could reduce CO₂ emissions from coal plants.



Telling the story of teamwork.

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Fitting in on a college faculty is harder when you are the first in your family to go to college.

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SCIENCE SIGNALING

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THE SIGNAL TRANSDUCTION KNOWLEDGE ENVIRONMENT

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E. M. Adler and J. F. Foley

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M. Dow

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PERSPECTIVE: Bacterial-Modulated Signaling Pathways in Gut Homeostasis

W.-J. Lee

Stimulation of the production of reactive oxygen species in gut epithelial cells by commensal bacteria dampens the host immune response.

PERSPECTIVE: ETosis—A Novel Cell Death Pathway

F. Wartha and B. Henriques-Normark

Pathogenic microbes are trapped and killed by mast cell- and neutrophil-derived extracellular traps.

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320 (5879)

Science **320** (5879), 981-1096.

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