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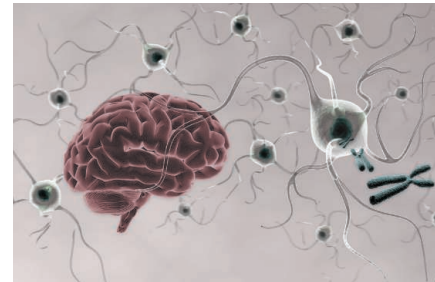
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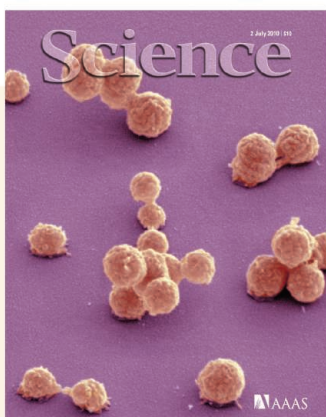


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## COVER

Electron micrograph of *Mycoplasma mycoides* JCVI-syn1.0 cells (magnification ~25,000×). These cells were produced following transplantation of a 1.08-megabase pair synthetic *M. mycoides* genome into *M. capricolum* recipient cells. The cells are controlled by the synthetic genome, exhibit the expected phenotypic properties, and are capable of self-replication, thus providing proof of principle for the production of cells from digitized sequence information. See page 52.

*Photo: Thomas Deerinck and Mark Ellisman, National Center for Microscopy and Imaging Research, University of California at San Diego*

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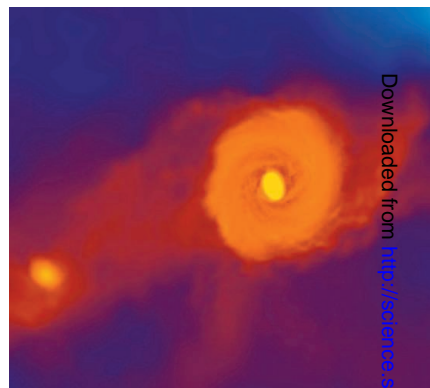
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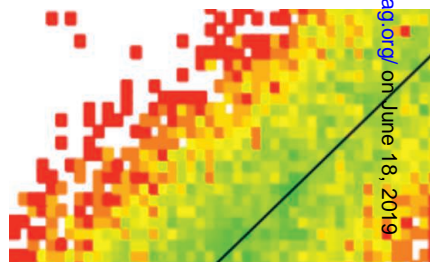
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## SCIENCEONLINE

## SCIENCEEXPRESS

[www.sciencexpress.org](http://www.sciencexpress.org)

**Peripheral Protein Quality Control Removes Unfolded CFTR from the Plasma Membrane**

*T. Okiyonedo et al.*

Cells clear misfolded and damaged proteins from the cell surface, sometimes frustrating attempts to treat protein-folding diseases.

10.1126/science.1191542

**Genetic Signatures of Exceptional Longevity in Humans**

*P. Sebastiani et al.*

Centenarians have genetic signatures that distinguish them from random individuals but are themselves genetically diverse.

10.1126/science.1190532

>> [Science Podcast](#)

**Muscle Dysfunction Caused by a  $K_{ATP}$  Channel Mutation in Neonatal Diabetes Is Neuronal in Origin**

*R. H. Clark et al.*

Identification of the origin of muscle weakness that accompanies a form of neonatal diabetes may lead to safer therapies.

10.1126/science.1186146

**Functional Modules and Structural Basis of Conformational Coupling in Mitochondrial Complex I**

*C. Hunte et al.*

A long helix transduces conformational energy to the proton-pumping elements in complex I.

10.1126/science.1191046

**Ultrahigh Porosity in Metal-Organic Frameworks**

*H. Furukawa et al.*

The large surface areas of these materials would correspond to that of dispersed nanocubes just 3 to 6 nanometers wide.

10.1126/science.1192160

**Single-Shot Readout of a Single Nuclear Spin**

*P. Neumann et al.*

The quantum state of a single nitrogen vacancy in diamond can be read out nondestructively in a single-shot measurement.

10.1126/science.1189075

## SCIENCENOW

[www.sciencenow.org](http://www.sciencenow.org)

Highlights From Our Daily News Coverage

**'Altitude Doping' Has Its Limits**

Athletes who spend too long at high elevation to gain a competitive advantage may be hurting their performance.

**Earth-Like Planets May Be Shielded From Solar Scorching**

Simulation finds that M dwarf stars will not destroy the atmospheres of habitable worlds.

**Bats and Wallabies Have a Lot of NIRV**

"Fossil" genes from the Ebola family of viruses found in a wide range of mammals reveal pathogens' ancient origins.

## SCIENCE SIGNALING

[www.sciencesignaling.org](http://www.sciencesignaling.org)

The Signal Transduction Knowledge Environment

## EVOLUTION OF SIGNALING SYSTEMS

## EDITORIAL GUIDE: Focus Issue—

**The Evolution of Complexity**

*N. R. Gough and W. Wong*

With the wealth of data in genomics and proteomics, scientists can begin to investigate how signaling systems evolved.

**RESEARCH ARTICLE: Evolution of the TSC1/TSC2-TOR Signaling Pathway**

*J. Serfontein et al.*

## PODCAST

*C. J. Howe and A. M. VanHook*

Analysis of TOR signaling pathway evolution may shed light on the early divergence of eukaryotic lineages.

**RESEARCH ARTICLE: Origins and Diversification of a Complex Signal Transduction System in Prokaryotes**

*K. Wuichet and I. B. Zhulin*

**PERSPECTIVE: The Promise of Evolutionary Systems Biology—Lessons from Bacterial Chemotaxis**

*O. S. Soyer*

Genomic analysis reveals missing links in the evolution of chemotaxis systems.

**NETWATCH: Understanding Evolution for Teachers**

Teach and learn evolutionary concepts with materials appropriate for K-12 students; in Educator Sites.

## SCIENCE CAREERS

[www.sciencereers.org/career\\_magazine](http://www.sciencereers.org/career_magazine)

Free Career Resources for Scientists

**Charting Relationships in an Unseen World**

*S. Carpenter*

Metagenomics research probes how complex microbial communities function.

**Scoring a Career in Sports Science**

*K. Travis*

Three scientists talk about their careers in sports-related science.

**Science Careers Communities**

*Science Careers Staff*

MySciNet and CTSciNet offer opportunities to connect with like-minded scientists.

## SCIENCE TRANSLATIONAL MEDICINE

[www.sciencetranslationalmedicine.org](http://www.sciencetranslationalmedicine.org)

Integrating Medicine and Science

**EDITORIAL: Qualifying Therapeutic Discovery Project Tax Credit**

*V. E. Boegh and G. L. Hecimovich*

## PODCAST

*V. E. Boegh et al.*

Small life sciences companies can earn tax credits for research and development or exchange these credits for grants.

**COMMENTARY: Offering Individual Genetic Research Results—Context Matters**

*L. M. Beskow and W. Burke*

A "one size fits all" threshold cannot be developed for decisions about return of individual results.

**RESEARCH ARTICLE: Genomic Architecture Characterizes Tumor Progression Paths and Fate in Breast Cancer Patients**

*H. G. Russnes et al.*

**PERSPECTIVE: Translating the Genomic Architecture of Breast Cancer into Clinical Applications**

*H. M. Horlings et al.*

An objective score of structural alterations in tumor chromosomes gives prognostic information about breast cancer.

**RESEARCH ARTICLE: Serotonergic Neurons Mediate Dyskinesia Side Effects in Parkinson's Patients with Neural Transplants**

*M. Politis et al.*

A serotonin receptor agonist reduces the involuntary movements that can result from cell-based therapies for Parkinson's disease.

## SCIENCEPODCAST

[www.sciencemag.org/multimedia/podcast](http://www.sciencemag.org/multimedia/podcast)

Free Weekly Show

Download the 2 July *Science* Podcast to hear about genetic signatures of long life, biosecurity and ethical concerns about synthetic biology, behavioral epigenetics, and more.

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Science Policy News and Analysis

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