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- 929 **A Diiron Protein Autogenerates a Valine-Phenylalanine Cross-Link**  
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An enzyme creates its own cofactor by linking two nonfunctionalized amino acid side chains.

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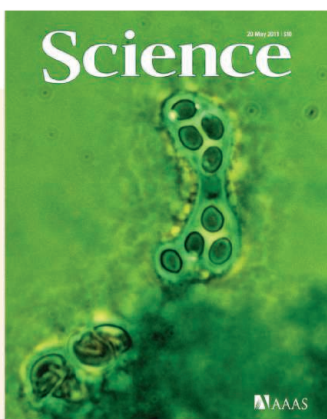


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## COVER

Phase contrast photomicrograph of a *Schizosaccharomyces octosporus* ascus, a sac-like cell that typically contains eight spores (each ~2 micrometers across). *S. octosporus* and other fission yeasts are important models of eukaryote biology and have evolved a single-celled lifestyle independently from their budding yeast cousins. On page 930, Rhind *et al.* present a comparative genomic analysis of fission yeasts that sheds light on their genome structure and gene regulation.

Image: *Dr. George Wilder/Visuals Unlimited, Inc.*

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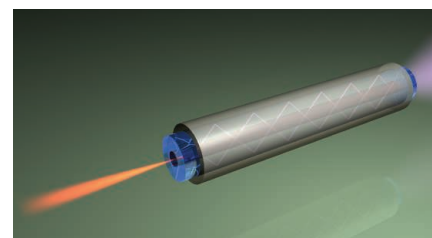
- 930 **Comparative Functional Genomics of the Fission Yeasts**  
*N. Rhind et al.*  
A combined analysis of genome sequence, structure, and expression gives insights into fission yeast biology.

## REPORTS

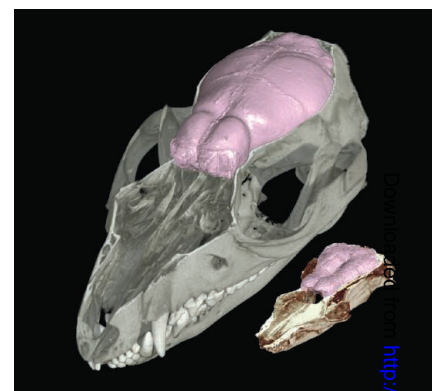
- 937 **Dimensionality Control of Electronic Phase Transitions in Nickel-Oxide Superlattices**  
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- 940 **Competition of Superconducting Phenomena and Kondo Screening at the Nanoscale**  
*K. J. Franke et al.*  
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- 944 **Chlorinated Indium Tin Oxide Electrodes with High Work Function for Organic Device Compatibility**  
*M. G. Helander et al.*  
Closer matching of the energy levels of transparent electrodes and active materials in organic light-emitting diodes improves efficiency.
- 947 **Probing Asthenospheric Density, Temperature, and Elastic Moduli Below the Western United States**  
*T. Ito and M. Simons*  
Monitoring the response to ocean tidal loads reveals detailed variations in Earth's internal structure.
- 951 **Impact of Polar Ozone Depletion on Subtropical Precipitation**  
*S. M. Kang et al.*  
The Antarctic ozone hole has led to increased summertime precipitation in the subtropics of the Southern Hemisphere.  
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- 955 **Fossil Evidence on Origin of the Mammalian Brain**  
*T. B. Rowe et al.*  
Evidence from two early fossils suggests that brain enlargement and specialization proceeded in three pulses.  
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- 958 **Industrial Melanism in British Peppered Moths Has a Singular and Recent Mutational Origin**  
*A. E. van't Hof et al.*  
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- 960 **The Selaginella Genome Identifies Genetic Changes Associated with the Evolution of Vascular Plants**  
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- 963 **Chromatin "Prepattern" and Histone Modifiers in a Fate Choice for Liver and Pancreas**  
*C.-R. Xu et al.*  
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- 966 **Spatial Coupling of mTOR and Autophagy Augments Secretory Phenotypes**  
*M. Narita et al.*  
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- 970 **Diet Drives Convergence in Gut Microbiome Functions Across Mammalian Phylogeny and Within Humans**  
*B. D. Muegge et al.*  
The normal range of physiological and metabolic phenotypes has been shaped by coevolution with microbial symbionts.  
>> *Science Podcast*
- 974 **The Toll-Like Receptor 2 Pathway Establishes Colonization by a Commensal of the Human Microbiota**  
*J. L. Round et al.*  
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- 977 **A Packing Mechanism for Nucleosome Organization Reconstituted Across a Eukaryotic Genome**  
*Z. Zhang et al.*  
Genome-wide nucleosome positioning is a self-organizing system amenable to in vitro reconstitution.
- 981 **Structures of the Bacterial Ribosome in Classical and Hybrid States of tRNA Binding**  
*J. A. Dunkle et al.*  
Two crystal structures indicate how conformational changes in the ribosome assist protein synthesis.

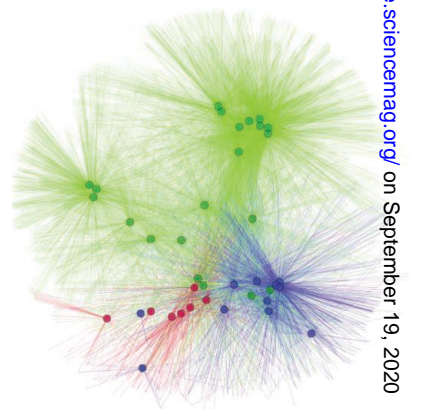
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## SCIENCEONLINE

## SCIENCEEXPRESS

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

## The Visual Impact of Gossip

*E. Anderson et al.*

Negative gossip about a person renders that person's face more visible to the onlooker.  
10.1126/science.1201574

## Predicting a Human Gut Microbiota's Response to Diet in Gnotobiotic Mice

*J. J. Faith et al.*

Model microbial communities in mouse guts respond quickly and predictably to dietary shifts.  
10.1126/science.1206025

## Widespread RNA and DNA Sequence Differences in the Human Transcriptome

*M. Li et al.*

All 12 categories of discordances can be observed where the RNA sequence does not match that of the DNA.  
10.1126/science.1207018

## Thermal Structure and Dynamics of Saturn's Northern Springtime Disturbance

*L. N. Fletcher et al.*

Satellite and ground-based observations characterize a massive storm on Saturn and its effects on the atmosphere.  
10.1126/science.1204774

## Endotoxin-Induced Structural Transformations in Liquid Crystalline Droplets

*I.-H. Lin et al.*

Bacterial lipid A was detected by its interactions with defects in droplet-confined liquid crystals.  
10.1126/science.1195639

## The 2011 Magnitude 9.0 Tohoku-Oki Earthquake: Mosaicking the Megathrust from Seconds to Centuries

*M. Simons et al.*

10.1126/science.1206731

Shallow Dynamic Overshoot and Energetic Deep Rupture in the 2011  $M_w$  9.0 Tohoku-Oki Earthquake

*S. Ide et al.*

10.1126/science.1207020

## Displacement Above the Hypocenter of the 2011 Tohoku-Oki Earthquake

*M. Sato et al.*

Detailed geophysical measurements reveal features of the 2011 Tohoku-Oki megathrust earthquake.  
10.1126/science.1207401

>> *News story p. 911*

## TECHNICALCOMMENTS

## Comment on "Positive Selection of Tyrosine Loss in Metazoan Evolution"

*Z. Su et al.*

Full text at [www.sciencemag.org/cgi/content/full/332/6032/917-a](http://www.sciencemag.org/cgi/content/full/332/6032/917-a)

## Response to Comment on "Positive Selection of Tyrosine Loss in Metazoan Evolution"

*C. S. H. Tan et al.*

Full text at [www.sciencemag.org/cgi/content/full/332/6032/917-b](http://www.sciencemag.org/cgi/content/full/332/6032/917-b)

## SCIENCENOW

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

Highlights From Our Daily News Coverage

## Bright Lights, Rich Cities

Satellite images of nighttime lights could help economists model GDP in regions where it is poorly reported.

<http://scim.ag/bright-lights>

## Controversial Computer Is at Least a Little Quantum Mechanical

Skepticism of the system remains, however.

<http://scim.ag/quantum-computer>

## Mice Reject Reprogrammed Cells

Finding underscores challenges of using iPS cells as a potential therapy for humans.

<http://scim.ag/ips-rejection>

## SCIENCE SIGNALING

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

The Signal Transduction Knowledge Environment

17 May issue: <http://scim.ag/ss051711>

RESEARCH ARTICLE:  $Ca^{2+}$  Signaling Tools Acquired from Prostatomes Are Required for Progesterone-Induced Sperm Motility

*K.-H. Park et al.*

## PERSPECTIVE: Calcium Signaling in Sperm—Help from Prostatomes

*D. Ren*

Proteins involved in calcium signaling are delivered to sperm through fusion with prostate-derived vesicles.

## RESEARCH ARTICLE: Stomatal Closure by Fast Abscisic Acid Signaling Is Mediated by the Guard Cell Anion Channel SLAH3 and the Receptor RCAR1

*D. Geiger et al.*

Plant survival during periods of drought may involve SLAH3, a nitrate-conducting anion channel activated by abscisic acid.

## PRESENTATION: Network-Based Tools for the Identification of Novel Drug Targets

*I. J. Farkas et al.*

Analysis of network topology and dynamics holds promise for identifying new sets of potential drug targets.

## SCIENCE CAREERS

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

Free Career Resources for Scientists

## Focus on Aging: Engineering Safer Drivers

*L. Chiu*

MIT engineer Bryan Reimer designs systems to monitor and improve drivers' performance behind the wheel.

<http://scim.ag/aging-engineering>

## Tooling Up: I've Got a Great Idea

*D. Jensen*

Two recent entrepreneurs offer advice on starting a new company.

[http://scim.ag/startup\\_success](http://scim.ag/startup_success)

## SCIENCE TRANSLATIONAL MEDICINE

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

Integrating Medicine and Science

18 May issue: <http://scim.ag/stm051811>

## EDITORIAL: NCATS Purrs—Emerging Signs of Form and Function

*G. A. FitzGerald*

Derisking and repurposing therapeutics will be among the aims of the National Center for Advancing Translational Science.

## RESEARCH ARTICLE: Functional Regulatory T Cells Produced by Inhibiting Cyclic Nucleotide Phosphodiesterase Type 3 Prevent Allotraft Rejection

*G. Feng et al.*

RESEARCH ARTICLE: Massive ex Vivo Expansion of Human Natural Regulatory T Cells ( $T_{regs}$ ) with Minimal Loss of in Vivo Functional Activity

*K. L. Hippen et al.*

## RESEARCH ARTICLE: Human Regulatory T Cells with Alloantigen Specificity Are More Potent Inhibitors of Alloimmune Skin Graft Damage than Polyclonal Regulatory T Cells

*P. Sagoo et al.*

## PERSPECTIVE: Regulatory T Cells—Customizing for the Clinic

*X. Wang et al.*

A collection of new data provides a platform for clinical use of regulatory T cells as personalized therapeutic agents.

## SCIENCEPODCAST

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

Free Weekly Show

On the 20 May *Science* Podcast: diet and mammalian gut microbiomes, the science of alchemists, inquiry-based writing, and more.

## SCIENCEINSIDER

[news.sciencemag.org/scienceinsider](http://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 © 2011 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): \$149 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$990; 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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**332 (6032)**

*Science* **332** (6032), 891-985.

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