

COVER

The universe is filled with filamentary structures of dark and visible matter that make up the “cosmic web,” as suggested in this artist’s rendering of cosmic bubbles and connected clumps. A special section beginning on page 46 considers the latest research into the origins and evolution of the cosmic web.

Image: Shigemi Numazawa/Atlas Photo Bank/Photo Researchers Inc.

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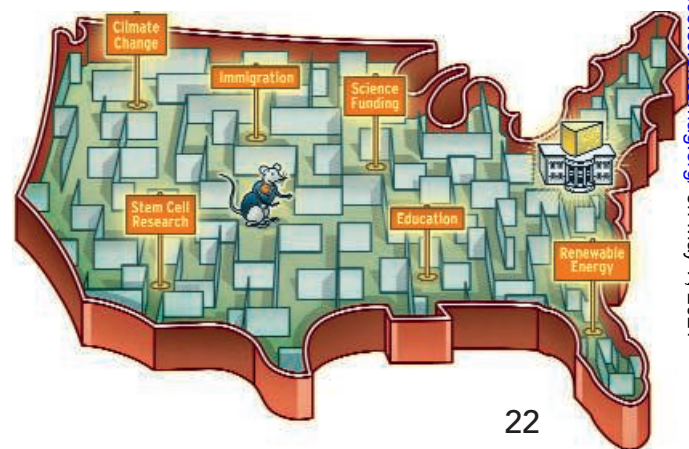
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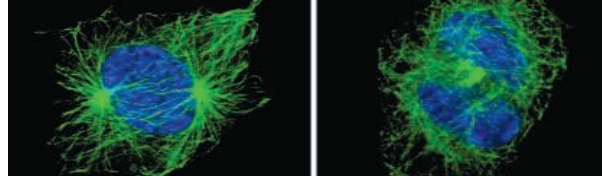
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BIOPHYSICS

Three-Dimensional Super-Resolution Imaging by Stochastic Optical Reconstruction Microscopy

B. Huang, W. Wang, M. Bates, X. Zhuang

Three-dimensional fluorescence images of cellular structures in fixed cells are realized at 20- to 30-nm lateral and 50-nm axial resolution, without scanning.

10.1126/science.1153529

BIOCHEMISTRY

Direct Observation of Hierarchical Folding in Single Riboswitch Aptamers

W. J. Greenleaf et al.

Optical trapping reveals that activation by adenine stabilizes the weakest helix in a riboswitch, after which secondary and tertiary structures are formed sequentially.

10.1126/science.1151298

GENETICS

Mutations in the Pericentrin (PCNT) Gene Cause Primordial Dwarfism

A. Rauch et al.

In humans, an inherited condition with small brain size and near-normal intelligence is caused by mutations that disrupt chromosome separation during cell division.

10.1126/science.1151174

CLIMATE CHANGE

The Spatial Pattern and Mechanisms of Heat Content Change in the North Atlantic

M. S. Lozier et al.

Warming and cooling in different parts of the North Atlantic since 1950 reflect variable atmospheric circulation, complicating our understanding of anthropogenic changes.

10.1126/science.1146436

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Response to Comment on "Protein Sequences from Mastodon and *Tyrannosaurus rex* Revealed by Mass Spectrometry"

J. M. Asara and M. H. Schweitzer

full text at www.sciencemag.org/cgi/content/full/319/5859/33d

BREVIA

EVOLUTION

Rarity of Males in Pea Aphids Results in Mutational Decay 58

J. A. Brisson and S. V. Nuzhdin

Genes used preferentially by female pea aphids are under stronger selection than those used by males, probably because females mainly reproduce asexually.

EVOLUTION

Physiological Sex Predicts Hybrid Sterility 59

Regardless of Genotype

J. H. Malone and P. Michalak

An apparent violation of Haldane's rule (in hybrid organisms the heterogametic sex tends to be sterile) in frogs can be explained by postulating that males have evolved faster.

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Reduced North Atlantic Deep Water Coeval with the 60

Glacial Lake Agassiz Freshwater Outburst

H. F. Kleiven et al.

Data on deep water formation in the North Atlantic indicate that the sudden draining of a huge glacial lake south of Hudson Bay led to dramatic cooling 8200 years ago.

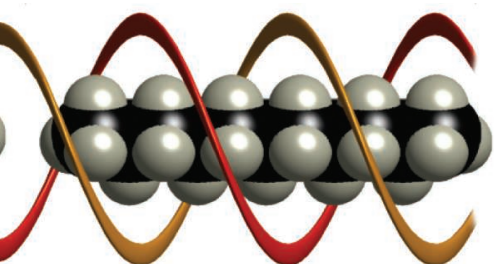
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S. A. Rensing et al.

Comparison of the moss genome sequence with those of other plants reveals hallmarks of colonization of land, including genes to manage terrestrial stresses such as dehydration.



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B. Shen, L. Dong, S. Xiao, M. Kowalewski

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- Polymorphic Y Chromosomes Harbor Cryptic Variation with Manifold Functional Consequences** 91
B. Lemos, L. O. Araripe, D. L. Hartl

Unexpectedly, the Y chromosome exerts strong regulatory effects on X-linked and autosomal genes in *Drosophila*. >> *Perspective p. 42*

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- Heterochromatin and RNAi Are Required to Establish CENP-A Chromatin at Centromeres** 94
H. D. Folco, A. L. Pidoux, T. Urano, R. C. Allshire

Formation of the centromere, the specialized region by which chromosomes are pulled apart during cell division, requires the presence of RNAi-induced heterochromatin.

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- Ongoing in Vivo Experience Triggers Synaptic Metaplasticity in the Neocortex** 101
R. L. Clem, T. Celikel, A. L. Barth

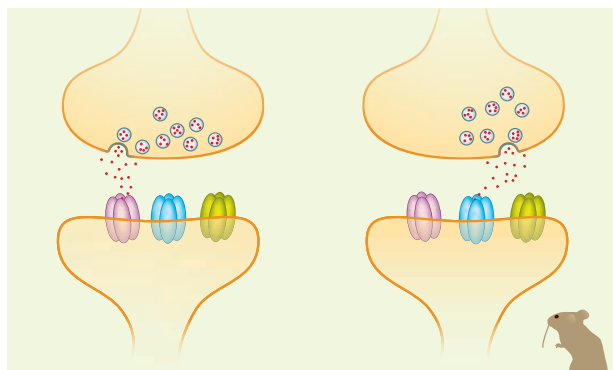
During continuous sensory stimulation, NMDA receptors in the mouse cortex switch from enhancing synaptic potentiation to opposing it.

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T. Schlegel and S. Schuster

Archerfish shoot their insect prey with a stream of water and then use sensory information and just a few neurons to calculate how to retrieve their food.



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