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Science

Epigenetics

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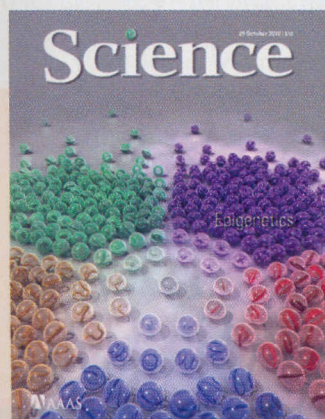
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During development, a multicellular organism generates many different cell types (colored marbles) from a single progeny cell (clear marble in the center), yet all of the cells have nominally identical DNA sequences (and, therefore, the same genetic instruction sets). The maintenance and inheritance of these distinct cellular phenotypes is the basis of epigenetics (the prefix "epi-" is Greek for over or above), the subject of a special section beginning on page 611.

Image: Chris Bickel/Science

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- 641 Diversity of Human Copy Number Variation and Multicopy Genes

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Laboratory measurements of a critical atmospheric rate constant should improve predictions of tropospheric ozone formation.

- 650 Direct Observation and Quantification of CO₂ Binding Within an Amine-Functionalized Nanoporous Solid

R. Vaidhyanathan et al.

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- 653 The Occurrence and Mass Distribution of Close-in Super-Earths, Neptunes, and Jupiters

A. W. Howard et al.

About one-quarter of observed Sun-like stars harbors a close-in terrestrial-mass planet.

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In Soay sheep, self-reactive antibodies are indicators of an evolutionary trade-off between survival and reproduction.

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- 665 Lineage Relationship Analysis of ROR γ t⁺ Innate Lymphoid Cells

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- 669 Filtering of Visual Information in the Tectum by an Identified Neural Circuit

F. Del Bene et al.

A neural circuit in zebrafish is preferentially activated by small visual stimuli, facilitating the capture of prey.

- 673 Visualizing Ribosome Biogenesis: Parallel Assembly Pathways for the 30S Subunit

A. M. Mulder et al.

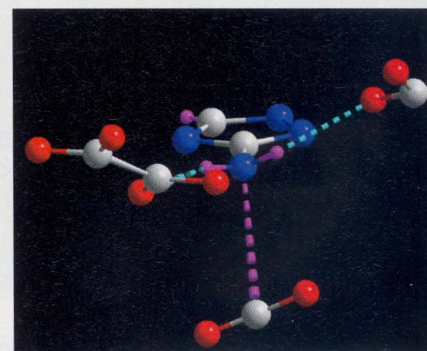
A time-resolved electron microscopy method provides snapshots that reveal the mechanism of ribosome self-assembly.

- 677 Polarized Myosin Produces Unequal-Size Daughters During Asymmetric Cell Division

G. Ou et al.

Motor proteins help to produce developmentally distinct daughter cells during development.

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A. Derdowski et al.

Yeast prion conformations specify phenotypes by affecting the size distribution of aggregates.

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- 683 Cognitive Illusions of Authorship Reveal Hierarchical Error Detection in Skilled Typists

G. D. Logan and M. J. C. Crump

One error-detection mechanism monitors the correctness of one's action, whereas a second mechanism monitors the output.

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- 686 Evidence for a Collective Intelligence Factor in the Performance of Human Groups

A. W. Woolley et al.

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Probing the Ultimate Limit of Fiber-Optic Strain Sensing

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The precisely spaced teeth of an optical frequency comb can be used as a highly accurate strain gauge.
10.1126/science.1195818

The Impact of Conservation on the Status of the World's Vertebrates

M. Hoffmann et al.

Though the threat of extinction is increasing, overall declines would have been worse in the absence of conservation.
10.1126/science.1194442

Scenarios for Global Biodiversity in the 21st Century

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A range of measures predicts continuing declines of biodiversity, highlighting opportunities for policy development and action.
10.1126/science.1196624

Calcium-Permeable AMPA Receptor Dynamics Mediate Fear Memory Erasure

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The subunit composition of AMPA receptors at lateral amygdala synapses changes after the acquisition of associative fear.
10.1126/science.1195298

PML Regulates Apoptosis at Endoplasmic Reticulum by Modulating Calcium Release

C. Giorgi et al.

The promyelocytic leukemia protein likely influences apoptosis by influencing a calcium channel in the endoplasmic reticulum.
10.1126/science.1189157

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Highlights From Our Daily News Coverage

Robot 'Hands' Write Without Fingers

Grain-filled sacks help robots get a grip on cumbersome objects.

Attention Passengers: Please Keep Your Shoes On

New sensor array quickly sniffs out shoe-bomber explosive.

Malaria in India May Be 13 Times Worse Than Feared

New estimates of 200,000 deaths per year prompt shock and skepticism.

SCIENCE SIGNALING

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The Signal Transduction Knowledge Environment

RESEARCH ARTICLE: PI3K Signaling Through the Dual GTPase-Activating Protein ARAP3 Is Essential for Developmental Angiogenesis
L. Gambardella et al.

PODCAST

S. Vermeren and A. M. VanHook

The guanosine triphosphatase-activating protein ARAP3 may be a target for antiangiogenic therapies.

RESEARCH ARTICLE: Antagonistic Regulation of Actin Dynamics and Cell Motility by TRPC5 and TRPC6 Channels

D. Tian et al.

Coupling TRPC5 and TRPC6 calcium channels to different Rho GTPases allows calcium to both promote and inhibit cell migration.

RESEARCH ARTICLE: Regulation of 3-Phosphoinositide-Dependent Protein Kinase 1 Activity by Homodimerization in Live Cells

T. A. Masters et al.

Spatial and temporal regulation of the homodimerization of PDK1 modulates its activity.

PERSPECTIVE: Delivering the Lateral Inhibition Punchline—It's All About the Timing

J. D. Axelrod

New ways to understand lateral inhibition in patterning sensory bristles in the fruit fly are proposed.

REVIEW: Apoptosis, Stem Cells, and Tissue Regeneration

A. Bergmann and H. Steller

Cells undergoing stress- or injury-induced apoptosis can stimulate tissue regeneration by promoting stem or progenitor cell proliferation.

SCIENCE CAREERS

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Free Career Resources for Scientists

Opening New Research Avenues in Epigenetics

E. Pain

Epigenetics provides a common theme to Spanish cancer researcher Manel Esteller's broad interests in basic and translational research.

Environmental Exposures Shape Human Health—and Careers

L. S. Chiu

Brown University scientist Carmen Marsit's unique training allows him to take an interdisciplinary and translational approach to epigenetics.

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Integrating Medicine and Science

RESEARCH ARTICLE: The Inducible Costimulator (ICOS) Is Critical for the Development of Human T_H17 Cells

C. M. Paulos et al.

PERSPECTIVE: ICOS-timizing Immunotherapies with T_H17

J. Garaude and J. M. Blander

The inducible costimulator ICOS promotes the antitumor activity of human T_H17 cells.

RESEARCH ARTICLE: Thermal Enhancement with Optically Activated Gold Nanoshells Sensitizes Breast Cancer Stem Cells to Radiation Therapy

R. L. Atkinson et al.

Local heating with gold nanoshells sensitizes mouse and human breast cancer stem cells to radiation treatment.

SCIENCEPODCAST

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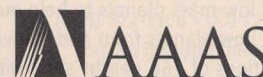
Defining Epigenetics

Science Senior Editor Guy Riddihough taps experts for their definition of epigenetics.

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