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# Breakthrough of the Year

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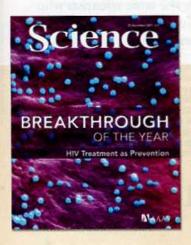
1650 An Exit Strategy for Measles Virus
V. Racaniello

1651 Efficient Fluorination of Organic Molecules with Chiral Atoms

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# COVER

Scanning electron micrograph of HIV viruses, each ~120 nanometers in diameter, on an infected cell surface. This year, clinical trial results showing that antiretroviral treatments for HIV also keep the virus from spreading raised hopes of ending HIV/AIDS epidemics in whole populations. See the Breakthrough of the Year special section beginning on page 1628 and at www.scim.ag/2011btoy.

Image: Thomas Deerinck, Kathleen Fitzpatrick, John Guatelli, and Mark Ellisman, NCMIR, UCSD/Visuals Unlimited, Inc.

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1664 Pigeons on Par with Primates in Numerical Competence
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1665 Voyager Measurements of Hydrogen Lyman-α Diffuse Emission from the Milky Way

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1669 Npas4 Regulates a Transcriptional Program in CA3 Required for Contextual Memory Formation

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A transcription factor dependent on electrical activity regulates genes involved in long-term memory formation.

1675 How a DNA Polymerase Clamp Loader Opens a Sliding Clamp B. A. Kelch et al.

Crystal structures show how the sliding clamp that facilitates processive replication is loaded onto DNA.

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1684 Angular Momentum Conservation in Dipolar Energy Transfer D. Guo et al.

> Spin states restrict energy transfer between donor and acceptor chromophores that appear otherwise compatible.

1687 Graphitic Tribological Layers in Metal-on-Metal Hip Replacements

> A graphitic layer is found to be the cause of low friction in metal-on-metal hip implants.

1690 Evidence from Numerical Experiments for a Feedback Dynamo Generating Mercury's Magnetic Field D. Heyner et al.

> Feedback between the external magnetospheric field and the internal magnetic field explains Mercury's weak magnetic field.

1694 Isotopic Evidence for Massive Oxidation of Organic Matter Following the Great Oxidation Event

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1696 Fossilized Nuclei and Germination Structures Identify Ediacaran "Animal Embryos" as Encysting Protists I. Huldtgren et al.

High-resolution imaging of 570-million-year-old fossils suggests that they were not remnants of early animals. >> Perspective p. 1655

1699 From Flat Foot to Fat Foot: Structure, Ontogeny, Function, and Evolution of Elephant "Sixth Toes" J. R. Hutchinson et al.

> Elephants have an extra bone in their feet that can be traced through their fossil record to reveal a transition from flat to raised feet.

1703 Global Seabird Response to Forage Fish Depletion—One-Third for the Birds P. M. Cury et al.

> One-third of maximum fish biomass must be available for seabirds to sustain high breeding success.

1706 Mouse B-Type Lamins Are Required for Proper Organogenesis But Not by Embryonic Stem Cells

Y. Kim et al.

Mice lacking critical structural components of the nucleus, lamin-B intermediate filament proteins, remain viable until birth.

1710 Direct Redox Regulation of F-Actin Assembly and Disassembly by Mical R.-J. Hung et al.

A protein involved in redox signaling disassembles actin filaments and alters their reassembly,

1713 Mismatch Repair, But Not Heteroduplex Rejection, Is Temporally Coupled to DNA Replication

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The crystal structure of biomineralized magnetic nanocrystals depends on environmental and genetic factors.

1723 The Ribosome Modulates Nascent Protein Folding

C. M. Kaiser et al.

Single-molecule studies show that the ribosome promotes efficient folding of a two-domain protein.

1727 The Hedgehog Pathway Promotes Blood-Brain Barrier Integrity and CNS Immune Quiescence

J. I. Alvarez et al.

Hedgehog signaling is required for maintaining the integrity of the blood-brain barrier. >> Perspective p. 1652

1730 Fear Erasure in Mice Requires Synergy Between Antidepressant Drugs and Extinction Training

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