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COVER
*Ardipithecus ramidus*, a possible human ancestor, inhabited then-wooded regions of Ethiopia 4.4 million years ago.

This year, studies of the fossilized skeleton of a member of the species raised surprising questions about how key human traits evolved. See the Breakthrough of the Year special section beginning on page 1598 and at www.sciencemag.org/btoy2009/.

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Enabling New Missions for Robotic Aircraft
J. W. Langelaan and N. Roy

Mining Our Reality
T. M. Mitchell

Reflections On: Our Planet and Its Life, Origins, and Futures
J. J. McCarthy

Regiodivergent Ring Opening of Chiral Aziridines
B. Wu et al.
A bimetallic catalyst selects different ring-opening sites, depending on the chiral configuration of the substrate.

Stepwise Modification of a Modular Enhancer Underlies Adaptation in a Drosophila Population
M. Rebeiz et al.
A combination of new and previously existing mutations in gene regulatory sequences can drive morphological evolution.

Crystal Structure of the Eukaryotic Strong Inward-Rectifier K+ Channel Kir2.2 at 3.1 Å Resolution
X. Tao et al.
A structure reveals the basis of diode-like conduction properties and toxin insensitivity of these channels.

Formation and Survival of Water Vapor in the Terrestrial Planet–Forming Region
T. Bethell and E. Bergin
Water in protoplanetary disks shields water molecules in deeper layers of the disk from destructive ultraviolet radiation.

Spatial Organization of Hominin Activities at Gesher Benot Ya’aqov, Israel
N. Alperson-Afil et al.
The spatial distribution of artifacts implies that living space was organized by use as early as 800,000 years ago.

Mozambican Grass Seed Consumption During the Middle Stone Age
J. Mercader
Residues on stone tools imply that early humans were processing grass seeds by 100,000 years ago.

Universality in Three- and Four-Body Bound States of Ultracold Atoms
S. E. Pollock et al.
The interactions involved in the formation of few-body bound states can be probed in a cloud of ultracold atoms.

Experimental Observations of Stress-Driven Grain Boundary Migration
T. J. Rupert et al.
Shear stresses drive grain boundaries to move in a manner consistent with predictions of coupled grain boundary migration.

Real-Time Observation of Carbonic Acid Formation in Aqueous Solution
K. Adamczyk et al.
The use of a photoacid enables the long-sought characterization of the conjugate acid of bicarbonate.

Bacterial Community Variation in Human Body Habitats Across Space and Time
E. K. Costello et al.
The composition of microbial communities on the human body is primarily determined by their location.

The Fanconi Anemia Pathway Promotes Replication-Dependent DNA Interstrand Cross-Link Repair
P. Knipscheer et al.
Insertion of a nucleotide during the repair of a complex lesion in DNA requires tagging of a lysine residue.

Indirect Punishment and Generosity Toward Strangers
A. Ule et al.
Frequent rewards spiced with occasional punishment are a recipe for the evolution of cooperation.

On the Origin of Species by Natural and Sexual Selection
G. S. van Doorn et al.
Modeling demonstrates how speciation occurs due to sexual selection.

Structure of the LKB1-STRAD-MO25 Complex Reveals an Allosteric Mechanism of Kinase Activation
E. Zegiraj et al.
A “pseudokinase” activates the LKB1 tumor suppressor protein without catalyzing phosphorylation.

The Subtle Transmission of Race Bias via Televised Nonverbal Behavior
M. Weisbuch et al.
Nonverbal behaviors can contribute to implicit bias in intergroup attitudes.

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is required for some, but not all, of its functions

The guanine nucleotide exchange activity of Vav1

A. Saveliev

Activation Exchange Activity of Vav1 in T Cell Development

Inhibitors of fatty acid signaling promote apoptosis in

Antilipogenic Therapy

Pathway Sensitizes Glioblastomas to

RESEARCH ARTICLE: EGFR Signaling Through an

Intravenous Hemostat—

Therapeutic Development.

S. A. Stanley and D. T. Hung

Genetic Screens in Human Cells

Infection Biology—A New Method for Conducting

PERSPECTIVE: Toward a Systems-Level Analysis of

Integration of Medicine and Science

PERSPECTIVE: Cell Mechanics and Feedback

Regulation of Actomyosin Networks

R. Fernandez-Gonzalez and J. A. Zallen

Mechanical signals shape the organization and
dynamics of contractile networks in cells during
morphogenesis.

PERSPECTIVE: Book Review—Making Sense of

Signal Transduction

W. T. Miller

A textbook provides an overview of signaling concepts and models for teaching.

PODCAST

P. S. Mischi and A. M. VanHook

Inhibiting fatty acid synthesis may be effective in controlling glioblastomas driven by EGFR signaling.

SCIENCECAREERS

www.sciencecareers.org/career_magazine

Free Career Resources for Scientists

Tooling Up: Presenting Your Technology

D. Jensen

Budding scientist-entrepreneurs must be able to present their company skillfully to potential investors and partners.

Breakthrough of the Year:

A Tale of Two Paleontologists

E. Pain

Two young paleontologists tell how they got involved in the field work that uncovered Ardipithecus ramidus in Ethiopia.

GrantsNet Funding News

GrantsNet Staff

Get the latest funding opportunities for science research, fellowships, scholarships, and internships.

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PERISPECTIVE: Pharmacologic Induction of CD8+ T Cell Memory—Better Living Through Chemistry

L. Cattoni et al.

Targeting the immune system using small molecules may enhance immunotherapy.

PERSPECTIVE: toward a Systems-Level Analysis of Infection Biology—A New Method for Conducting Genetic Screens in Human Cells

S. A. Stanley and D. T. Hung

Human genetic screens at the DNA level advance therapeutic development.

RESEARCH ARTICLE: Intravenous Hemostat—

Nanotechnology to Halt Bleeding

J. P. Bertram et al.

Bioengineers develop functional blood cells.