CONTENTS

TOWARD AN HIV VACCINE: A SCIENTIFIC JOURNEY
Different strategies are coming together to provide insights for an effective HIV vaccine
By A. S. Fauci and H. D. Marston

NEWS

IN BRIEF
350 Roundup of the week’s news

IN DEPTH
352 SCIENTISTS PONDER AN IMPROBABLY ACTIVE PLUTO
New Horizons delights researchers with stark vistas and perplexing puzzles
By E. Hand

354 NEW MYSTERY FOR NATIVE AMERICAN ORIGINS
Rival papers compete to explain surprising link to Australia and Melanesia
By M. Balter

355 CHILD FIGHTS HIV TO A DRAW
After 12 years off treatment, a young woman has had remarkable—and unexplained—control of her infection
By J. Cohen

356 IRAN NUCLEAR DEAL HOLDS ‘GOODIES’ FOR SCIENTISTS
Researchers to collaborate at repurposed nuclear facilities
By R. Stone

357 WEB BILLIONAIRE JOINS SEARCH FOR ALIEN SIGNALS
Yuri Milner hopes that $100 million can answer one of humanity’s most enduring questions
By D. Clery

FEATURES

358 NEW LIFE FOR OLD BONES
After a stormy adolescence, the field of ancient DNA enters its golden era
By E. Culotta

362 REVOLUTION IN HUMAN EVOLUTION
As it smashes disciplinary boundaries, ancient DNA is rewriting much of human prehistory
By A. Gibbons

367 LOST WORLDS FOUND
Sugar cubes of buried soil reveal how ecosystems warmed after the last ice age
By E. Pennisi

369 Prospecting for genetic gold
By E. Pennisi

370 BREAKING A TROPICAL TABOO
Most ancient DNA comes from frigid environs. Can new methods sample hot and humid locales?
By L. Wade

372 PROTEIN POWER
Paleoproteomics hustles to catch up with its more developed cousin
By R. F. Service

INSIGHTS

PERSPECTIVES
374 FOUR LEGS TOO MANY?
A long-bodied fossil snake retains fore- and hindlimbs
By S. Evans

376 MAKING METHANE DOWN DEEP
Scientists find active life 2.5 km beneath the sea floor
By J. A. Huber

377 MOVING CTLA-4 FROM THE TRASH TO RECYCLING
Individuals lacking a protein expressed in T cells have low CTLA-4 and develop autoimmunity
By D. M. Sansom

379 CATALYSTS BY PLATONIC DESIGN
Sophisticated shape-controlled design is yielding ever more active nanocatalysts
By P. Strasser

380 BREAKERS AND BLOCKERS—miRNAs AT WORK
MicroRNAs mediate silencing through messenger RNA degradation and translation repression
By E. Izaurralde

382 STRETCH, WRAP, AND RELAX TO SMARTNESS
Carbon nanotubes wrapped around rubber cores create resilient conducting fibers
By T. Ghosh

384 YELLOW LIGHTS FOR EMERGING TECHNOLOGIES
All-or-none regulatory systems are not adequate for revolutionary innovations
By R. A. Charo

386 TOWARD AN HIV VACCINE: A SCIENTIFIC JOURNEY
Different strategies are coming together to provide insights for an effective HIV vaccine
By A. S. Fauci and H. D. Marston
BOOKS ET AL.

388 HOW TO CLONE A MAMMOTH
By A. Shapiro, reviewed by A. R. Hoelzel
NEWS STORY P. 369

389 THE LOCK AND KEY OF MEDICINE
By L. V. Marks, reviewed by S. Prabakaran
LETTERS

390 PRECISION MEDICINE: LOOK TO THE MICE
By K. C. K. Lloyd et al.

390 SEXISM DISCUSSION MISSES THE POINT
By H. S. Young

391 CHIMPANZEE DESERVE THEIR FREEDOM
By S. M. Wise

391 TECHNICAL COMMENT ABSTRACTS

RESEARCH

IN BRIEF

392 From Science and other journals

REVIEW

395 HUMAN MICROBIOTA
Small molecules from the human microbiota M. S. Donia and M. A. Fischbach
REVIEW SUMMARY: FOR FULL TEXT: dx.doi.org/10.1126/science.1254766

REPORTS

396 APPLIED ORIGAMI
Origami of thick panels Y. Chen et al.

400 STRETCHY ELECTRONICS
Hierarchically buckled sheath-core fibers for superelastic electronics, sensors, and muscles Z. F. Liu et al.
PERSPECTIVE P. 382

374 & 416
A Cretaceous snake with limbs

392
QUANTUM INFORMATION
405 Coherent coupling between a ferromagnetic magnon and a superconducting qubit Y. Tabuchi et al.

408 Coherent coupling of a single spin to microwave cavity photons J. J. Viennot et al.

412 NANOCATALYSTS
Platinum-based nanocages with subnanometer-thick walls and well-defined, controllable facets L. Zhang et al.
PERSPECTIVE P. 379

416 EVOLUTION
A four-legged snake from the Early Cretaceous of Gondwana D. M. Martill et al.
PERSPECTIVE P. 374

420 DEEP BIOSPHERE
Exploring deep microbial life in coal-bearing sediment down to ~2.5 km below the ocean floor E. Inagaki et al.
PERSPECTIVE P. 376

424 NEURODEVELOPMENT
Adult cortical plasticity depends on an early postnatal critical period S. D. Greenhill et al.

377 & 436
An autoimmunity mechanism

428 PI4P/phosphatidylserine countertransport at ORP5- and ORP8-mediated ER–plasma membrane contacts J. Chung et al.

432 Phosphatidylserine transport by ORP/Osh proteins is driven by phosphatidylinositol 4-phosphate J. Moser von Filseck et al.

436 AUTOIMMUNE DISEASE
Patients with LRBA deficiency show CTLA4 loss and immune dysregulation responsive to abatacept therapy B. Lo et al.
PERSPECTIVE P. 377

DEPARTMENTS

349 EDITORIAL
Rethinking graduate education
By Alan I. Leshner

446 WORKING LIFE
Songwriting and science
By C. Neal Stewart Jr.

ON THE COVER

A researcher drills into ancient bone to extract material for DNA analysis at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. As the newest sequencing methods are applied to ancient samples and spread to many laboratories, ancient DNA is poised to enter its golden age, delivering stunning results ranging from the evolution of humans to that of microbes. See page 358. Photo: © Jörg Singer

Science Staff ........................................... 348
New Products ........................................ 441
Science Careers ..................................... 442