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Animal domestication has been key to the development of human societies. The sequence of the bovine genome reveals new insights into the history and biology of cattle. See pages 522 and 528, and related research on horse and sheep genetics and domestication on pages 485 and 532.

*Photo illustration: Yael Kats (images: Jupiterimages)*  
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## BREVIA

- 485 Coat Color Variation at the Beginning of Horse Domestication  
*A. Ludwig et al.*

As part of the domestication process, humans appear to have selectively bred color variants of horses.

## REPORTS

- 486 The Disappearance of the Progenitors of Supernovae 1993J and 2003gd  
*J. R. Maund and S. J. Smartt*

The presumed progenitor stars of supernovae are indeed absent in later images from these sites.

- 488 Greatly Increased Toughness of Infiltrated Spider Silk  
*S.-M. Lee et al.*

Infiltration of spider silk with impurities enhances the mechanical performance.

- 492 Asymmetric Autocatalysis Triggered by Carbon Isotope ( $^{13}\text{C}/^{12}\text{C}$ ) Chirality  
*T. Kawasaki et al.*

The origin of chirality in asymmetric autocatalysis is due to carbon isotope substitution.

- 495 A Global View of the Lithosphere-Asthenosphere Boundary  
*C. A. Rychert and P. M. Shearer*

Seismic imaging reveals a global velocity anomaly at depths of 70 to 100 kilometers that may be from some melt or a strong fabric in Earth's mantle.

>> *Perspective p. 474*

- 499 Seismic Evidence for Sharp Lithosphere-Asthenosphere Boundaries of Oceanic Plates  
*H. Kawakatsu et al.*

Detection of the presence of melt at variable depth beneath two oceanic plates reveals the vertical extent of old oceanic plates.

>> *Perspective p. 474*

- 502 Subducting Slab Ultra-Slow Velocity Layer Coincident with Silent Earthquakes in Southern Mexico  
*T.-R. A. Song et al.*

Seismic mapping suggests that silent earthquakes may be related to an ultra-slow velocity layer on top of a subducting slab.

- 506  $^{14}\text{CH}_4$  Measurements in Greenland Ice: Investigating Last Glacial Termination  $\text{CH}_4$  Sources  
*V. V. Petrenko et al.*

Radiocarbon measurements show that wetlands were responsible for the rapid increase of atmospheric methane concentration during the last deglaciation.

>> *Perspective p. 477*

- 509 Tuning the Activation Threshold of a Kinase Network by Nested Feedback Loops  
*Q. A. Justman et al.*

Interacting negative feedback loops control the sensitivity of amphibian oocytes to the hormone progesterone.

>> *Perspective p. 476*

- 513 Catalytic Core of a Membrane-Associated Eukaryotic Polyphosphate Polymerase  
*M. Hothorn et al.*

A yeast membrane protein complex contains a domain that generates linear phosphate polymers from adenosine triphosphate.

- 516 Homeostatic Sleep Pressure and Responses to Sustained Attention in the Suprachiasmatic Area  
*C. Schmidt et al.*

After prolonged wakefulness, people who are "night owls" do better at mental tests than those who are "early birds."

- 519 Intuition and Deliberation: Two Systems for Strategizing in the Brain  
*W.-J. Kuo et al.*

Optimal gaming requires matching the type of neural circuitry (intuitive versus deliberative) to the type of game.

- 522 The Genome Sequence of Taurine Cattle: A Window to Ruminant Biology and Evolution  
*The Bovine Genome Sequencing and Analysis Consortium*

- 528 Genome-Wide Survey of SNP Variation Uncovers the Genetic Structure of Cattle Breeds  
*The Bovine HapMap Consortium*

A survey of genetic diversity of cattle suggests two domestication events in Asia and selection by husbandry.

>> *Perspective p. 478; Science Podcast*

- 532 Revealing the History of Sheep Domestication Using Retrovirus Integrations  
*B. Chessa et al.*

Sheep retroviruses can be used to map the selective preferences of early farmers and trace livestock movements across Europe.

>> *Science Podcast*

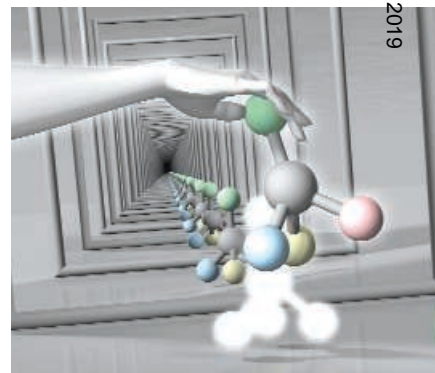
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## SCIENCEONLINE

## SCIENCEEXPRESS

[www.scienceexpress.org](http://www.scienceexpress.org)

**Phasic Firing in Dopaminergic Neurons Is Sufficient for Behavioral Conditioning**

*H.-C. Tsai et al.*

High-frequency pulses in deep brain cells release dopamine and cause reward-related behavior in mice.

10.1126/science.1168878

**Crystal Structure of the Nuclear Export Receptor CRM1 in Complex with Snurportin1 and RanGTP**  
*T. Monecke et al.*

The structure of an exportin complex shows how nuclear transport complexes differentially recognize cargo.

10.1126/science.1173388

**Entropic Evidence for Linguistic Structure in the Indus Script**

*R. P. N. Rao et al.*

Analysis of the pattern of symbols confirms the linguistic role of ancient signs.

10.1126/science.1170391

**Magnetic Field Sensing Beyond the Standard Quantum Limit Using 10-Spin NOON States**

*J. A. Jones et al.*

Quantum mechanical entanglement of nuclei in a single molecule results in an enhancement of the magnetic field sensitivity.

10.1126/science.1170730

**Penultimate Deglacial Sea Level Timing from Uranium/Thorium Dating of Tahitian Corals**

*A. L. Thomas et al.*

Sea levels rose during the penultimate deglaciation while Northern Hemisphere insolation was at a minimum.

10.1126/science.1168754

## TECHNICALCOMMENTS

**Comment on "Colossal Ionic Conductivity at Interfaces of Epitaxial  $ZrO_2:Y_2O_3/SrTiO_3$  Heterostructures"**

*X. Guo*

full text at [www.sciencemag.org/cgi/content/full/324/5926/465a](http://www.sciencemag.org/cgi/content/full/324/5926/465a)

**Response to Comment on "Colossal Ionic Conductivity at Interfaces of Epitaxial  $ZrO_2:Y_2O_3/SrTiO_3$  Heterostructures"**

*J. García-Barriocanal et al.*

full text at [www.sciencemag.org/cgi/content/full/324/5926/465b](http://www.sciencemag.org/cgi/content/full/324/5926/465b)

## SCIENCENOW

[www.sciencenow.org](http://www.sciencenow.org)

Highlights From Our Daily News Coverage

**Neandertal Babies Didn't Do the Twist**

Unlike in humans, Neandertal babies may not have rotated in the birth canal.

**Closer Look at Einstein's Brain**

A new anatomical study reveals unusual features in the physicist's parietal lobes.

**The Mother of All Pileups**

Crash of giant gas clouds suggests dark matter's hand.

## SCIENCESIGNALING

[www.sciencesignaling.org](http://www.sciencesignaling.org)

The Signal Transduction Knowledge Environment

**EDITORIAL GUIDE: Demystifying mTOR Signaling**

*N. R. Gough*

The field of mTOR signaling is rapidly advancing.

**PERSPECTIVE: The Pharmacology of mTOR Inhibition**

*D. A. Guertin and D. M. Sabatini*

The quest for effective cancer therapies reveals insight into the regulation and function of the mammalian target of rapamycin.

**PERSPECTIVE: Immune Regulation by Rapamycin: Moving Beyond T Cells**

*M. R. Janes and D. A. Fruman*

Rapamycin regulates immune responses, in part, through its effects on macrophages and dendritic cells.

**PERSPECTIVE: Akt Demoted in Glioblastoma**

*P. K. Vogt and J. R. Hart*

PKC $\alpha$  is an essential component of a pathway linking EGFR signaling to mTOR and cell proliferation in glioblastoma.

**PERSPECTIVE: New Insights into mTOR Signaling—mTORC2 and Beyond**

*D. R. Alessi et al.*

mTORC2 promotes the phosphorylation of AGC kinase substrates at two distinct sites.

## PODCAST

*M. B. Yaffe and A. M. VanHook*

*Science Signaling's* Chief Scientific Editor gives an overview of mTOR signaling.

## SCIENCECAREERS

[www.sciencecareers.org/career\\_magazine](http://www.sciencecareers.org/career_magazine)

Free Career Resources for Scientists

**Special Feature: The Other Parts of Your Academic Job**

*J. Austin*

Research gets more attention, but teaching and service are also important parts of an academic career.

**Teach the Students You Have**

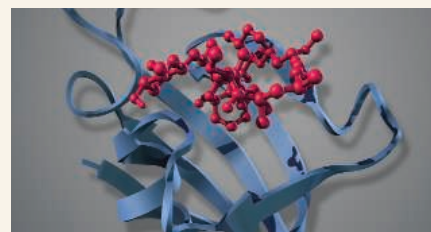
*S. Carpenter*

To teach well, take a scholarly approach and make your expectations clear.

**Professional Service**

*E. Pain*

Institutional service may be an annoyance, but you still need to do your part.



## SCIENCESIGNALING

An mTOR inhibitor.



## SCIENCECAREERS

Mastering the teaching and service career components.

## SCIENCEPODCAST

[www.sciencemag.org/multimedia/podcast](http://www.sciencemag.org/multimedia/podcast)

Free Weekly Show

Download the 24 April *Science* Podcast to hear about advances in livestock research, including the sequencing of the cattle genome and insights into the history of sheep domestication.

## ORIGINSBLOG

[blogs.sciencemag.org/origins](http://blogs.sciencemag.org/origins)

A History of Beginnings

## SCIENCEINSIDER

[blogs.sciencemag.org/scienceinsider](http://blogs.sciencemag.org/scienceinsider)

Science Policy News and Analysis

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