Science

In Science Journals

Highlights from the *Science* family of journals

MUTUALISM | SCIENCE

Separate partners

Mutualistic relationships between ants and plants have evolved repeatedly. In these relationships, the ants often supply the plants with nutrients, while the plants provide structures suitable for ant nests, generally referred to as "domatia." In some pairs, these relationships are exclusive, but in many others, ...

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IMMUNOLOGY | SCIENCE

Macrophages heal damage during infection

Healthy tissue may be damaged by the activity of immune cells working to eradicate infection. Hoagland *et al.* found that in mice, the production of the cytokine oncostatin M (OSM) by macrophages within the respiratory tract provided protection during immune responses in the lung. ...

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SOLAR CELLS | SCIENCE

A diradical approach to hole transport

The incorporation of strong donor-acceptor interactions, coplanar conjugation, and steric hindrance creates diradical self-assembled monolayer molecules that function as a robust and efficient hole transporter for perovskite solar cells. Wu *et al.* used scanning electrochemical cell microscopy–thin-layer cyclic voltammetry to determine the improvements in ...

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INNATE LYMPHOID CELLS | SCIENCE IMMUNOLOGY

ILC progenitors from the liver

Innate lymphoid cells (ILCs) comprise a heterogeneous family of mostly tissue-resident lymphocytes that play an important role as the first line of host defense and contribute to tissue homeostasis and immune regulation. Wang *et al.* now report that in mice, ILC progenitors (ILCPs) from the ...

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DOG DOMESTICATION | SCIENCE

History of an essential partnership

Dogs have been an important part of human societies for thousands of years, and in Arctic regions, dogs adapted to extreme cold conditions have been essential for human survival. One such region is Greenland, where a native sled dog, the Qimmiq (plural Qimmit), has ...

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OCEAN ECOLOGY | SCIENCE

Functional atlas for the oceans

The oceans of our planet are divided into regions by massive water movements that delineate physicochemical regimes that may represent ecosystems. A functional ecosystem atlas of the ocean will help us understand what happens to biochemical cycling and storage of carbon. For the South Pacific, ...

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SEISMOLOGY | SCIENCE

Deep fluids, shallow quakes

Subsurface fluids are known to trigger earthquakes through engineering and in nature. For the latter, the effect of fluids on seismicity above subduction zones is of particular interest for populated areas where megathrust earthquakes are known to occur, such as Japan. A machine-learning analysis of ...

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NEUROPHYSIOLOGY | SCIENCE

Decoding dopamine signaling

Dopamine is critical for a wide range of fundamental behaviors, including movement, motivation, action selection, and reinforcement learning. The spatiotemporal dynamics of dopamine transmission remain to be fully elucidated. Yee *et al.* used in vivo approaches in mice to study striatal dopamine signaling. ...

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NEUROSCIENCE | SCIENCE

Brain clearance and Alzheimer's disease

Since the first characterization of the glymphatic system, much attention has been paid to the role that its dysfunction may play in the development of Alzheimer's disease and other neurodegenerative conditions. Although the glymphatic system in the rodent brain and in rodent models of disease ...

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EVOLUTION | SCIENCE

Trying to resolve an old question

Sex chromosomes have distinct evolutionary patterns compared with autosomes. The Y or W chromosome often degenerates due in part to lack of recombination with the X or Z chromosomes, heterogametic hybrids of two species tend to be inviable or sterile, and the X and Z ...

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NEUROSCIENCE | SCIENCE

Programmed neuronal diversity

The use of human induced pluripotent stem cells to generate induced neurons is used in a broad range of neuroscience studies, from disease modeling to drug screening. However, replicating the large heterogeneity of human neurons is challenging. Lin *et al.* performed a systematic screening ...

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MOLECULAR BIOLOGY | SCIENCE

Structure of the human telomerase dimer

Telomerase maintains chromosome ends (telomeres) and is an essential factor in genome stability, aging, and cancer. Although telomerase is known to function as a monomer, evidence has hinted at a possible dimeric form. Using cryo–electron microscopy, Balch *et al.* resolved the structure of a ...

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PROSTHETICS | SCIENCE

Direct interfacing for better lower limb control

Early designs for lower limb prosthetics focused on restoring basic movement. There have been advances enabling greater functionality, but these systems are still based on preprogrammed motions using limbs physically separated from the body. Shu *et al.* hypothesized that if connections could be formed ...

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NEUROSCIENCE | SCIENCE

Replacing diseased microglia

Mutations in the gene encoding colony stimulating factor 1 receptor (CSF1R) lead to a severe neurological disease called adult-onset leukoencephalopathy with axonal spheroids and pigmented glia (ALSP), for which there are no treatments. In the brain, CSF1R is mainly expressed by microglia. Wu *et al.* ...

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ORGANIC CHEMISTRY | SCIENCE

Universal access to carbenes

Carbenes are reactive, two-coordinate carbon centers with an unbonded electron pair. They are useful intermediates in numerous reactions, but their precursors are themselves often unstable and hazardous. Nguyen *et al.* now report a protocol to generate carbenes with a very wide variety of substituents ...

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RIVER DYNAMICS | SCIENCE

Rivers find their inner imbalance

In rivers, water and sediment move down one or more pathways, or threads. Dams and dikes have forced many multithreaded rivers into single pathways, and effective restoration depends on knowing the mechanism behind a river's original state. Using satellite imagery to measure changes over 56 ...

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CELL BIOLOGY | SCIENCE

Mitochondria, peroxisomes, and redox protection

Mitochondria generate reactive oxygen species (ROS) molecules that can cause oxidative damage if not properly controlled. Mitochondria have been thought to manage their own ROS using built-in antioxidant systems. However, defects in antioxidant-rich organelles called peroxisomes lead to mitochondrial damage. DiGiovanni *et al.* ...

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HEART DISEASE | SCIENCE TRANSLATIONAL MEDICINE

Regulating hypertrophic cardiomyopathy

Hypertrophic cardiomyopathy (HCM) is a genetic disorder that causes cardiac fibrosis. Wang *et al.* showed that cardiac fibrosis from HCM can be lessened by the actions of regulatory T (T_{reg}) cells. Human heart tissue from patients with HCM had leukocyte infiltration and ...

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VASCULAR BIOLOGY | SCIENCE SIGNALING

Vascular liabilities of MDM2 inhibition

Pharmacological inhibition of the enzyme MDM2, which targets the tumor suppressor p53 for degradation, is being tested to treat cancer. Levey *et al.* assessed the interplay between the p53-MDM2 axis and the growth factor neprin, which is critical for barrier integrity between the blood and ...

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