

tells the immune system when enough is enough. — KLM

Science, this issue p. 1623; see also p. 1560

NEUROTECHNOLOGY

Closing the loop on neuroprosthetic control

Patients paralyzed from a spinal cord injury may soon be able to move their legs more naturally. Current neuromodulation devices cause leg movement by electrically stimulating the spinal cord, but they require constant monitoring and adjustment. Wenger *et al.* created a closed-loop system that auto-tunes the device. The authors stimulated the spinal cords of paralyzed rats and then mapped their leg movements while they walked or climbed stairs, creating integrated feedback and feed-forward models for continuous stepping control. — MLF

Sci. Transl. Med. **6**, 255ra133 (2014).

JOVIAN ATMOSPHERE

Hot electron plasma moves in from Io

Scientists have known that solar radiation ionizes the gases from Io's volcanoes to create a torus of plasma around Jupiter, but how that plasma moves is unclear. To investigate this, Yoshioka *et*

al. monitored the temperature of the hot electron plasma as a function of distance from the planet with the Hisaki Earth-orbiting satellite. The fraction of hot electrons decreases only gradually with distance from Jupiter, which implies a rapid resupply of these electrons from outside Io's orbit. — MMM

Science, this issue p. 1581

PHYSIOLOGY

Preventing vascular scarring after surgery

The endothelium that lines blood vessels can undergo a change called the endothelial-to-mesenchymal transition (EndMT), which can cause vessel "scarring." Such scarring limits the success of surgical procedures that require blood vessel grafting, including, for example, heart transplantation or coronary bypass surgery. Chen *et al.* found that mice lacking FGFR1 in endothelial cells showed increased EndMT after blood vessel grafting. Moreover, arteries from patients who had rejected heart transplants had lower levels of FGFR1 than those from normal individuals. Thus, enhancing FGFR1 activity could limit vascular scarring in heart disease patients undergoing surgery. — WW

Sci. Signal. **7**, ra90 (2014).

IN OTHER JOURNALS

Edited by **Kristen Mueller** and **Jesse Smith**



NEUROSCIENCE

Timing counts for whisker development

Whiskers help animals to sense the world around them. Each whisker precisely connects to a specific area of the brain. These connections form during early brain development, and protein receptors that bind to the neurotransmitter glutamate (specifically, NMDA-type glutamate receptors) play a key role in their refinement. Fetal and neonatal brains express subunits of the NMDA receptor that regulate its function, called GluN2B and GluN2D. Yamasaki *et al.* discovered that GluN2B and GluN2D play opposing roles as whisker-brain connections develop and mature in mice. Connections formed nearly a day early when mice lacked GluN2D expression. In contrast, reduced expression of the GluN2B subunit delayed the development of the connections by a day. — PRS

J. Neurosci. **34**, 11534 (2014).

NEUROSCIENCE

Animal behavior follows dopamine rewards

In auditory fear conditioning, mice learn to associate auditory cues, such as a tone, with mild footshocks. Forming associations like this, then remembering them long-term (called fear memory consolidation), is an important strategy for navigating one's environment. To understand the molecular basis of fear memory consolidation, Dias *et al.* investigated the contribution microRNAs, small bits of RNA that modulate gene expression. They discovered an important role for the microRNA-34a,

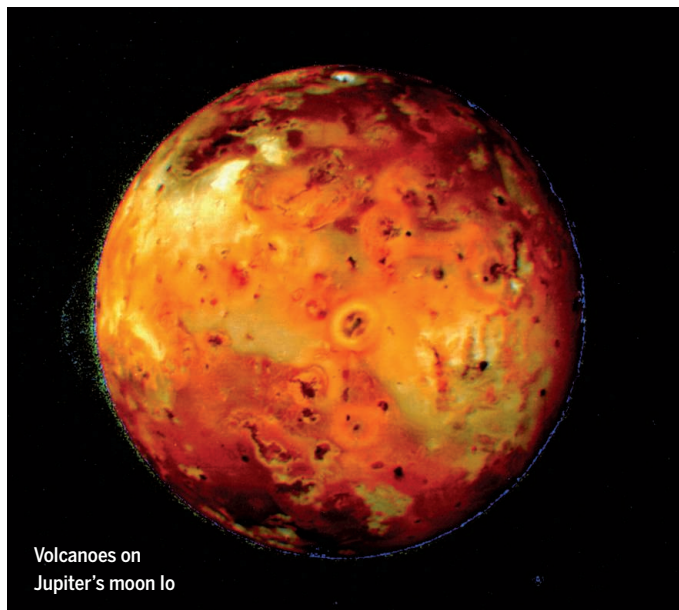
which targeted components of a particular signaling pathway (the so-called Notch pathway) that is normally involved in development. MicroRNA-34a caused a transient decrease in Notch-dependent signalling in the amygdala, which was important for fear memory consolidation. — PRS

Neuron **83**, 906 (2014).

PHAGOCYTOSIS

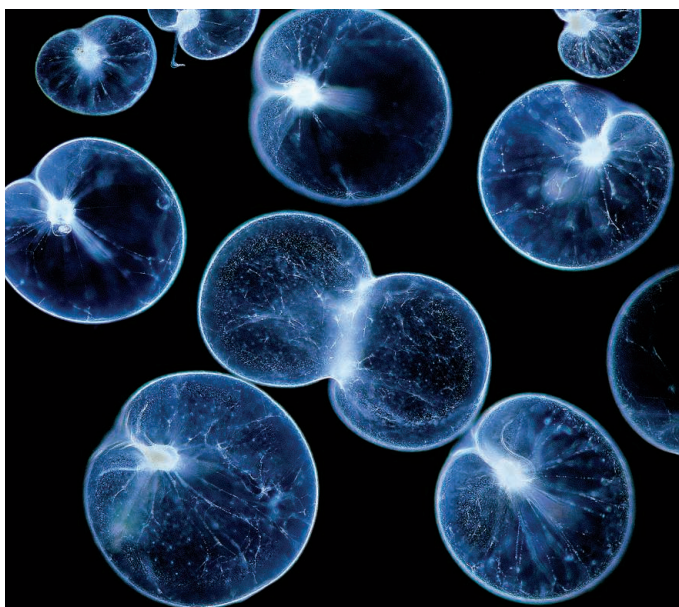
Bring out your dead — hungry receptors await

Every day billions of cells die within the body. Specialized cells called phagocytes patrol the blood and act as cellular



Volcanoes on Jupiter's moon Io

PHOTOS: (LEFT TO RIGHT) NASA/JPL; © 2/LIFE ON WHITE/OCEAN/CORBIS



The bioluminescent dinoflagellate *Noctiluca scintillans*

MARINE ECOLOGY

An Arabian wintertime bloom on the rise

Large and widespread wintertime blooms of the dinoflagellate *Noctiluca scintillans* have begun to occur in the Arabian Sea. Until a decade ago, wintertime blooms there were dominated by diatoms, unicellular photosynthetic organisms that thrive in the abundant sunlight and high-nutrient conditions which occur at that time of the year. Now those diatoms are being outcompeted. Gomes *et al.* report that a decrease in the oxygen content of surface waters probably has caused this change, which itself may be caused by high fluxes of organic matter from domestic and industrial wastes. The ascendance of *Noctiluca scintillans* could have a negative impact on the fisheries of the Arabian Sea, which are sustained by the diatom blooms that now are being disrupted by this new order. — HJS

Nat. Commun. 10.1038/ncomms5862 (2014).

garbage collectors, clearing dead cells to prevent tissue damage and inflammation. Phagocytes recognize dead cells because they express molecular “eat me” signals on their surfaces. Zagórska *et al.* examined how mouse phagocytes use different cellular protein receptors, called TAMs, during this process. The TAM receptors Mer and Axl recognize the “eat me” signals on the surface of dead cells. Mer kept the peace by removing the dead cells that accumulate during normal wear and tear. In contrast, during inflammation, Axl protein expression increased

and it took over the removal process from Mer. — SMH
Nat. Immunol. 10.1038/ni.2986 (2014).

SOCIAL INTERACTIONS

Hate and violence spread through the air

During the 1994 Rwandan genocide, radio station RTLM aired racist propaganda promoting violence against Tutsis. We now can see quantitatively some of the effects of this propaganda. Yanagizawa-Drott modeled radio signal propagation across this “land of a thousand hills” to

determine which villages could receive the RTLM signal. Then they compared their map with court records of the number of people in each village later prosecuted for violent crimes during the genocide. They found that RTLM radio reception was associated with an increase in violence. Militia violence was higher when neighboring villages also had radio coverage, suggesting that social interactions promoted the diffusion of organized violence. The authors estimate that RTLM was responsible for 10% of the total participation in the genocide, by roughly 51,000 people. — BW

Quart. J. Economics 10.1093/qje/qju020 (2014).

ORNITHOLOGY

Social complexity creates brainy parrots

A complex social world of shifting alliances and competitors may be key to the evolution of large brains in humans, dolphins, and spotted hyenas – and, researchers now say, parrots. Hobson *et al.* observed wild populations of monk parakeets (*Myiopsitta monachus*) in Argentina and captive ones in Florida, finding that the parakeets prefer to spend time with one individual, usually a mate. Captive birds had strong associations with one or two individuals and numerous moderate relationships; their aggressive interactions also suggest a dominance hierarchy of winners and losers. Those layers of relationships require the birds to recognize and remember others—tasks linked to the evolution of cognitive skills. — VM

Auk. 10.1642/AUK-14-14.1 (2014)



Monk parakeets' relationships are key to their smarts.

MEDICINE

Teaching tolerance stops the bleeding

People with hemophilia A lack a clotting factor [factor VIII (FVIII)] that stops wounds from bleeding. Regular infusions of FVIII can help, but up to 30% of patients make antibodies that attack this treatment. To prevent this, Sherman *et al.* developed a way to teach the immune system to tolerate FVIII, rather than makes antibodies against it. For 2 months, the researchers fed mice leaves from plants engineered to produce fragments of FVIII. The fragments, safely encapsulated in plant cells, entered the area of the gut where immune cells reside and reduced the immune response to FVIII. Treated mice made fewer antibodies against FVIII, suggesting that teaching (immune) tolerance may allow FVIII to stick around and do its job. — LC

Blood 123, 10 (2014).

CATALYSIS

Constructing a maze full of phosphines

The manufacture of commodity chemicals relies on metals to catalyze, or speed along, the process of making and breaking bonds between lighter elements such as carbon and oxygen. In many cases, the metals are bound to a supporting material to facilitate their separation from the product stream and their subsequent reuse. However, it can be challenging to adopt this approach when the catalyst structure incorporates metal-phosphorus coordination. Sun *et al.* prepared a porous solid by linking phosphine building blocks

together. When they introduced rhodium into the structure, the resulting material catalyzed the hydroformylation reaction of octene as well as a free-floating rhodium-phosphine complex. — JSY

Chem. Commun. 10.1039/C4CC03884C (2014).

Science

Hate and violence spread through the air

Brad Wible

Science **345** (6204), 1575.

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