potency as the tumor acquires new mutations that allow it to bypass the drug’s lethal effects. To stay ahead of the tumor, oncologists need a noninvasive way to collect tumor cells from patients over the course of their treatment. Analyzing the mutations in these samples may help them choose the right drugs as the tumors change. In a small study of breast cancer patients, Yu et al. show that rare tumor cells circulating in the blood can be captured in viable form and used for this purpose. — PAK

Science, this issue p. 184

SUPERCONDUCTIVITY

Optically probed superconductor

The exotic superconductor UPt₃ has two superconducting phases that appear at different temperatures, but their nature remains unclear. Schemm et al. shone circularly polarized light on a crystal of UPt₃ and studied its reflection (see the Perspective by van der Marel and Sawatzky). In the low-temperature phase, the pairs of electrons that make the material superconducting have a handedness to them. The finding narrows down the possible descriptions of the electron-pair wave function. — JS

Science, this issue p. 190; see also p. 138

HIV LATENCY

For HIV: Location, location, location

HIV-infected cells linger even in the face of therapy, and this persistence, termed the latent reservoir, is a major hurdle for curing HIV. HIV integrates itself into the DNA of its host cells. Could that affect the latent reservoir? To find out, Maldarelli et al. drew blood from five HIV patients on antiretroviral therapy and analyzed sites where HIV had inserted itself into the blood cells’ DNA (see the Perspective by Margolis and Bushman). In many cases, these sites were not random; HIV often weaseled its way into genes that help cells grow and proliferate. Where HIV integrates into the host genome may thus determine the size of the latent reservoir. — KLM

Science, this issue p. 179; see also p. 143

PHYSIOLOGY

Interfering with the signal to relax

In people with high blood pressure, tissue perfusion is often reduced. In response to specific stimuli, endothelial cells that line arteries instruct the surrounding smooth muscle cells to relax, increasing blood flow into the tissue. Endothelial cells extend small processes called myoendothelial projections (MEPs) to communicate with smooth muscle cells. Sonkusare et al. found that the calcium-conducting ion channel TRPV4 and the scaffold protein AKAP150 concentrated at MEPs and visualized calcium signals at these sites. In a mouse model of hypertension, AKAP was not concentrated in MEPs, and the endothelial cells failed to tell the smooth muscle to relax, reducing tissue perfusion. — NRG


SPACE WEATHER

How the ionosphere gains influence

In Earth’s upper atmosphere, the reconnection of magnetic field lines converts latent magnetic energy into the thermal and kinetic energy of plasma flows. But reconnection appears to produce faster flows before midnight compared with after. To find out why, Lotko et al. simulated this energy exchange. Challenging common assumptions about our space weather environment, they conclude that the ionosphere plays an active role when coupled to the magnetosphere driving the behavior of the magnetotail. — MMM

Science, this issue p. 184

IN OTHER JOURNALS

Edited by Kristen Mueller and Jesse Smith

Satellite image of Emiliania huxleyi blooms in the Barents Sea

MARINE MICROBIOLOGY

A virus that enslaves ocean algae

The algal blooms that flourish near the ocean surface feed ecosystems and remove carbon from the atmosphere. But algal blooms can get sick. Rosenwasser et al. studied metabolism and gene transcription in the coccolithophore Emiliania huxleyi and a virus that attacks it. They find that the virus hijacked the algae’s metabolic pathway and used it to build more virus particles. The virus carries information for its own lipid biosynthetic pathway. No shrinking violet, this physically large virus shut down and superplanted the parallel metabolic pathway in its algal host, forcing the algae to synthesize lipids that the virus needed. The host, deprived of its own lipids, faded into oblivion, sinking into the ocean and taking its resident carbon with it. — PJH


NEUROSCIENCE

Hearing and imagination shape what we see

Hearing sounds helps our visual system to predict incoming information and may give us a survival advantage. Vetter et al. blindfolded people and scanned their brains while they listened to birds singing, traffic noise, or people talking. Using sophisticated algorithms, the researchers were able to identify the category of sounds just by examining the pattern of activity.
in the primary visual cortex, a brain area previously believed to process nothing but input from the eyes. And when the people imagined the specific sound categories in the complete absence of sight and sound, their primary visual cortices also showed activity. These results highlight the interconnectedness of the brain’s sensory systems. — PRS


**CELL ADHESION**

**Forces inside the cell control adhesion**

When tissues undergo change—when they’re growing or healing, for example—the contact between cells changes too. Mechanical forces play an important role in remodeling these connections. The protein cadherin sticks cells together by spanning the cell membrane, making contacts with the network of actin filaments inside one cell and cadherins on another cell. Engl et al. watched junctions grow between pairs of cells. The dynamics of the actin cytoskeleton affected how cadherin moved to the junctions. During actin turnover, when opposite ends of the filament add and lose actin monomers simultaneously, contacts between cells shrank, whereas stable actin filaments stabilized the contacts between cells. Forces inside the cell stabilize the actin filaments and thus influence cell adhesion. — VV


**VIRAL CELL BIOLOGY**

**NEC helps herpesvirus escape from nucleus**

Viruses must move out of their host cells before they can infect new ones. To make the break, newly created viruses form infectious virus particles by ensnaring themselves in the host cell’s membrane, which eventually pinches off in a process called scission. For herpesviruses, this “budding” occurs in the inner nuclear membrane and requires a special protein tool, called a nuclear egress protein complex (NEC). Bigalke et al. asked whether the NEC itself tells the membrane to bud and pinch off, or whether it needs to recruit host-cell proteins to get the message across. Using only purified NEC and lipids, the authors found that NEC works alone, by forming a coat-like hexagonal array inside the budding membrane. This array forms a scaffold for the bud and helps the neck of the budding point narrow so scission occurs. — SMH

Nat. Commun. 10.1038/ncomms5131 (2014).

**DIFFRACTION METHODS**

**Locking into surface structure**

Knowing the surface structure of functional materials such as catalysts is an essential part of understanding how they work. Lock-in amplifiers are instruments that extract weak signals from noisy data, which can help investigators who employ high-energy x-ray diffraction techniques to probe surfaces. Ferri et al. studied palladium nanoparticles on cerium-zirconium oxides, which are similar to catalysts used to control automotive exhaust emissions. They detected reduced Pd nanocrystals, as well as changes in oxygen coordination around the cerium cations, using phase-sensitive detection of diffraction peaks. Exposing the sample to alternating pulses of reducing CO and oxidizing O2 led to those phase shifts. — PDS


**PHYSICS**

**Making larger numbers count more**

Some measurements make better use of a larger number of particles than others. To make very precise measurements, physicists often increase the number of particles they use as probes—the more particles, the more precise the measurement. Sewell et al. sent light pulses through a cloud of 87Rb atoms to measure the spin alignment of the atomic cloud. They found that the precision of the measurement grew more quickly as the number of photons was increased than it does when more conventional methods are employed. The key to this improvement was making an indirect measurement in which the output was a nonlinear function of the number of photons used. — JS


**PALEONTOLOGY**

**In the footsteps of duckbilled dinos**

Thousands of fossilized footprints left on a 180-m-long stretch of flood plain in Alaska’s Denali National Park and Preserve offer news clues to the lives of hadrosaurs, commonly called duck-billed dinosaurs. The impressions, made between 69 million and 72 million years ago, cluster within four size ranges that represent specific age groups in a multigenerational herd, report Fiorillo et al. About 84% of the tracks were made by adult and near-adult hadrosaurs, 13% by young probably less than 1 year old, and only 3% by juveniles—a rarity that suggests the species experienced a rapid growth spurt. The presence of juveniles also hints that the creatures spent their lives in the Arctic; the young would not have been able to migrate to and from warmer climates during wintertime. — SP