



## FINDINGS

## How Giants Conquered Earth

The discovery of a new dinosaur from Argentina may offer clues about how the largest creatures to walk on Earth evolved.

Scientists have long been stumped by how the dinosaur group Sauropodomorpha started out the size of tricycles and evolved, over 80 million years, into long-necked, tractor trailer-sized sauropods like *Apatosaurus*. A related group of dinosaurs, the prosauropods, are intermediate in size and posture between the small, early dinosaurs and the later giants, but any fossils that fall in between prosauropods and sauropods have been extremely rare and fragmentary.

That has now changed with the discovery of *Leonasaurus taquetrensis*, the closest relative yet to the giant sauropods. As paleontologist Diego Pol of the Egidio Feruglio Paleontological Museum in Trelew, Argentina, and colleagues described online

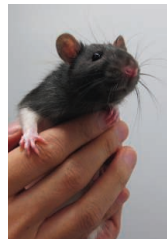
in *PLoS ONE*, the specimen is just 2.4 meters long—tiny compared with sauropods, which ranged from 10 meters to perhaps 40 meters in length. But it had already evolved an important feature needed for gigantism: a beefed-up sacrum, the fused vertebrae of the lower spine. Scientists had assumed that great mass would have produced selective pressure for the larger sacrum,

but now they know that the sacral enlargement came first. That's evidence, say other researchers, that many of the distinctive characteristics of sauropods evolved long before the dinosaurs became gigantic. <http://scim.ag/sauropod>

## Memory Booster

Insulinlike growth factor 2 (IGF-2), a naturally occurring hormone, is known for roles in cell growth and repair. A new study suggests that it can also boost memory retention.

IGF-2 has been spotted in the hippocampus, a brain region associated with learning and memory. To find out whether the hormone plays a role in cognition, neuroscientist Cristina Alberini and colleagues at the Mount Sinai School of Medicine in New



York City had rats enter a specially designed box with a light and a dark side. Those that entered the dark side got a mild foot shock. The rats' subsequent hesitation to try that side again provided a measure of how well they remembered the traumatic event.

When their brains were injected with IGF-2 after the shock, the rats hesitated more than twice as long before entering the next time, indicating a sharper memory, the team reported online last week in *Nature*.

IGF-2 is naturally occurring and can cross the blood-brain barrier, making it a promising candidate for treating memory-impairing diseases or even forgetfulness, the researchers say. But just how IGF-2 improves memory remains a mystery. <http://scim.ag/brain-boost>

## An Army of Ant Genomes

Whether you think of them as paragons of industry or picnic-crashing pests, ants are an inseparable part of our lives. Apparently, researchers think so, too. In three papers published online in the *Proceedings of the National Academy of Sciences* and one forthcoming in *PLoS Genetics*, scientists report the genomes of four ant species: the fire ant, the Argentine ant, the harvester ant, and the leaf ant.

These sequences are shedding light on everything from how ant social systems work to how to keep the insects out of our kitchens. For example, the researchers identified a surprisingly large number of genes used for recognizing the chemical signals ants use to navigate and socialize. They also discovered parallels between ant and bee genes, which may reveal how ants organize their complex hierarchies. With this knowledge, researchers may be able to combat the insects by, say, provoking an ant civil war—a greener solution than using pesticides. <http://scim.ag/ant-genome>

## Hugs Follow a 3-Second Rule

Ever wondered how long a hug lasts? About 3 seconds, a new study declares. The finding supports a hypothesis that we go through life perceiving the present in a series of 3-second windows.

Crosscultural studies have shown that goodbye waves, musical phrases, and infants' bouts of babbling and gesturing all last about 3 seconds, as do many basic physiological events, such as relaxed breathing. In 2008, Emese Nagy, a developmental psy-



## Kepler Packs in the Exoplanets

Astronomers have discovered a stunningly unfamiliar system of planets that, yet again, undercuts theorists' expectations about how planets form and evolve.

The find comes from NASA's orbiting Kepler telescope, which stared at 156,000 stars for the tiniest fading of a star's light that signals a planet passing in front of it. In this week's issue of *Nature*, planetary dynamicist Jack Lissauer of NASA's Ames Research Center in Mountain View, California, and 39 co-authors announced the discovery of six planets orbiting the star designated Kepler-11. Their relative sizes, along with their radii compared to Earth's ( $R_E$ ), are shown here. None is Earth-like, but five of them orbit far closer to their star than Mercury orbits the sun. "Why there are so many so close is a mystery," says Lissauer.

"This six-planet system is just incredible," says exoplanet astronomer Debra Fischer of Yale University. "We keep hearing it over and over again—other planetary systems aren't like our own. The models are not successful at packing these small planets close in. There's some physics that's not in the models yet." <http://scim.ag/kepler-11>



## Random Sample

## Gene Ed

This week, 200 Cornell undergraduates took a different kind of test: a genetic one. As part of the Cornell University Genetic Ancestry Project, these volunteers swabbed their cheeks and submitted DNA samples to the Genographic Project (*Science*, 15 April 2005, p. 340), which for 5 years has tracked the history of human migration through DNA studies. Sponsored by National Geographic and IBM, the project has analyzed genetic markers from 72,000 indigenous people and 400,000 people who bought \$99.95 mail-in test kits in return for “deep ancestry” information.

Cornell population geneticist Charles Aquadro organized the event to get students thinking about the legal, social, and ethical implications of genetic testing. He teamed up with the Genographic Project’s Spencer Wells to map ancient wanderings of the students’ ancestors from variations in mitochondrial DNA or the Y chromosome. “It’s but one small snippet of ancestry,” says Aquadro. “But there’s no marker relevant to medical [history].” (Results from a genetic testing project at the University of California, Berkeley, were never released to students after the California Department of Public Health said the genes being tested had health implications.)

Aquadro is curious to see if the Cornell group is as diverse as volunteers Wells tested at a 2009 street fair in Queens, a famously multicultural borough in New York City; they turned out to represent all the major migration routes from Africa. Before the results come back in April, Aquadro’s lesson plans will cover the pros and cons of genetic testing. “We’re trying to address building a knowledge base before these things really hit them,” he adds.



## BY THE NUMBERS

**\$100 million** The amount pledged by the Bill and Melinda Gates Foundation and United Arab Emirates leader Sheikh Mohammed bin Zayed Al Nahyan to vaccinate Afghan and Pakistani children against common childhood diseases, including polio.

**10.5** Tons of carbon dioxide produced by an average New Yorker in 1 year. Residents of Denver, who rely much more on cars, generate about twice as much, according to a study in the journal *Environment and Urbanization*.

**11.9%** The average growth of U.S. university endowments in the 2010 fiscal year, according to the National Association of College and University Business Officers. Due to big losses in 2009, however, the median is still down \$15.1 million from 2008.

chologist at the University of Dundee in the United Kingdom, was watching the Beijing Summer Olympics on television and wondered whether the rule would hold for all the hugs she was seeing. So she had an independent observer watch video recordings of the Olympic finals and time 188 hugs between athletes from 32 nations and their coaches, teammates, and rivals.

Regardless of the athletes’ and their partners’ gender or national origin, the hugs lasted about 3 seconds on average, Nagy reported online 18 January in the *Journal of Ethology*. The results reinforce an idea current among some psychologists that intervals of about 3 seconds are basic temporal units of life that define our perception of the present moment.

Colwyn Trevarthen, a psychobiologist at the University of Edinburgh in the United Kingdom, points out that the body has other rhythms, too, including split-second reflexes. “We’re not talking about something crude and automatic,” he says. “This is the timing of the human spirit.” <http://scim.ag/3-sec>

## The Write Stuff

Researchers have revamped the atomic force microscope to let nanotechnologists quickly and cheaply write lines and dots of molecules across a large area. The tool could help scientists rapidly prototype novel nanostructures for use in medical research.

The atomic force microscope (AFM) uses an ultrafine stylus on the end of a can-

tilever to “feel” the atomic hills and valleys on a surface. Researchers have made arrays of AFM tips and used them as quills to write with molecular inks. But making arrays of cantilevers is costly.

Three years ago, researchers led by Chad Mirkin of Northwestern University in Evanston, Illinois, did away with cantilevers by making the tips out of a springy plastic that flexed to maintain contact with the surface. The downside was that the softer plastic couldn’t make as sharp a point as the conventional version made from silicon.

Mirkin and colleagues reported online last week in *Nature* a new, cheap version with hard tips mounted on a springy polymer layer instead of cantilevers. The researchers took an array of 4750 tips for a test drive; they wrote 19,000 copies of the pyramid portrayed on the United States \$1 bill on a gold-coated silicon wafer. Each tiny pyramid was made up of 6982 42-nanometer-wide dots. <http://scim.ag/AFM-arrays>

