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The Best Refrigerator Magnet Ever?

There are limits to just how magnetic a material can be, or so researchers thought. A compound of iron and nitrogen is about 18% more magnetic than the most magnetic material currently known, a team of materials scientists claims. If such magnets could be produced commercially, they could, for example, allow electronics manufacturers to equip computer hard drives with smaller "write heads" capable of being crammed with more information. <http://bit.ly/bestmagnet>

Mosquitoes Become Flying Vaccinators

A group of Japanese researchers has developed a mosquito that spreads vaccine instead of disease. Even the researchers admit, however, that regulatory and ethical problems will prevent the critters from ever taking wing—at least for the delivery of human vaccines. <http://bit.ly/vaccinators>



Landlubber Caterpillars Take to the Water

Adolescence is a tough time for anyone, but what if, on top of your growing pains, you had to learn how to breathe underwater? Hawaiian caterpillars take it all in stride. Researchers have discovered 12 species of Hawaiian moths whose caterpillars are equally comfortable submerged in a stream or beached on a bone-dry strip of land. The feat makes them unique among insects, and maybe even among animals, the researchers say. <http://bit.ly/caterpillars>

Nano-Gadget Holds the Salt

Water desalination plants can effectively turn seawater into drinking water, but they're hardly portable. Now a team has created a salt-removing gadget so small that hundreds of them could fit onto a penny. If researchers can scale up this invention into a working device, it could generate up to a glass of fresh water per minute using about the same amount of energy as a table lamp does. <http://bit.ly/nano-gadget>

Read the full postings, comments, and more on sciencenow.sciencemag.org.

HUMAN EVOLUTION

Ancient DNA From Siberia Fingers a Possible New Human Lineage

When ancient-DNA expert Svante Pääbo gave his colleague Johannes Krause a sample of a 40,000-year-old human finger bone from a Siberian cave, he had only one question: Was its mitochondrial DNA (mtDNA) that of a Neandertal or a modern human?

It was neither. Evolutionary geneticists Pääbo and Krause, of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, have apparently identified a new lineage of ancient human, the first time that this has been done using ancient DNA and not fossil bones.

"I couldn't believe it," Pääbo says. "I thought Johannes was pulling my leg." The complete sequence of mtDNA from the finger bone, reported online this week in *Nature*, suggests that Central Asia was occupied at that time not only by Neandertals and *Homo sapiens* but also by a third, previously unknown hominin lineage. "This is the most exciting discovery to come from the ancient DNA field so far," says Chris Tyler-Smith, a geneticist at the Sanger Institute in Hinxton, United Kingdom. "A stunning piece of work," says Terence Brown of the University of Manchester in the U.K.

The work complicates the human story, much as the discovery of the controversial *H. floresiensis*—a.k.a. the hobbit—has upset earlier and simpler views of early human migrations around the globe. If four hominins including the hobbit were alive about 40,000 years ago, "the amount of [human] biodiversity ... was pretty remarkable," says geneticist Sarah Tishkoff of the

University of Pennsylvania. For now, Pääbo's team is not naming the new lineage.

The finger bone—a phalanx whose species could not be identified—was found in 2008 at Denisova Cave in Russia's Altai Mountains, where archaeologists led by co-authors Michael Shunkov and Anatoli Derevianko of the Russian Academy of Sciences in Novosibirsk have worked for decades. The cave, which has many archaeological layers spanning about 100,000 years, has yielded both Neandertal and modern human stone tools, personal ornaments, and a small collection of hominin bones too fragmentary to be identified. The bone came from a layer radiocarbon-dated to between 48,000 and 30,000 years ago. The team ground up a 30-milligram sample and extracted and sequenced all of the 16,569 base pairs of its mtDNA genome, using new techniques Pääbo's group has successfully employed to sequence both Neandertal and prehistoric modern human DNA (*Science*, 17 July 2009, p. 252). The team compared the new mtDNA sequence with that of 54 living people from around the world, a roughly 30,000-year-old modern human from another Russian site, and six Neandertals.

They got a big surprise: Although Neandertals differ from modern humans at an average of 202 nucleotide positions in the mitochondrial genome, the Denisova hominin differed from modern humans at an average of 385 positions and from Neandertals at 376 positions. When mtDNA from chimpanzees and bonobos was added to the mix,

RESEARCH FUNDING

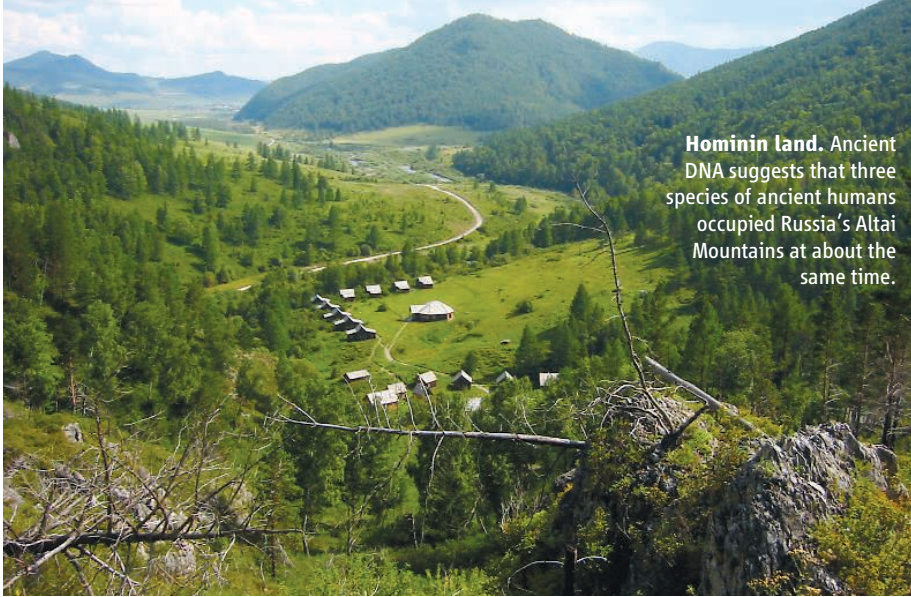
NIH Seeks Fresh Ideas on Diversity

The National Institutes of Health (NIH) is betting \$10 million that academics can find new ways to promote diversity in U.S. science.

The money will be spent on a new competition called the Director's Pathfinder Award. NIH is looking for a handful of researchers "willing to try something that would really change the game," says Clifton Poodry of the division of Minority Opportunities in Research within the National Institute of General Medical Sciences (NIGMS), which will manage the program. "What haven't we been thinking about? What type of intervention or institutional change would take us to a new level?"

The Pathfinder Award is modeled after the Director's Pioneer Award Program, begun in 2004, which generously funds individuals with potentially transformative research ideas. Pathfinder applicants must devote at least 30% of their time to efforts that will broaden the talent pool in the biomedical, clinical, behavioral, and social sciences. "We want their brains on the job," says Poodry. "It's a bit of a gamble. We're betting on the person to do something great. It's like a MacArthur grant for diversity."

Freeman Hrabowski, president of the University of Maryland, Baltimore County,



Hominin land. Ancient DNA suggests that three species of ancient humans occupied Russia's Altai Mountains at about the same time.

ScienceInsider

From the Science Policy Blog



"Why So Few?," a new report on women in science by the American Association of University Women, distills several recent reports on gender equity to provide a road map for those seeking improvements. <http://bit.ly/a5wNlN>

Three U.S. agencies have launched a joint **program to predict climate change** and its impacts on local scales over a few decades, fueled by \$50 million a year for 5 years. <http://bit.ly/alDpSZ>

A super-low-fuel navigation system for space flight, a software program that can recognize and analyze photos, and an exploration of mathematical representation theory snagged the top three awards at this year's **Intel Science Talent Search**. <http://bit.ly/8XlkpW>

Physicist Carl Wieman, a 2001 Nobelist and a leader in reforming U.S. undergraduate science education, has been nominated to be **associate director for science** in the White House Office of Science and Technology Policy. <http://bit.ly/a6q4UR>

Tim Berners-Lee and Nigel Shadbolt have received \$45 million to create the Institute of Web Science, with the goal of helping the United Kingdom extract maximum **benefit from the arrival of Web 3.0**. <http://bit.ly/clI3PH>

The spat over the **leadership of the Royal Institution of Great Britain** is headed to a showdown next month, with both fans and critics of former Director Susan Greenfield weighing in. <http://bit.ly/b6LzeA>

The U.S. National Institutes of Health is launching a new online registry that asks gene-testing companies to volunteer information on studies they've conducted on their products. **The Genetic Testing Registry** will be run by the National Library of Medicine. <http://bit.ly/b4Ow47>

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the researchers were able to estimate that the new hominin's mtDNA had shared a common ancestor with Neandertals and modern humans about 1 million years ago.

The team appears to have avoided contamination and other problems that have plagued ancient DNA research, says Maria-Eva Geigl of the Jacques Monod Institute in Paris, calling it a "great paper ... technically well done."

But who was this mystery hominin? The team says the date is too late for Asian *H. erectus*, which first migrated out of Africa into what is now the republic of Georgia and Java about 1.8 million years ago. And it's too early for *H. heidelbergensis*, which came on the scene in Africa and Europe about 650,000 years ago and is thought by many to be the common ancestor of modern humans and Neandertals. There's "no evidence" that these or other known species "persisted that late" in mainland Asia, says paleoanthropologist Russell Ciochon of the University of Iowa in Iowa City, although he thinks a claimed 27,000-year-old date for *H. erectus* on the island of Java remains possible.

Of course, a population of *H. erectus* may

have lingered undetected in Siberia. But if the divergence time is right, says Tyler-Smith, the new hominin cannot descend from that first migration into Asia 1.8 million years ago: Neandertals, the new hominin, and *H. sapiens* all share a common ancestor that lived 1 million years ago, presumably in Africa, according to the team. The new lineage could be related to *H. antecessor*, a species from northern Spain dated to between 800,000 and 1.2 million years ago and thought by some researchers to be the ancestor of *H. heidelbergensis*, says Chris Stringer, a paleoanthropologist at the Natural History Museum in London. Or it could represent "a pre-*heidelbergensis*, post-*erectus* dispersal" out of Africa "that we haven't picked up yet," Stringer says.

Pääbo agrees that the new lineage might represent "something that came out of Africa later" than the first *H. erectus* migration. To find out more, his group plans to try to sequence nuclear DNA from the finger bone. If they succeed, they might discover the secret identity of Hominin X. **—MICHAEL BALTER**

and a national leader in increasing minority participation in science, agrees that it's precisely those "great" individuals who can make the biggest difference in promoting diversity. "Whatever success we have achieved has had faculty involvement at its core," says Hrabowski, who has nurtured the school's successful Meyerhoff Scholars Program. "Too often, tenured faculty are not involved in these kinds of activities."

The solicitation invites ideas at all levels, from precollege through faculty members, although Poody acknowledges that most of NIH's programs in this area target graduate and postdoctoral students. Improving undergraduate retention rates is the key to promoting diversity, says Hrabowski, and requires

innovations in teaching, curriculum, mentoring, and every other aspect of the educational process.

The deadline for applications is 4 May. NIH plans an initial screening of the six-page proposals, followed by personal interviews of the finalists. It anticipates making five 3-year awards, for \$2 million each.

The program is funded with money NIH received as part of the American Recovery and Reinvestment Act. That means NIH must commit the money by 30 September, and there is no provision for future competitions. But NIGMS Director Jeremy Berg suggested that NIH might continue the program with regular funding if the community's response is positive. **—JEFFREY MERVIS**