Abstractions

FIRST AUTHOR

Fossils from Ethiopia's Afar valley have shed light on human evolution over the past 6 million years. The dearth of older fossils, however, makes it difficult to corroborate genomic studies suggesting that the gorilla and human lineages diverged between 6 million and 8 million years ago. On page 921, University of Tokyo palaeoanthropologist Gen Suwa and his colleagues report the first fossilized teeth of a large-bodied ape from southern Afar's Chorora Formation. Suwa explains how this new species, which they have named *Chororapithecus abyssinicus* and dated to roughly 10 million years ago, provides evidence that the human and gorilla lines may have diverged earlier than thought.

You initiated a systematic survey of the Chorora Formation in 2005. Why?

I first visited the Chorora area with my longtime Ethiopian colleagues Berhane Asfaw and Yonas Beyene in 1989. It is 10 million to 11 million years old, and any animal fossil site covering this period would be important to understanding human origins. The area is not fossil-rich, but recent satellite images showed more possible sites. So we decided to do short, systematic surveys every year. An assistant found the canine tooth in 2006 and we found the molars earlier this year.

What is unique about the teeth you found?

The molars of modern gorillas have shearing crests that are specialized for eating leaves and stems; most fossil apes have more generalized molars. The fossil teeth we found are different again, combining shearing crests with thick enamel on one side of the molar — suggesting that this species of ape may have been partially adapted to a fibrous diet.

How has this finding changed your research approach?

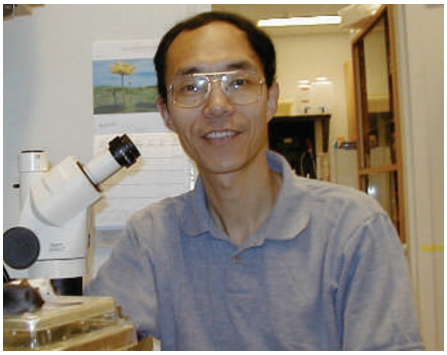
We now think apes and very early human ancestors may have lived in more forested environments, and did not get fossilized with other animals. So we are searching in the less obvious patches — with fewer animal bones — in the right geological settings.

Do these teeth redefine the date of the human–gorilla divergence?

We're not yet sure. Until now, there were no convincing fossils to trace the modern African ape between 12 million and 7 million years ago. The ape we describe was either a primitive form of gorilla, or an independent branch showing a similar adaptation at about the time when the gorilla line would have been emerging. We think that currently accepted divergence estimates are unnecessarily biased towards the younger side, and hope we can convince people to be open-minded. ■

MAKING THE PAPER

Guoping Feng



Loss of one brain protein causes compulsive grooming in mice.

People with obsessive-compulsive disorder (OCD) repeat ritualistic actions such as hand washing or checking locks so frequently that it interferes with their everyday lives. But although the symptoms of the disease are obvious, its causes are not. By knocking out one gene, neurobiologist Guoping Feng at Duke University Medical School in Durham, North Carolina, and his colleagues have engineered mice that show OCD-like behaviours.

The work began with Feng's interest in the signal-receiving, or postsynaptic, ends of neurons. "The postsynaptic complex has hundreds of proteins," he says, "But why are so many needed for an apparatus that is less than a micrometre across?" The researchers engineered mice lacking the gene for one of these proteins, the scaffolding protein SAPAP3, and waited for signs that the mice were different.

"We predicted that they might have severe, abnormal behaviour, but we didn't know what would come up," says Feng. Patches of bald, irritated skin appeared around the eyes, snouts and necks of the mice. The mutant mice literally rub their own fur and skin away with compulsive grooming. "They can't stop grooming themselves," says Feng. Videotapes showed the mice grooming themselves when normal mice would be sleeping.

Characterizing these mice took several laboratories six years, says Feng. William Wetsel's team, also at Duke University, looked at behaviour, and found that the mutant mice showed high anxiety (spending more time along walls or in dark areas of experimental chambers, for instance). In such mice, both anxiety and grooming were reduced by antidepressants. A third Duke-based team, led by Nicole Calakos, found that the altered synapses were less able to transmit signals. And Richard Weinberger's laboratory at the University of North Carolina, Chapel Hill, found that mice lacking SAPAP3 had morphological defects in the postsynaptic complexes in the striatal region of the brain.

But to pin the observed symptoms to defects in the striatum, the researchers needed to show that restoring SAPAP3 function in the striatum alone could relieve the OCD-like behaviour. Feng's team injected engineered lentiviruses with working versions of the gene into the striatum of 7-day-old mice. Six months later, five of the eight mice injected with *SAPAP3* had no skin lesions from excessive grooming, whereas all of the control mice had lesions. Treated mice showed less anxiety, and their neurons received and transmitted signals more effectively (see page 894).

Most studies of OCD in humans have focused on neurons that either produce or respond to dopamine or serotonin. Feng's work, however, implicates neurons that respond to glutamate.

Once destined to become a physician in his native China, Feng now finds himself back addressing the needs of patients. His team is collaborating with clinicians to identify mutations in SAPAP3 and similar proteins in human families with a history of OCD. The findings also have implications for drug discovery, which so far has not focused on glutamate synapses. Feng says drug companies are interested in using the OCD-like mice for drug screening. Small molecules are unlikely to affect SAPAP3 itself, Feng says, but proteins that function downstream of postsynaptic signalling in the striatum might make suitable drug targets. ■

FROM THE BLOGOSPHERE

What do Eric Lander, Frank Wilczek, James Randi and Martha Stewart have in common? The answer can be found at Nautilus (http://tinyurl.com/35xbq9): all attended the recent Science Foo Camp, co-organized by Nature Publishing Group, O'Reilly Media and Google, and hosted at the Googleplex in Mountain View, California.

The 'Foo Camp' format has been pioneered by O'Reilly, a publisher of computing books and organizer of technology conferences, as an antidote to restrictive formal conferences, where the best conversations seem to happen in hallways and during coffee breaks rather than at the main sessions. Foo is self-organizing, unpredictable and rather anarchic — but also quite wonderful.

Visit Nautilus for fuller accounts of what Henry Gee calls in his 'End of the Pier Show' blog "a gathering of some of the coolest and most influential scientists, technologists, engineers and thinkers on the planet". You will be directed to Gee's blog on Nature Network, an essay by George Dyson on the Edge website and Timo Hannay's account on Nascent. ■

Visit Nautilus for regular news relevant to *Nature* authors ▸ http://blogs.nature.com/nautilus and see Peer-to-Peer for news for peer-reviewers and about peer review ▸ http://blogs.nature.com/peer-to-peer.