Abstractions

LAST AUTHOR

Twenty-eight years after AIDS was first recognized, preventing the transmission of HIV remains an elusive goal. Clinical trials of strategies aimed at preventing transmission to women, including virus-inhibiting compounds called microbicides, have been disappointing. On page 1034, microbiologist Ashley Haase at the University of Minnesota in Minneapolis and his colleagues show that microbicides may yet prove beneficial. While investigating the earliest stages of simian immunodeficiency virus (SIV) infection in rhesus macaques, the team revealed how this HIV-like virus exploits the host's normal immune response in order to fuel systemic spread. This led them to test a seemingly unorthodox strategy — blocking the host's immune response with microbicides to deprive the virus of the cells it uses to spread. Haase tells *Nature* more.

How did your work lead to testing a microbicide in this unusual way?

Despite the large dose of virus used to infect animals, we discovered that founder populations of infected cells are small and focal. We were puzzled by how these barely detectable populations could so quickly turn into an explosive systemic infection. By detailed mapping of infected cell clusters in cervical tissues, we established that the clusters grow by accreting newly infected cells. We then pieced together how the virus takes advantage of the host's inflammatory response to infection to recruit new target cells for its spread. The response brings in circulating T cells, HIV's target cells, and in so doing provides an opportunity for the virus to spread systemically.

Were you surprised that an existing antimicrobial compound was effective?

Yes. My co-author Patrick Schlievert has been working with glycerol monolaurate (GML) for 17 years. He previously showed that it blocks the signalling and immune-response system we wanted to disrupt, so we thought it might be effective as a microbicide. And it was. Four out of five animals challenged with repeated high doses of SIV were completely protected from infection by GML therapy.

Have your data met with excitement or scepticism?

Both. Many people are as excited as we are about GML's potential, but there is also scepticism about it being another microbicide that does not specifically target HIV. But we have advanced the idea that blocking the host's inflammatory immune response might prevent vaginal transmission. Ultimately, I think combining microbicides with specific antiretroviral compounds might be the most effective way to prevent infection. ■

MAKING THE PAPER

Natalia Rybczynski

Arctic freshwater fossil fills a missing branch of seal ancestry.

M. LIPMAN

Natalia Rybczynski (left) and Mary Dawson.

At the end of another long Arctic summer day on Canada's Devon Island, Natalia Rybczynski's palaeontology field crew was disheartened, having once again found nothing new. Then, to make matters worse, their all-terrain vehicle ran out of petrol. Undergraduate researcher Elizabeth Ross, who had been in charge of fuel, sheepishly kicked around in the dirt while Rybczynski ran back to camp.

Uncovering a piece of bone, Ross immediately showed it to palaeontologist Mary Dawson of the Carnegie Museum of Natural History in Pittsburgh, Pennsylvania. By the time Rybczynski returned, the two had uncovered handfuls of bones from an animal that turned out to be a missing link in the evolution of pinnipeds — seals, sea lions and the walrus.

Of all the mammals that have marched back into the sea during their evolution, the ancestors of pinnipeds have been the most elusive. Other ancient specimens, of the genus *Enaliarctos*, have previously been found on the northwestern coast of the United States and already had fully formed flippers. On the basis of these remains, many researchers in the field assumed that pinnipeds had evolved from terrestrial forms in the same region.

Rybczynski, a palaeobiologist at the Canadian Museum of Nature in Ottawa, Ontario, and her team uncovered 65% of the animal's skeleton within a couple of days. Nestled in freshwater lake deposits in an impact crater, the skeleton dates to roughly 20 million years ago.

"Even in the field, we were seeing evidence of specialization for swimming," recalls Rybczynski. This included powerful shoulder muscles and flattened phalange bones that indicate webbing of the feet. The animal's teeth and skull revealed that it was a carnivore that shared characteristics with pinnipeds. Through phylogenetic analysis, the team confirmed it to be a pinniped (see page 1021).

"It's the kind of animal that can be once-in-a-career. It's a transitional fossil that's filling a gap in our understanding," says Rybczynski. That alone would have been enough to put it on the map of scientific merit, but add to that the fact that it was found in an unexpected locale — the Arctic Circle — and in a freshwater setting, and "it's really phenomenal", she adds.

Named *Puijila darwini* (pronounced pew-yee-la, for an Inuit word for young seal), it's the most terrestrial of all known pinniped fossils. Rybczynski likens it to a "swimming wolverine" that was a powerful hunter both on land and in the water. And it may have hunted in seawater as well as freshwater, opting for the former when lakes froze over in winter. *Puijila*'s habitat would have been a forested, relatively temperate area, but subject to a great deal of seasonal variation owing to its high latitude. The setting brings new ideas about pinniped evolution.

"What would it have been like hunting in the near-total darkness of the Arctic winter?" Rybczynski wonders. Biologists have generally associated the evolution of pinnipeds' large eyes with deep diving, she says, but it could instead be linked to the Arctic Circle's long, dark winters.

The discovery also addresses scepticism about the migration of pinniped ancestors from the Arctic to the Pacific — the Bering land bridge that existed at the time would have presented a barrier to swimmers. But, Rybczynski notes, the flipperless *Puijila* could have walked across. ■

FROM THE BLOGOSPHERE

Should authors get a grade for peer reviewing? It's indisputable that, if done well, peer-review activities are a time-consuming contribution to science — and can easily be overlooked by a tenure committee.

A guest post by Willy Aspinall of the University of Bristol, UK, on the Peer-to-Peer blog earlier this month suggested that peer-reviewing activities be scored with a metric that takes into account how many reviews a scientist performs in a year and the impact factors of the journals involved (http://tinyurl.com/d7w4ys).

That post sparked *Nature* associate editor Noah Gray to respond on his blog, Nothing's Shocking, that such a metric "seems wildly over-simplistic and hardly quantitative" (http://tinyurl.com/cnulcj). Gray takes issue with the idea that peer reviewing is truly a solo undertaking. He goes on to suggest that it would be more appropriate to track authors' contributions through their Web 2.0 interactions and public commenting on science — what he calls "peer review lite".

He argues that until the review system becomes public and non-anonymous, there is really no way of applying a meaningful metric. ■

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