and prevent them from cutting other proteins, part of ACE2's natural function. The changes proved so effective at protecting mice from SARS-CoV-2, Procko says, that he left UI and joined Cyrus, which plans to launch a clinical trial of the compound.

Now, Nathaniel Landau, a microbiologist at New York University (NYU), and his colleagues have posted results showing a decoy similar to Procko's protected mice against infection by many of the latest Omicron variants of SARS-CoV-2, which have evolved to evade antibody drugs that work against the original virus. Researchers think the decoys, in contrast, are unlikely to lose their potency. If SARS-CoV-2 does evolve to prevent decoys from binding, the virus' own ability to bind to and infect cells will probably suffer as well. "It puts the viruses in checkmate," says Landau, who published the findings in a 2 January preprint on bioRxiv.

The NYU team also went a step further. The body would quickly break down a dose of inhaled or injected decoys. But in a second preprint posted on 12 January on bioRxiv the researchers reported they'd packaged a gene for the decoy into viruses commonly used as "vectors" to deliver disease-treating genes. Injecting a small dose into mice, they showed the vectors infected muscle cells, causing them to churn out the decoy, which then protected the animals from infection for up to 2 months.

Landau acknowledges that regulators aren't likely to approve gene therapy targeting SARS-CoV-2 in otherwise healthy people. However, he adds, "It could be extremely useful for immunocompromised people who can't generate an effective immune response" to either a natural infection or a vaccine. Guangping Gao, a gene therapy expert at the University of Massachusetts Chan Medical School, agrees, saying, "This project has great potential." Others note, however, that the immune system often fights off viral vectors, which could limit the effectiveness of the approach for preventing COVID-19.

However they're delivered, using decoys to stymie SARS-CoV-2 could be just the beginning. Baker's UW colleague Lauren Carter, a pharmaceutical bioengineer at the university's Institute for Protein Design, notes that Baker's group and others are already designing decoys to fight mpox, influenza, Ebola and even HIV—previous efforts to deceive the AIDS virus this way failed in clinical trials but there is new optimism about improved decoys for it.

"This could be the avant-garde of pandemic prevention," she says. "All we need is the structure [of a viral target] to design against." ■

PALEOANTHROPOLOGY

Neanderthals lived in groups big enough to eat giant elephants

Meat from the butchered beasts would have fed hundreds

By **Andrew Curry**

On the muddy shores of a lake in east-central Germany, Neanderthals gathered some 125,000 years ago to butcher massive elephants. With sharp stone tools, they harvested up to 4 tons of flesh from each animal, according to a study that is casting these ancient human relatives in a new light. The degree of organization required to carry out the butchery—and the sheer quantity of food it provided—suggests Neanderthals could form much larger social groups than previously thought.

The find comes from a trove of animal bones and stone tools uncovered in the 1980s by coal miners near the town of Neumark-Nord. The finds date to a relatively warm period in Europe known as the Eemian interglacial, 75,000 years before modern humans arrived in Western Europe. They include the bones and tusks of more than 70 mostly adult male straight-tusked elephants (*Palaeoloxodon antiquus*), an extinct species almost twice the size of modern African elephants that stood nearly 4 meters tall at the shoulder. Most had been left in dozens of piles along the ancient lakeshore over the course of about 300 years.

> **"Why would you slaughter the whole elephant if you're going to waste half the portions?"**
> **Lutz Kindler**, MONREPOS Archaeological Research Center

"We wondered, 'What the hell are 70 elephants doing there?'" says Lutz Kindler, an archaeozoologist at the MONREPOS Archaeological Research Center.

To find out, he and his colleague Sabine Gaudzinski-Windheuser, also an archaeozoologist at MONREPOS, spent months examining the 3400 elephant bones, which are now stored in a warehouse. Some weighed dozens of kilograms and required a forklift to move. Under a microscope, Gaudzinski-Windheuser says, nearly every bone showed signs of butchery.

Although Neanderthals were known to be capable hunters, these cutmarks "seem to be the first evidence of large-scale elephant hunting," says April Nowell, an archaeologist at the University of Victoria who was not involved with the research.

Gouges and scratches on nearly every bone show the butchers were thorough in their slaughter. "They really went for every scrap of meat and fat," says University of Leiden archaeologist and study co-author Wil Roebroeks. The bones hadn't been gnawed by scavengers like wolves or hyenas, suggesting nothing was left for them.

The meat from a single elephant would have been enough to feed 350 people for a week, or 100 people for a month, the researchers calculate. In the past, Neanderthals were thought to live in small, highly mobile groups of about 20 individuals at most, but the elephant bounty suggests far bigger groups—big enough to slaughter and process an entire elephant and big enough to consume it—once lived near the site, the researchers report this week in *Science Advances*. "This is really hard and time-consuming work," Kindler says. "Why would you slaughter the whole elephant if you're going to waste half the portions?"

The researchers "make a good case these huge food packages mean much larger groups," says University of Reading archaeologist Annemieke Milks, who was not involved in the research. "Maybe it's a large, seasonal gathering, or they're storing food—or both."

Nowell agrees, adding that felling an elephant must have required careful orchestration. The hunters likely singled out adult males, which roam alone without the protection of a female-led herd. "It would necessitate a high level of competence in sequencing and planning out the hunt and coordinating everybody."

That doesn't mean Neanderthals always lived and worked in large groups. But the results, like other recent findings, show these archaic humans were more sophisticated than once assumed. "If one regional group of Neanderthals was capable of such behavior, other groups elsewhere surely would have been capable, too," says retired University of Nevada, Reno, archaeologist Gary Haynes. "This lets us imagine Neanderthals as more like modern humans rather than as humanoid brutes, as they once were interpreted." ■