Africa’s Oldest DNA Is Helping Address Science’s Racial Bias

Scientists have way more DNA from ancient Europeans than Africans. Now analysis of a genome from nearly 20,000 years ago is answering questions about the continent’s past.
HUMAN HISTORY IS written in DNA. Where our ancestors lived and who they loved—the story is right there if we can see into their genes. The trouble is that the ravages of climate and time degrade DNA, making its secrets harder and harder to detect. Gradually, however, scientists have begun to peer back through time by sequencing ancient DNA. In 2016, researchers at the Max Planck Institute for Evolutionary Anthropology pieced together DNA from a skeleton found in a cave in northern Spain. The human ancestor it was from lived more than 430,000 years ago.

Other ancient DNA discoveries have filled in our knowledge of humanity’s distant past. A Siberian cave yielded up a bone that DNA analysis revealed belonged to a woman from 90,000 years ago who was half Neanderthal and half Denisovan. Another skeleton from the same cave gave us Neanderthal DNA from 120,000 years ago. But all of this DNA has something in common: Almost all of it comes from Europe and Asia. The oldest DNA from sub-Saharan Africa—the place where the whole human story began—dates back to less than 10,000 years ago.

Now a new discovery of the oldest African DNA is pushing back against this bias, and in the process revealing how our ancestors lived and moved around the continent tens of thousands of years ago. The findings add further evidence to the idea that, at some point around 20,000 years ago, some people in Africa started to come together in larger, more settled populations. Evidence of beads and pigments from burial sites suggests that something changed in Africa 20,000 years ago that made these societies more closely resemble those of today. Now DNA evidence suggests that it may have had to do with these ancient movement patterns. “We’ve never had any actual genetic evidence for that until this time because we’ve never had any skeletons,” says Jessica Thompson, an anthropologist at Yale University and coauthor on this new study.

The big problem facing archaeologists is that ancient DNA does not survive for long in tropical environments. Heat and humidity break it down, making it extremely difficult to extract from bones. That’s one reason the best-preserved ancient genomes that scientists have been able to access tend to come from cold, dry
genomes that scientists have been able to access tend to come from cold, dry environments—often in caves that are shielded from the weather. For this study, Thompson and her colleagues had to work with extremely small fragments of bone—in one case the DNA came from a single finger bone from an infant. The oldest DNA they managed to recover from African bones dated to between 17,000 and 20,000 years ago, although in this case there was so little bone available that the researchers had to estimate the date from ostrich egg artifacts found in the burial site.

Thompson and her colleagues analyzed the DNA of 34 individuals—six of them for the first time—who lived in Africa between 500 and 20,000 years ago. By analyzing specific regions in these genomes, they were able to model how ancient populations may have moved around between 50,000 and 20,000 years ago. These findings will help tell the history of people in south-central Africa, says Maggie Katongo, an assistant keeper of archaeology at Livingstone Museum in Zambia, graduate student at Rice University, and one of the study’s coauthors. “This kind of research gives us information that can be used to tell the story of these past communities that might have lived around different parts of Zambia,” she says.

The researchers compared the ancient African DNA with samples from people living in present-day Africa to get an idea of how much genetic variation there is between people living in different places and times. The ancient DNA from south-central and eastern Africa revealed that these people had ancestors who came from three different parts of the continent: Central Africa, southern Africa, and eastern Africa. “It shows that there was a lot of long-distance movement and mixture and that eastern Africa, in particular, is a really important hub,” says Thompson.

Diyendo Massilani, a geneticist at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, says that these findings should lead to more work into ancient African DNA. “It’s proof that there is definitely potential in Africa—that we can find fossils, we can find DNA,” says Massilani, who was not involved with the research. But he cautions that with only a very small number of individuals, and relatively poor quality DNA, it’s hard to draw firm conclusions about what happened in Africa tens of thousands of years ago. “Are those two or three individuals actually a faithful representation of the other individuals living in the same area at the same time? We don’t know,” Massilani says.

https://www.wired.com/story/ancient-african-dna/
Uncovering ancient African DNA might also allow new narratives to emerge about Africa’s place in human history, says Thompson. East Africa is where humans first evolved hundreds of thousands of years ago, but when it comes to investigating more recent human stories, Africa has often been overlooked by mostly European and American scientists. “The people with the resources are able to put a lot of effort into the more recent time periods that they consider part of their own immediate heritage,” says Thompson. Sarah Tishkoff, a geneticist at the University of Pennsylvania, agrees. “It’s clear that there has been an extremely complex demographic history in Africa—more complex than probably any other region of the world. But all the ancient DNA studies are done in Asia and Europe, and then Africa just gets left out of it.”

Massilani is hopeful that this study will lead to more research into ancient African DNA. His own work focuses on extracting DNA from the soil, and he has shown it’s possible to recover neanderthal DNA from only a few milligrams of sediment. He’s now working on using the same technique to try and recover human DNA from sites in Africa and Mongolia. Potiphar Kaliba, director of museums in Malawi and another coauthor of the paper, says there is still more to discover from the bones that exist within museum collections. “This information has been lying there for years,” he says.

The involvement of African scientists and curators was also critical for this research, says Katongo. Many of the remains within the Livingstone Museum’s collection were excavated when British colonialists still ruled over Zambia, but this DNA analysis places these ancient bones within a new context. This research isn’t telling the same old story of human origins from a Eurocentric perspective, Katongo says: “It also caters for our people.”