



Mt. Hora in Malawi, source of two individuals analyzed in the study of ancient DNA. Credit: Jacob Davis

Archaeology

Modern Humans Began to Evolve, and Almost Immediately Split Into Three Groups

Very early in the history of modern humans, a deep divergence emerged, a new study reveals. The groups would only encounter each other again over 100,000 years later



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We modern humans began our story in Africa, splitting off from whatever species preceded us about 300,000 years ago, according to anatomical and archaeological evidence. Now a new multidisciplinary paper based on archaeological and genetic evidence springs new surprises in the story of humanity. One is profound divergence very near our time of origin, not into two groups as has been recently proposed – but into three.

The new research compared the genomes of people living in eastern, southern and central Africa 18,000 to 5,000 years ago and some modern people as well, including the Ju/'hoansi in southern Africa and the Mbuti rainforest foragers in central Africa. This is what they found.

It has already been shown that not long after modern humans began to evolve, two separate groups developed: in the south and east of Africa. Now it turns out that modern sub-Saharan Africans stem from not two but three source populations that became highly divergent, according to a paper published Wednesday in Nature by Mark Lipson of Harvard, Elizabeth Sawchuk of the University of Alberta, David Reich also of Harvard University, Mary Prendergast of Rice University and altogether 44 authors.

Separate genetic lineages developed in eastern, central, and southern Africa, well over 200,000 years ago, possibly much earlier.

“That does not mean that there weren’t subsequent interactions – it just wasn’t sufficient to merge the populations back into a homogenous population,” observes co-author Jessica Thompson of Yale University.

When these lineages diverged is uncertain but the why seems clearer: they became physically cut off. “Geography is the best predictor of the relative proportions of eastern, central, and southern African ancestry,” Prendergast explains.

And then, perhaps about 80,000 to 50,000 years ago, the “Later Stone Age”, these deeply diverged groups began to move around long distance. Over generations, they encountered the other groups and mixed with them. Previously distinct groups of hunter-gatherers began exhibiting similar cultural manifestations, from technological innovations to symbolism.

Archaeologists had long since noticed this “Later Stone Age transition” involving the advent of ostensible “modern behavior,” and had hypothesized that the impetus was demographic change. Now the genetic data supports that suggestion.

“By about 50,000 years ago, we find that artifacts carrying some kind of symbolic meaning – such as ostrich eggshell beads, or ochre pigment – became much more widespread across sub-Saharan Africa than they were in the 300,000 to 50,000 year range (Middle Stone Age),” Prendergast explains. “Now, we have evidence from ancient DNA to show that people were indeed moving and interacting in new ways around this time.”

The study shows that descendants of people living Ethiopia in antiquity spread as far south as Zambia; and descendants of people living in southern Africa spread as far north as Kenya, she elaborates.



Bayaka in the Central African Republic rainforest Credit: JMGRACIA100

"It is pretty amazing that members of groups whose ancestors had long been separated began to connect between 50,000 to 20,000 years ago," Prendergast says.

Regarding Zambia, the data indicates when these people replaced the original foragers in the region, adds co-author Maggie Katongo of Rice University. The remains for the study were found in the Kalembe rock-shelter.

"Kalembe has an earlier occupation for sure. Material evidence such as stone tool technology suggests the site has an occupation period that stretches to the Late Stone Age," Katongo adds - noting that the shelter also features rock art, apparently from the Late Stone Age.

By 18,000 years ago and later, which is the timeline of the people whose genomes are analyzed in this paper, people in eastern, central and southern Africa had become a mix of all three lineages following widespread movement and mixing across sub-Saharan Africa as the Middle Stone Age transited to the Later Stone Age, co-author Sawchuk sums up.



Rockshelter at Mt. Hora, Malawi, where recent excavations uncovered two of the individuals analyzed in a collaborative study of ancient DNA Credit: Jennifer Miller

Note that different people in different areas had (and have) different proportions of the three lineages, Prendergast helpfully elaborates. “For example, some individuals have more central African related ancestry than others,” she says. Latter-day foragers living in the central African rainforests have the highest concentration of the “previously unappreciated” central African lineage, the team found.

The Nature paper is about sub-Saharan genetics of yore, but before we get to the next surprise, one must ask: All non-African humans stemmed from Africans who exited the continent about 50,000 years ago (there had been previous stabs at leaving Africa but those lineages went extinct). What does this new information imply about all humanity?

“Other studies have shown that people who left Africa were most closely related to the eastern African forager lineage described in our study. This makes a lot of sense since the likely expansion from Africa would be from northeast Africa to southwest Asia,” Prendergast answers. “African population history is human population history. We are reconstructing the deep history of African foragers, and all people on the planet descended from African foragers.”

Have ostrich eggshell beads, won't travel

So, dear reader, you probably descended mainly from prehistoric hunter-gatherers in East Africa. Now let us get back to the hunter-gatherers who stayed in Africa.

Archaeology shows that modern behaviors emerging in the Middle Stone Age became more consistently expressed across sub-Saharan Africa around 50,000 years ago. By around 20,000 years ago these manifestations were practically ubiquitous, albeit regionally diverse, the authors say.





Ancient beads made of ostrich egg-shells Credit: Jennifer Miller

“Genetic, fossil/anatomical, and archaeological/behavioral evidence do not necessarily need to move in tandem, and evidence of ‘modernity’ could appear across different parts of the African continent at different times,” Prendergast points out.

But between 50,000 to 20,000 years ago the human wanderlust seems to have ebbed. Long-distance interactions were passe. “Rather, by that time, we see strong evidence of people having kids with those geographically closest to them,” Prendergast says.

Over in Eurasia, the descendants of Africans may have been swarming everywhere but in sub-Saharan Africa, after generations of wandering far afield, people were staying put – a process the authors call “regionalization.”

Which means, by about 20,000 years ago, the archaeological evidence indicates the rise of regional traditions: local norms about the functional and/or beautiful. Just as today different cultures have different tastes – think of the range of chicken dishes, from southern fried nuggets to vindaloo to coq au vin.

It’s hard to know why regionalization developed but one possibility is the emergence of social boundaries, Prendergast suggests.





San next to termite mound in southern Africa Credit: Oleg Znamenskiy / Shutterstock.c

"Why things changed is the big question – and in short, we still don't know," Sawchuk says.

"Environment was likely a factor – the height of the last Ice Ages were about 26,000 to 11,500 years ago and many parts of sub-Saharan Africa would have been very dry. "

A [recent study on ostrich eggshell beads](#) suggests social networks across Africa broke down around this time, probably because of the climate downturn, Sawchuk adds. "However, there were probably cultural and social reasons too. Perhaps once long-distance trade was established, people didn't need to move around as much – they could just exchange goods and information. Another possibility is that as cultural traditions diversified (a phenomenon archaeologists call regionalization), people's identities may have changed and they may have preferred to start finding partners within their own communities."

In any case, one upshot is that in the time period covered by the individuals in the study, from about 20,000 to 5,000 years ago, the threefold ancestry of sub-Saharan Africans remained quite stable.

Yet this was a time of dramatic change necessitating cultural innovation. As the last [Ice Age waned](#), the continent entered a major wet and warm period known as the [African Humid Period](#), Prendergast says.

Lakes and rivers expanded (later to reverse); the Sahara and [Arabia even greened](#). In sub-Saharan Africa people developed new toolkits and techniques, and may even have begun to settle down, as opposed to being full-time nomadic hunter-gatherers. Move far, they did not any more; all this cultural upheaval was accompanied by relatively little genetic change.

They were marrying locally, and the innovations were apparently local as well.

Then came yet another change. During the last 5,000 years, the African continent was dramatically transformed again, this time less because of planetary forces and more because due to anthropogenic elements: the rise and spread of farming and animal domestication.

Agriculture and animal husbandry is believed to have begun in the Levant and Anatolia much earlier.

"Some domesticated animals (like sheep and goats) were introduced [to Africa] from the Levant about 8,000 years ago, and some animals (potentially cattle, donkeys) were domesticated locally," Sawchuk relates.

And all that was, Prendergast explains, followed in turn by the rise of African states and empires, as well as forced migrations associated with imperialism and enslavement, and then by postcolonial political, economic, and social transformations.

"One thing I always like to emphasize when we are talking about present-day groups for whom we have DNA, is that we should not assume the ancestors of these groups have always lived in the same place," Prendergast qualifies. "So when we say central African ancestry, what we mean is ancestry related to

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lineages in the past, we need more ancient DNA studies.” It turns out that the story of the last 50,000 years, she points out, is not only under-researched; it was incredibly important to humanity.