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Oldest European genome illuminates diverse ancestry

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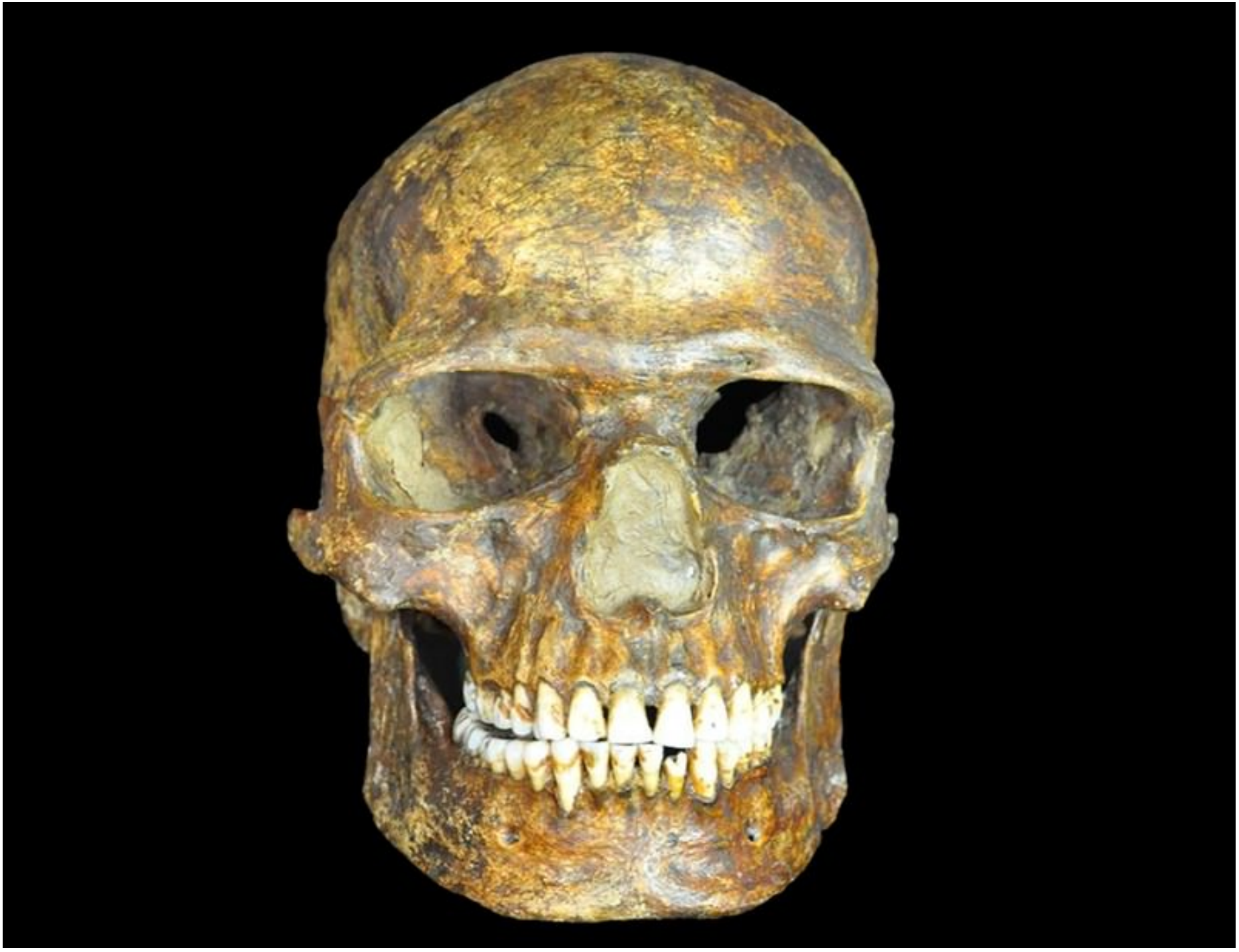

Kostenki-14's 37,000-year-old genome is revealing a wealth of human history
(Image: Peter the Great Museum)

The 37,000-year-old body of a man found in 1954 in south-west Russia has delivered the oldest European DNA. The analysis of his genome, published this week, shows that much of Europe's diverse genetic makeup stretches back over 30,000 years and survived the last ice age.

The study is the latest in a slew of attempts to tease apart the origins of modern Europeans. We know that modern humans left Africa around 60,000 years ago at least, and that an early group migrated east, possibly along the coast, to south-east Asia and Oceania. We also know that Europeans and Asians parted ways more recently.

Today, Europeans are a hybrid breed that show traces of DNA from several distinct early populations. How Europeans came to acquire their diverse genetic heritage is something that several groups studying ancient human DNA are currently trying to decipher.

Merry threesome

A leading proposal is that Europeans hail from three separate populations that migrated into Europe and mated with each other at different times in history.

To add to our understanding, a group of scientists led by the Centre for GeoGenetics at the University of Copenhagen in Denmark delved into the DNA of Kostenki-14, a man whose 37,000-year-old body was found on the banks of the Don river in southern Russia, several hundred kilometres from the border with Ukraine.

They compared markers in his DNA to other ancient humans found in Eurasia and to modern humans. They found that Kostenki-14's DNA was closely related to early European hunter-gatherers, contemporary Europeans and some contemporary Siberians. What they did not find was any relation to East Asians, suggesting that by the time Kostenki-14 was born the European and Asian lineages had already split from each other.

By contrast, another ancient genome published just a few weeks ago, belonging to a 45,000-year-old west-Siberian known as Ust'-Ishim, was related to both Europeans and Asians. That suggests the two groups parted ways between 45,000 and 37,000 years ago and makes Kostenki-14 the oldest European to have his genome sequenced.

Untangling the family tree

What's more, Kostenki-14's Y-chromosome shares features with a 7000-year-old hunter-gatherer from Spain. "This shows some level of continuity in European populations across almost 30,000 years," says Iosif Lazaridis at Harvard University.

During that time, European populations ebbed and flowed as ice sheets grew and shrank, at times covering large swathes of the continent. Although new cultures emerged, the study shows that the population remained broadly of the same original stock.

Because European genomes seem to have remained relatively similar over such a long period of time, Eske Willerslev at the Centre for GeoGenetics believes their results undermine the idea – proposed by Lazaridis and colleagues earlier this year – that the modern European genome arose from three populations intermingling and swapping genes. Instead, he believes that a mega-population stretched from Europe all the way to Central Asia 36,000 years ago, and that sub-groups within this mated to produce the modern European mix.

Lazaridis disagrees: "I don't think that [this study] in any way provides evidence against the model proposed in ours," he says Lazaridis. Others, meanwhile, say the difference between the two theories is superficial.

What everyone does seem to agree on is that the final ingredient to the modern European genome came very late in the game, as recently as 7000 years ago, when a group of middle eastern farmers appears to have arrived into southern Europe and mated with the hunter gatherers living there.

The latest study also further pinpoints when early humans mated with their now-extinct cousins, the Neanderthals. The recent study of Ust'-Ishim narrowed it down to between 50,000 and 60,000 years ago. From Koskenki-14's genome, Willerslev and colleagues calculated that the mating happened about 54,000 years ago.