

# Genetic study unravels ancient links between African and European populations

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Large numbers of people moved between Africa and Europe during recent and well-documented time periods such as the Roman Empire, the Arab conquest, and the slave trade, and genetic evidence of these migrations lives on in Europeans today. But were there more ancient migrations? In a study published online today in *Genome Research*, researchers present the first genetic evidence for prehistoric gene flow between Africa and Europe, dating back as far as 11,000 years ago.

To trace the evolution and ancestry of humans, scientists study the DNA sequence of the mitochondria, a specialized [cellular structure](#) that produces energy for the cell and carries genetic information that is separate from the rest of the genome that resides in the nucleus. While the [nuclear genome](#) is a mix of genetic information from both mother and father, the [mitochondrial DNA](#) (mtDNA) is passed directly from mother to child without any contribution of DNA from the father. But not everyone's mtDNA is exactly alike: over long periods of time, small changes in the mtDNA sequence have arisen in different populations. Geneticists can use these changes as markers that indicate the movements and migrations of humans in the past, and classify them into specific "haplogroups."

In this study, an international team of researchers performed the largest analysis of complete mtDNA genomes belonging to haplogroup L (a lineage of sub-Saharan Africa origin) in Europe to date, aiming to untangle the history of genetic links between the two continents. By comparing the sequences of mtDNA genomes from various regions of

Europe with mitochondrial genomes from around the world, they made a very surprising observation regarding when sub-Saharan lineages appeared in Europe.

"It was very surprising to find that more than 35 percent of the sub-Saharan lineages in Europe arrived during a period that ranged from more than 11,000 years ago to the Roman Empire times," said Dr. Antonio Salas of the University of Santiago de Compostela and senior author of the study. The other 65% of European haplogroup L lineages arrived in more recent times.

The authors explain that these contacts likely connected sub-Saharan Africa to Europe not only via North Africa, but also directly by coastal routes. Salas said that it still remains unknown why there was genetic flow between the Africa and Europe in prehistoric times, but one possible scenario is that some bidirectional flow was promoted when the last glaciation pushed some Europeans southward, until the glacier receded and populations returned north.

In addition to tracing the [genetic links](#) of Africa and Europe back to prehistoric times, Salas expects that their work will also help those individuals who want to learn more about their own ancestry. "There is a growing interest in direct-to-consumer genetic testing, including those aimed to serve a public interested in reconstructing their ancestry," Salas said. "Studies like the one presented here will help to unravel inferences made in these studies."

Scientists from the University of Santiago de Compostela (Galicia, Spain), the University of Perugia (Perugia, Italy), the University of Pavia (Pavia, Italy), the Sorenson Molecular Genealogy Foundation (Salt Lake City, UT), the University of Oxford (Oxford, UK), and the National Institute of Toxicology and Forensic Science (Sevilla, Spain) contributed to this study.

**More information:** Cerezo M, Achilli A, Olivieri A, Perego UA, Gómez-Carballa A, Brisighelli F, Lancioni H, Woodward SR, López-Soto M, Carracedo Á, Capelli C, Torroni A, Salas A. Reconstructing ancient mitochondrial DNA links between Africa and Europe. *Genome Res* [doi: 10.1101/gr.134452.111](https://doi.org/10.1101/gr.134452.111)

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