

Ancient DNA unravels Europe's genetic diversity

October 10 2013

Ancient DNA recovered from a time series of skeletons in Germany spanning 4,000 years of prehistory has been used to reconstruct the first detailed genetic history of modern-day Europeans.

The study, published today in *Science*, reveals dramatic population changes with waves of prehistoric migration, not only from the accepted path via the Near East, but also from Western and Eastern Europe.

The research was a collaboration between the Australian Centre for Ancient DNA (ACAD), at the University of Adelaide, researchers from the University of Mainz, the State Heritage Museum in Halle (Germany), and National Geographic Society's Genographic Project. The teams used mitochondrial DNA (maternally inherited DNA) extracted from bone and teeth samples from 364 prehistoric human skeletons – ten times more than previous ancient DNA studies.

"This is the largest and most detailed genetic time series of Europe yet created, allowing us to establish a complete genetic chronology," says joint-lead author Dr Wolfgang Haak of ACAD. "Focussing on this small but highly important geographic region meant we could generate a gapless record, and directly observe genetic changes in 'real-time' from 7,500 to 3,500 years ago, from the earliest farmers to the early Bronze Age."

"Our study shows that a simple mix of indigenous hunter-gatherers and the incoming Near Eastern farmers cannot explain the modern-day

diversity alone," says joint-lead author Guido Brandt, PhD candidate at the University of Mainz. "The genetic results are much more complex than that. Instead, we found that two particular cultures at the brink of the Bronze Age 4,200 years ago had a marked role in the formation of Central Europe's genetic makeup."

Professor Kurt Alt (University of Mainz) says: "What is intriguing is that the genetic signals can be directly compared with the changes in material culture seen in the archaeological record. It is fascinating to see [genetic changes](#) when certain cultures expanded vastly, clearly revealing interactions across very large distances." These included migrations from both Western and Eastern Europe towards the end of the Stone Age, through expanding cultures such as the Bell Beaker and the Corded Ware (named after their pots).

"This transect through time has produced a wealth of information about the genetic history of modern Europeans," says ACAD Director Professor Alan Cooper. "There was a period of stasis after farming became established and suitable areas were settled, and then sudden turnovers during less stable times or when economic factors changed, such as the increasing importance of metal ores and secondary farming products. While the genetic signal of the first farming populations becomes increasingly diluted over time, we see the original hunter-gatherers make a surprising comeback."

Dr Haak says: "None of the dynamic changes we observed could have been inferred from modern-day genetic data alone, highlighting the potential power of combining ancient DNA studies with archaeology to reconstruct human evolutionary history." The international team has been working closely on the genetic prehistory of Europeans for the past 7-8 years and is currently applying powerful new technologies to generate [genomic data](#) from the specimens.

The international team has been working closely on the genetic prehistory of Europeans for the past 7-8 years and is currently applying powerful new technologies to generate genomic data from the specimens.

More information: "Ancient DNA Reveals Key Stages in the Formation of Central European Mitochondrial Genetic Diversity," by G. Brandt et al *Science*, 2013.

Provided by University of Adelaide

Citation: Ancient DNA unravels Europe's genetic diversity (2013, October 10) retrieved 3 May 2024 from <https://phys.org/news/2013-10-ancient-dna-unravels-europe-genetic.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.