European invasion: DNA reveals the origins of modern Europeans

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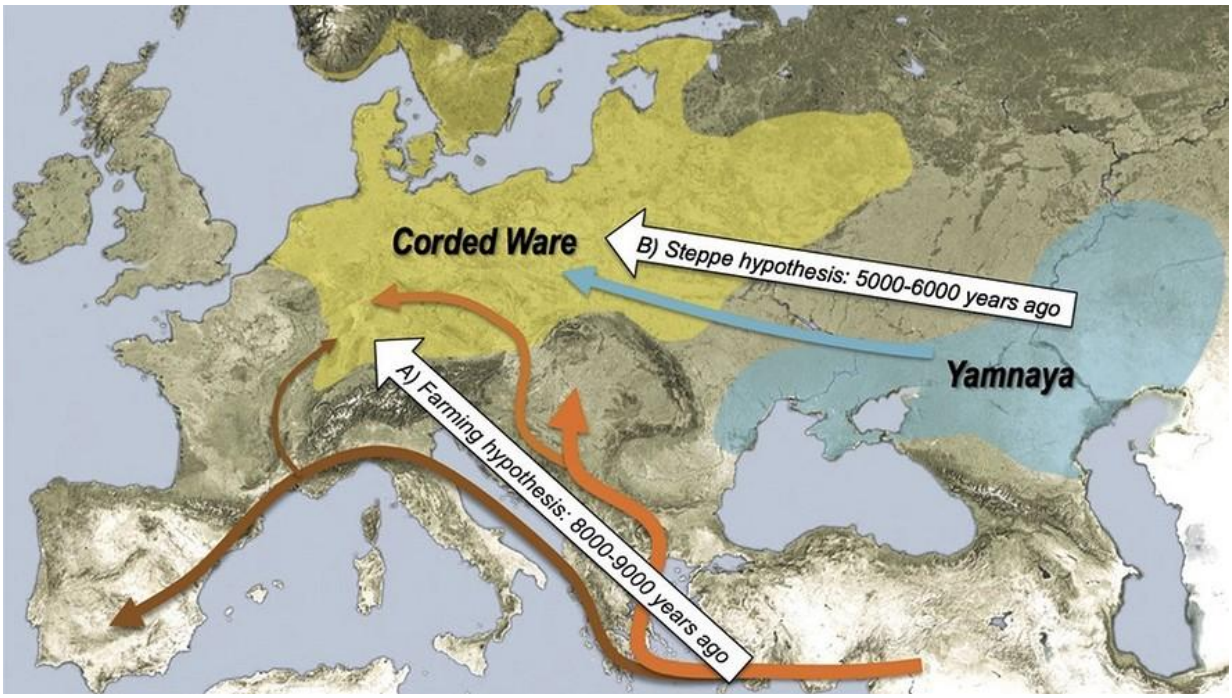

Map showing the two major theories of how the Indo-European languages (white arrows) spread through Europe. Image by: Wolfgang Haak/The Conversation.

Europe is a remarkable mix of cultural and language groups clustering in different regions. But how did they all get there and how are they related?

Archaeologists, linguists and other experts have spent their careers pondering these questions. One way of finding answers is by studying relics from Europe's archaeological past. Distinctive types of pottery and cultural practices have been used to identify different "archaeological cultures."

Another line of evidence is given by linguistics, the study of languages. Language experts study the ways in which languages, and therefore cultures, are related. In the case of Europe, they have identified one root language known as Indo-European. This language family evolved and split into many other languages such as Hindi, Russian, Spanish and English.

There is one more tool to help us explore the history of European peoples. This tool is known as DNA sequencing. DNA sequencing, or genome sequencing, analyzes DNA taken from human remains. Recent technology allows us to use the results to find connections between cultural and ethnic groups. The results paint a fascinating picture of European history.

Third Wave

DNA sequencing allowed us to answer a number of longstanding questions. One mystery was where Europe's hunter-gatherers learned how to farm. Had they learned from neighbors in southeast Europe? Or did they instead come from the Middle East, where farming was invented?

Genetic analysis of human remains points to the answer. Farming was introduced widely across Europe in one or two rapid waves around 8,000 years ago. It was the population of the Middle East that brought about this crucial cultural change.

At first, the original hunter-gatherers in Europe seem to have retreated to Britain, Scandinavia and Finland. But the genetics show that within a few thousand years they had returned and mixed with the new farming populations. The DNA of both hunter-gatherer and farming peoples have been found together, dating back 5,000 to 7,000 years ago.

Wheeling Across Europe

However, one major mystery remained unsolved. Genetic markers showed that a third large population joined the mix at some point. We have finally been able to identify this previously unknown group, thanks to fellow researchers at Harvard University.

Our study showed that some skeletons belonged to the Yamnaya culture. The Yamnaya were a nomadic group of animal herders, with domestic horses and ox-drawn wheeled carts. They were originally from today's Russian and Ukrainian grasslands north of the Black Sea.

These nomads appear to have "invaded" Central Europe in a previously unknown wave about 4,500 years ago. This event introduced two very significant new technologies to Western Europe: domestic horses and the wheel.

Speaking In Tongues

The discovery of Yamnaya DNA in central Europe also solved another major archaeological mystery. It finally answered who the source of the Indo-European language family was.

Previously, archaeologists had two major hypotheses. One was that the Indo-European language came with the wave of Middle East farmers more than 8,000 years ago. The other was that it came with some form of steppe population of Eastern Europe much later.

The first idea was supported by the fact that developments in farming usually came with cultural changes, too. The second idea was supported by linguistic evidence of common words across Indo-European languages. Some of these words stood for wheeled vehicles and transportation, which belonged to the culture of grassland herders. Because of this, it was likely that they were the ones who introduced the Indo-European language.

Our new genomic data finally provides strong evidence that brings us closer to the truth. It was the Yamnaya people who migrated from the steppe area of Ukraine and Russia, bringing their culture with them. They were either the first or the main population to introduce the Indo-European language to Europe.

Now we know that people with European ancestry have a connection to the oxen-drawn cart or the domestic horse. These are part of their heritage, along with their ancestor's history as hunter-gatherers and farmers.

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Quiz

1 Read the conclusion below.

The languages of Europe were brought over by cultures from the East.

Which selection from the article BEST supports this conclusion?

(A) Farming was introduced widely across Europe in one or two rapid waves around 8,000 years ago. It was the population of the Middle East that brought about this crucial cultural change.

(B) These nomads appear to have "invaded" Central Europe in a previously unknown wave about 4,500 years ago. This event introduced two very significant new technologies to Western Europe: domestic horses and the wheel.

(C) It was the Yamnaya people who migrated from the steppe area of Ukraine and Russia, bringing their culture with them. They were either the first or the main population to introduce the Indo-European language to Europe.

(D) Now we know that people with European ancestry have a connection to the oxen-drawn cart or the domestic horse. These are part of their heritage, along with their ancestor's history as hunter-gatherers and farmers.

2 Which section of the article supports the idea that a newly discovered group brought key technologies to Europe?

(B) Introduction [paragraphs 1-4]

(C) "Third Wave"

(D) "Speaking In Tongues"

(D) "Wheeling Across Europe"

3 Which sentence from the introduction [paragraphs 1-4] BEST introduces the kinds of people who study European origins?

(A) Europe is a remarkable mix of cultural and language groups clustering in different regions.

(B) Archaeologists, linguists and other experts have spent their careers pondering these questions.

(C) One way of finding answers is by studying relics from Europe's archaeological past.

(D) Recent technology allows us to use the results to find connections between cultural and ethnic groups.

4 What is MOST likely the reason why the author included details about DNA sequencing in the article?

(A) because DNA sequencing is a brand new and exciting technology

(B) because DNA sequencing is key to the research on European origins

(C) because DNA sequencing can only be used on European DNA

(D) because DNA sequencing is the only tool used by archaeologists