

Neandertals, humans share key changes to 'language gene'

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A new study published online on October 18th in *Current Biology* reveals that adaptive changes in a human gene involved in speech and language were shared by our closest extinct relatives, the Neandertals. The finding reveals that the human form of the gene arose much earlier than scientists had estimated previously. It also raises the possibility that Neandertals possessed some of the prerequisites for language.

The gene, which is called FOXP2, is the only one known to date to play a role in speech and language, according to the researchers. People who carry an abnormal copy of the FOXP2 gene have speech and language problems.

“From the point of view of this gene, there is no reason to think that Neandertals would not have had the ability for language,” said Johannes Krause of the Max Planck Institute for Evolutionary Anthropology. He noted, however, that many as-yet-unknown genes might underlie the capacity for language. Once found, those would have to be examined in Neandertals as well.

Previous analyses indicated that a very recent rise in the human FOXP2 variant had occurred as a result of strong selection, less than 200,000 years ago, added Svante Pääbo, also of the Max Planck Institute.

“Because we know that Neandertal and modern human populations diverged more than 300,000 years ago, we would have guessed that these changes in FOXP2 would have happened after we separated from Neandertals,” Pääbo said, noting that the human version of FOXP2

differs from that of chimps in two places.

The researchers extracted DNA from Neandertal fossils collected in a cave in northern Spain. They exhumed the bones under sterile conditions and froze them before transporting them to the laboratory. They then extracted DNA and sequenced the Neandertal FOXP2 gene, revealing that it was identical to the version found in modern humans. To ensure that the Neandertal DNA samples hadn't been contaminated with human DNA, they also sequenced parts of their Y chromosome, which was found to be distinct from that of men today.

In addition to its potential implications for the acquisition of language, the study also marks the first time a specific nuclear gene has been retrieved from Neandertals—opening the door to other breakthroughs in scientists' understanding of human and Neandertal evolution, the researchers said.

“The current results show that the Neandertals carried a FOXP2 protein that was identical to that of present-day humans in the only two positions that differ between human and chimpanzee,” the researchers concluded. “Leaving out the unlikely scenario of gene flow [between the two lineages], this establishes that these changes were present in the common ancestor of modern humans and Neandertals. The date of the emergence of these genetic changes therefore must be older than that estimated with only extant human diversity data, thus demonstrating the utility of direct evidence from Neandertal DNA sequences for understanding recent modern human evolution.”

Source: Cell Press

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