

Could our big brains come from Neanderthals?

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WASHINGTON (Reuters) -- Neanderthals may have given the modern humans who replaced them a priceless gift -- a gene that helped them develop superior brains, U.S. researchers reported Tuesday.

And the only way they could have provided that gift would have been by interbreeding, the team at the Howard Hughes Medical Institute and the University of Chicago said.

Their study, published in the Proceedings of the National Academy of Sciences, provides indirect evidence that modern Homo sapiens and so-called Neanderthals interbred at some point when they lived side by side in Europe.

"Finding evidence of mixing is not all that surprising. But our study demonstrates the possibility that interbreeding contributed advantageous variants into the human gene pool that subsequently spread," said Bruce Lahn, a Howard Hughes Medical Institute researcher at the University of Chicago who led the study.

Scientists have been debating whether Neanderthals, who died out about 35,000 years ago, ever bred with modern Homo sapiens. Neanderthals are considered more primitive, with robust bones but a smaller intellect than modern humans.

Lahn's team found a brain gene that appears to have entered the human lineage about 1.1 million years ago, and that has a modern form, or allele, that appeared about 37,000 years ago -- right before Neanderthals became extinct.

"The gene microcephalin (MCPH1) regulates brain size during development and has experienced positive selection in the lineage leading to Homo sapiens," the researchers wrote.

Positive selection means the gene conferred some sort of advantage, so that people who had it were more likely to have descendants than people who did not. Lahn's team estimated that 70 percent of all living humans have this type D variant of the gene.

"By no means do these findings constitute definitive proof that a Neanderthal was the source of the original copy of the D allele. However, our evidence shows that it is one of the best candidates," Lahn said.



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The researchers reached their conclusions by doing a statistical analysis of the DNA sequence of microcephalin, which is known to play a role in regulating brain size in humans. Mutations in the human gene cause development of a much smaller brain, a condition called microcephaly.

By tracking smaller, more regular mutations, the researchers could look at DNA's "genetic clock" and date the original genetic variant to 37,000 years ago.

They noted that this D allele is very common in Europe, where Neanderthals lived, and more rare in Africa, where they did not. Lahn said it is not yet clear what advantage the D allele gives the human brain.

"The D alleles may not even change brain size; they may only make the brain a bit more efficient if it indeed affects brain function," Lahn said.

Now his team is looking for evidence of Neanderthal origin for other human genes.