

# Altai Neanderthal Shows Gene Flow from Early Modern Humans

Using several genetic analytical methods, an international research team recently identified an interbreeding event between the Neanderthals and modern humans that occurred about 100,000 years ago, tens of thousands of years earlier than previously known. Dr. FU Qiaomei, from the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP), Chinese Academy of Sciences, has been working with this leading team of international scientists who has made this ground-breaking discovery published February 17th, 2016 in the *Journal Nature*.

The authors successfully pieced together the first genetic evidence to support a scenario that some modern humans may have left Africa in an early migration and admixed with the archaic hominins in Eurasia before the ancestors of present-day non-Africans have migrated out of Africa, less than 65,000 years ago. The breakthrough involves one specific

“Altai Neanderthal”, whose remains were found in a cave in the Altai Mountains in southern Siberia. The individual shows signs of gene flow from modern humans, in comparison with the two Neanderthals from European caves that were also sequenced for this study as well



Dorsal view of the Denisova Neanderthal toe bone. (Image by Bence Viola)

as a Denisovan, which all appeared to lack the specific DNA that derived from modern humans.

Some of their findings reveal that: 1) alleles in the windows of Altai Neanderthal genome with low divergence to Africans have higher divergence to the Denisovan than Denisovan windows with low divergence to Africans. The latter

windows in the Altai Neanderthal genome have higher heterozygosity than in the Denisovan genome; 2) a demographic model that estimates a gene flow from these early modern humans into the ancestors of the Altai Neanderthal to be about 1.0–7.1%, and although the exact source is unclear, the authors suspect that it may have come from a deep population that has either split off from the ancestors of present-day Africans or from one of the early African lineages; and 3) complex computer simulations also support the data.

The team was able to further calculate the time of early modern human introgression into the Altai Neanderthal lineage, and revealed that it occurred 100,000–230,000 years ago, based on the amount of shared haplotypes (50 kilobases or longer in length) between the modern humans and Altai Neanderthal. This introgression is much older than the previously reported gene flow from the Neanderthals into modern humans outside Africa (47,000–65,000 years ago). Possibly, there was an extended lag between the time when this group branched off the modern human family tree (roughly 200,000 years ago), and the time when they left their genetic mark in the Altai Neanderthal (about 100,000 years ago), before losing themselves to extinction.

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Entrance of the Denisovan Cave in the Altai Mountains of southern Siberia, where the remains of the “Altai Neanderthal” was found. (Image by Bence Viola)

