

Ancient DNA reveals humans living 40,000 years ago in Beijing area related to present-day Asians, Native Americans

January 21 2013



The leg of the early modern human from Tianyuan Cave was used for the genetic analysis as well as for carbon dating. Credit: MPI for Evolutionary Anthropology

An international team of researchers including Svante Pääbo and Qiaomei Fu of the Max Planck Institute for Evolutionary Anthropology

in Leipzig, Germany, sequenced nuclear and mitochondrial DNA that had been extracted from the leg of an early modern human from Tianyuan Cave near Beijing, China. Analyses of this individual's DNA showed that the Tianyuan human shared a common origin with the ancestors of many present-day Asians and Native Americans. In addition, the researchers found that the proportion of Neanderthal and Denisovan-DNA in this early modern human is not higher than in people living in this region nowadays.

Humans with morphology similar to present-day humans appear in the fossil record across Eurasia between 40,000 and 50,000 years ago. The [genetic relationships](#) between these early modern humans and present-day [human populations](#) had not yet been established. Qiaomei Fu, Matthias Meyer and colleagues of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, extracted nuclear and mitochondrial DNA from a 40,000 year old [leg bone](#) found in 2003 at the Tianyuan Cave site located outside Beijing. For their study the researchers were using new techniques that can identify ancient genetic material from an archaeological find even when large quantities of DNA from [soil bacteria](#) are present.

The researchers then reconstructed a genetic profile of the leg's owner. "This individual lived during an important evolutionary transition when early modern humans, who shared certain features with earlier forms such as Neanderthals, were replacing Neanderthals and Denisovans, who later became extinct", says Svante Pääbo of the Max Planck Institute for Evolutionary Anthropology, who led the study.



Researchers carrying out excavation works at the Tianyuan Cave from which the leg bones had been excavated in 2003. Credit: Institute of Vertebrate Paleontology and Paleoanthropology (IVPP), Beijing

The [genetic profile](#) reveals that this early modern human was related to the ancestors of many present-day Asians and Native Americans but had already diverged genetically from the ancestors of present-day Europeans. In addition, the Tianyuan individual did not carry a larger proportion of Neanderthal or Denisovan DNA than present-day people in the region. "More analyses of additional early modern humans across Eurasia will further refine our understanding of when and how modern humans spread across Europe and Asia", says Svante Pääbo.

Parts of the work were carried out in a new laboratory jointly run by the [Max Planck](#) Society and the Chinese Academy of Sciences in Beijing.

More information: Qiaomei Fu, Matthias Meyer, Xing Gao, Udo Stenzel, Hernán A. Burbano, Janet Kelso, Svante Pääbo, DNA analysis of an early modern human from Tianyuan Cave, China, *PNAS*, Online Early Edition, January 21, 2013.

Provided by Max Planck Society

Citation: Ancient DNA reveals humans living 40,000 years ago in Beijing area related to present-day Asians, Native Americans (2013, January 21) retrieved 25 April 2024 from <https://phys.org/news/2013-01-ancient-dna-reveals-humans-years.html>

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