Tags: ancestor, dental, evolution, fossil, human, morphology, Neanderthal, species, tooth

Separation between Neanderthal and Homo sapiens might have occurred 500,000 years earlier

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The separation of Neanderthal and Homo sapiens might have occurred at least one million years ago, more than 500.000 years earlier than previously believed after DNA-based analyses. A doctoral thesis conducted at the National Centre for Research on Human Evolution (Centro Nacional de Investigacion sobre la Evolucion Humana) -associated with the University of Granada-, analysed the teeth of almost all species of hominids that have existed during the past 4 million years. Quantitative methods were employed and they managed to identify Neanderthal features in ancient European populations.

The main purpose of this research - whose author is Aida Gomez Robles- was to reconstruct the history of evolution of Human species using the information provided by the teeth, which are the most numerous and best preserved remains of the fossil record. To this purpose, a large sample of dental fossils from different sites in Africa, Asia and Europe was analysed. The morphological differences of each dental class was assessed and the ability of each tooth to identify the species to which its owner belonged was analysed.

The researcher concluded that it is possible to correctly determine the species to which an isolated tooth belonged with a success rate ranging from 60% to 80%. Although these values are not very high, they increase as different dental classes from the same individual are added. That means that if several teeth from the same individual are analysed, the probability of correctly identifying the species can reach 100%.

Aida Gomez Robles explains that, from all the species of hominids currently known 'none of them has a probability higher than 5% to be the common ancestor of Neanderthals and Homo sapiens. Therefore, the common ancestor of this lineage is likely to have not been discovered yet.'

What is innovative about this study is that computer simulation was employed to observe the effects of environmental changes on morphology of the teeth. Similar studies had been conducted on the evolution and development of different groups of mammals, but never on human evolution.

Additionally, the research conducted at CENIEH and at the University of Granada is pioneer - together with recent studies based on the shape of the skull- in using mathematical methods to make and estimation of the morphology of the teeth of common ancestors in the evolutionary tree of the human species. 'However, in this study, only dental morphology was analysed. The same methodology can be used to rebuild other parts of the skeleton of that species, which would provide other models that would serve as a reference for future comparative studies of new fossil finds.'

To carry out this study, Gomez Robles employed fossils from a number of archaeological-paleontological sites, such as that of the Gran Colina and the Sima de los Huesos, located in Atapuerca range (Burgos, Spain), and the site of Dmanisi in the Republic of Georgia. She also studied different fossil collections by visiting international institutions as the National Museum of Georgia, the Institute of Human Palaeontology and the Museum of Mankind in Paris, the European Research Centre Tautavel (France), the Senckenberg Institute Frankfurt, the Museum of Natural History in Berlin, the Institute of Vertebrate Palaeontology and Paleoanthropology in Beijing and the Museum of Natural History in New York and Cleveland.

Although the results of this research were disclosed in two articles published in one of the most prestigious journals in the field of human evolution, Journal of Human Evolution (2007 and 2008), they will be thoroughly presented within a few months.

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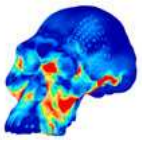

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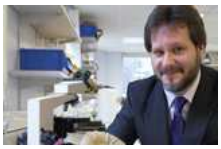

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