

A study proposes the low genetic diversity of the Neanderthals as the principal cause of their extinction

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Atlas from Neanderthals found in Krapina site. Credit: Carlos A. Palancar et al

What caused the disappearance of *Homo neanderthalensis*, a species which apparently possessed as many capacities as *Homo sapiens*? There are several theories attempting to explain this: the climate, competition,

low genetic diversity. Daniel García Martínez, a researcher at the Centro Nacional de Investigación sobre la Evolución Humana (CENIEH), has participated in a study published in the *Journal of Anatomy*, on the first cervical vertebra of several Neanderthals, which confirms that the genetic diversity of the population was low, thus hampering their capacity to adapt to possible changes in their environment and, therefore, their survival.

The Neanderthals inhabited the European continent until barely 30,000 years ago, and their disappearance continues to be a mystery. Work to decipher their genome has been carried out to determine their genetic diversity, as have analyses of different anatomical characteristics in the fossil record of the species.

"We have centered on the anatomical variants of the first cervical vertebra, known as the atlas. The anatomical variants of this vertebra are tightly bound up with genetic diversity: the greater the prevalence of this kind of anatomical variant, the lower the population genetic [diversity](#)," explains Carlos A. Palancar, a researcher at the Museo Nacional de Ciencias Naturales.

In *H. sapiens*, the anatomical variants of the atlas have been extensively studied over recent years. With regard to [modern humans](#), the atlas presents one or more of the different anatomical variations in almost 30% of cases.

El Sidrón

In this study, in which researchers from the Museo Nacional de Ciencias Naturales in Madrid (MNCN-CSIC) and the Universidad de Valencia also participated, three vertebrae from the Krapina site (Croatia) were analyzed, and the material from other sites such as El Sidrón (Asturias) was reviewed.

Recently, researchers from the Paleoanthropology Group at the MNCN determined the presence of different anatomical variants in the atlases from the El Sidrón Neanderthals. With the objective of confirming the high prevalence of these anatomical variants in the species, they conducted exhaustive analyses of the Neanderthal fossil atlases from Krapina.

"Krapina is a site around 130,000 years old, compared with the age of 50,000 or so for El Sidrón. This is the site from which the highest number of Neanderthal remains has been recovered, which makes these a sample of particular interest when analyzing the genetic diversity of this species, as all the individuals may potentially have belonged to the same population," says García-Martínez.

More information: Carlos A. Palancar et al. Krapina atlases suggest a high prevalence of anatomical variations in the first cervical vertebra of Neanderthals, *Journal of Anatomy* (2020). [DOI: 10.1111/joa.13215](https://doi.org/10.1111/joa.13215)

Provided by CENIEH

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