

Study reveals human body has gone through four stages of evolution

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SH-selected postcranial traits. Credit: *PNAS*, doi/10.1073/pnas.1514828112

Research into 430,000-year-old fossils collected in northern Spain found that the evolution of the human body's size and shape has gone through four main stages, according to a paper published this week.

A large international research team including Binghamton University anthropologist Rolf Quam studied the body size and shape in the human fossil collection from the site of the Sima de los Huesos in the Sierra de Atapuerca in northern Spain. Dated to around 430,000 years ago, this site preserves the largest collection of [human fossils](#) found to date anywhere in the world. The researchers found that the Atapuerca individuals were relatively tall, with wide, muscular bodies and less brain mass relative to body mass compared to Neanderthals. The Atapuerca humans shared many anatomical features with the later Neanderthals not present in modern humans, and analysis of their postcranial skeletons (the bones of the body other than the skull) indicated that they are closely related evolutionarily to Neanderthals.

"This is really interesting since it suggests that the evolutionary process in our genus is largely characterized by stasis (i.e. little to no evolutionary change) in body form for most of our evolutionary history," wrote Quam.

Comparison of the Atapuerca fossils with the rest of the human fossil record suggests that the evolution of the [human body](#) has gone through four main stages, depending on the degree of arboreality (living in the trees) and bipedalism (walking on two legs). The Atapuerca fossils represent the third stage, with tall, wide and robust bodies and an exclusively terrestrial bipedalism, with no evidence of arboreal behaviors. This same body form was likely shared with earlier members of our genus, such as *Homo erectus*, as well as some later members, including the Neanderthals. Thus, this body form seems to have been present in the genus *Homo* for over a million years.

It was not until the appearance of our own species, *Homo sapiens*, when a new taller, lighter and narrower [body form](#) emerged. Thus, the authors suggest that the Atapuerca humans offer the best look at the general [human](#) body shape and size during the last million years before the

advent of [modern humans](#).

The study, titled "Postcranial morphology of the middle Pleistocene humans from Sima de los Huesos, Spain," was published in *Proceedings of the National Academy of Sciences*.

More information: Postcranial morphology of the middle Pleistocene humans from Sima de los Huesos, Spain, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1514828112

Provided by Binghamton University

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