

Mexican skeleton gives clue to American ancestry

Genetic signature from cave remains matches that of modern Native Americans.

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The Hoyo Negro skeleton

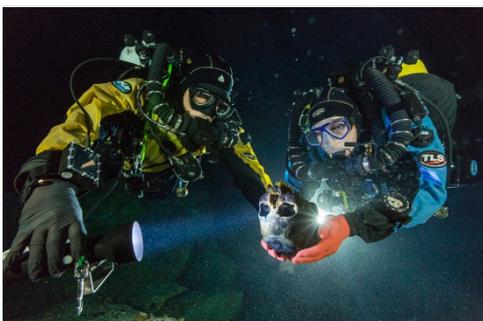
Researchers travel to the submerged Yucatan cave where divers found the remains of an ancient girl and 26 other large mammals, including a saber-toothed tiger.

National Geographic/NOVA

The near-intact skeleton of a delicately built teenage girl, who died more than 12,000 years ago in what is today's Mexico, could help to solve the riddle of how the Americas were first populated.

Cave divers discovered the skeleton seven years ago in a complex of flooded caverns known as Hoyo Negro, in the jungles of the Yucatan Peninsula. They called her Naia, after the naiads, the water nymphs of Greek mythology. She lies in a collapsed chamber together with the remains of 26 other large mammals, including a sabre-toothed tiger, 600 metres from the nearest sinkhole. Most of the mammals became extinct around 13,000 years ago.

Analysis of the remains, most of which are still lying in the submerged cave where they were found, suggests that modern Native Americans are the descendants of the earliest Palaeoamericans, who migrated from Siberia towards the end of the last glacial period. An alternative theory held instead that a mysterious, more recent influx had brought in new populations from Eastern Asia.



“Naia, and the other animals, would have slipped through a hidden sink hole and fallen 30 metres into a shallow pool,” says palaeontologist James Chatters of Applied Paleoscience in Bothell, Washington, who led the study, published today in *Science*¹. “There would have been no way out.” The broken pelvis of Naia’s otherwise near-perfect skeleton is likely a result of the fall, he says.

Reconstructing Naia

It was impossible to safely recover the body from the cave location, so the research

Paul Nicklen/National Geographic

Divers Alberto Nava and Susan Bird had to examine Naia's skull underwater to create a 3-D model (see video below).

team dove to the cave and made bone measurements *in situ*. They placed Naia's skull on a rotating tripod, and set a camera on a second tripod next to it. Turning the skull slowly, they snapped pictures every 20 degrees. Later the team used the photographs to reconstruct a three-dimensional image (see video at bottom).

Naia, they calculated, was approximately one and a half metres tall. Her skull, with its small, projecting, angular face and pronounced forehead, was similar to those of the earliest fossils of Paleoamericans dating from more than 10,000 years ago, most of which have been found in the Pacific Northwest. Her teeth and bone development suggest she was 15 or 16 years old.

The divers also recovered two teeth, a rib and sample of mineral deposits that had grown onto the surface of the bones. Using two independent methods to date the remains, the authors carbon-dated the tooth enamel and measured the ratio of uranium and thorium in the mineral deposits. Naia must have been between 12,000 and 13,000 years old, they concluded. The mitochondrial DNA for their genetics analysis came from one of her teeth.

DNA story

Naia's mitochondrial DNA reveals genetic signatures in common with modern Native Americans, despite her very different skull shape.

"You can never exclude that Native Americans have more than one group of ancestors," says Chatters. But his team's data, he points out, are consistent with the idea that Native Americans evolved from Siberian ancestors.

"It helps support the consensus view, from archaeological, genetic and linguistic evidence, that the Americas were initially peopled 15,000–20,000 years ago from Siberia," says human geneticist Chris Tyler-Smith from the Wellcome Trust Sanger Institute near Cambridge, UK.

According to this widely held theory, the Americas were populated by Siberian ancestors who crossed the Bering land bridge that back then linked Eurasia and Alaska. The migration is thought to have started during the Pleistocene ice age — which ended around 14,000 years ago — and continued over the next several thousand years as these populations moved south.

Yet researchers have puzzled over why the more-than-10,000-year-old Palaeoamerican skulls unearthed so far have such different morphology from those in more recent finds and from modern Native Americans. Scientists wondered whether other Native American ancestors had arrived in a later migration. The new DNA results indicate that the very different skulls of modern Native Americans have evolved on North American soil.

Palaeoamerican remains are few and far between, because the nomadic tribes did not always build tombs for their dead. This is the first full skeleton to be found, and the first major set of remains to be unearthed so far south.



3-D skull reconstruction

The authors created this 3-D model of Naia's skull after scanning it underwater, in the submerged cave where it was found.

Model by Corey and Ann Jaskolski based on photographs by Roberto Chavez Arce; video by Ingemar Lundgren.

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References

1. Chatters, J. C. *et al.* *Science* **344**, 750–754 (2014).