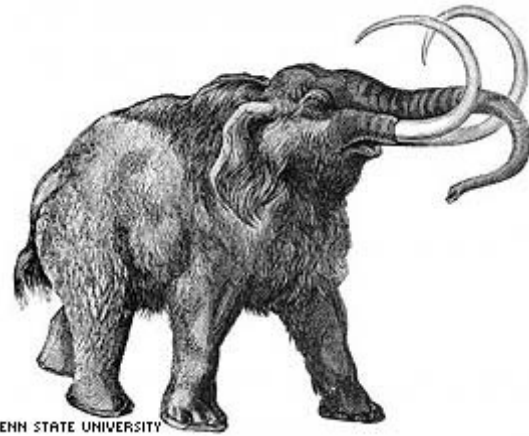


# Hair may solve mammoth mystery

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## Story Highlights

- Scientists: Mammoth hair is an excellent source of DNA
- Sequencing the hair may provide clues as to why the mammoth died out
- Several of the hair samples investigated were up to 50,000 years old



**WASHINGTON (AP)** -- Attacking several tons of woolly mammoth with stone-tipped spears must have taken extraordinary courage -- and ancient people left paintings to prove they did it.

Mammoth hair seems to be an excellent source of well-preserved DNA, researchers report.

Now, scientists are approaching mammoths in a different way, extracting DNA from their dense coats in an effort to learn more about them.

Mammoths are extinct, of course. No one knows if the cause was climate change, hungry Neanderthals or something else -- but they left behind remains, often frozen in the tundra.

Attempts have been made to sequence their DNA from frozen animals, but that can be complicated by contamination.

Researchers report in Friday's edition of the journal *Science*, however, that mammoth hair seems to be an excellent source of well-preserved DNA.

"It is important to understand the genetic makeup of an organism before it went extinct," explained lead researcher Stephan C. Schuster of Penn State University.

They try to understand the relationship between different groups of animals, especially ones that are highly endangered,



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to learn whether those might face a similar fate, said Schuster, an associate professor of biochemistry and molecular biology.

"We want to use this to sequence (the DNA from) museum specimens and therefore help to understand the evolution of species by using museum collections that date back several hundred years," Schuster said.

Indeed, the technique could be used to measure the DNA from specimens collected by such naturalists as Charles Darwin, Alexander von Humboldt and Carl Linnaeus.



The tusks of a 23,000 year old woolly mammoth are carried on a reindeer sled in October 1999.

The DNA collected from the hair is much cleaner and much less damaged than that from other parts of the mammoths, he said, so it is more economic to sequence it. Schuster explained that keratin, the hard covering of hair, could protect the DNA. Hair also can more easily be cleaned of contaminants such as bacteria.

"When people thought of sequencing DNA from hair, the usual assumption was that the material must come from the hair root, which contains recognizable cells, because the hair shaft appears to be dead," co-author Webb Miller, also at Penn State, said in a statement.

"However, we now know that a hair shaft consists essentially of DNA encased in a kind of biological plastic," said biology professor Miller.

Several of the hair samples investigated were up to 50,000 years old. One of the samples came from the first specimen ever recorded, the so-called Adams mammoth, found in 1799 and dug out of the permafrost between 1804 and 1806.

"We plan to use hair and other keratin-containing body parts, such as nail and horn, to untangle the secrets of populations that lived long ago, so these populations can send a message from the past about what it might have taken for them to survive," Schuster said. "This discovery is good news for anyone interested in learning more about how species of large mammals can go extinct."

Learning the DNA sequence does not mean that the ancient animal can be cloned or somehow resurrected, Schuster said, adding "this is science fiction."

Main funding for the research was from Pennsylvania State University, Roche Applied Sciences and a private sponsor.