Researchers revive 28,000-year-old woolly mammoth DNA

Kazuo Yamagata
Kouhei Nagai
Hiroshi Miyamoto
Masayuki Anzai
Hiromi Kato
Kei Miyamoto
Satoshi Kurosaka
Rika Azuma
Igorl Kolodeznikov
Albert V. Protopopov
Valerii V. Plotnikov
Hisato Kobayashi
Ryouka Kawahara-Miki
Tomohiro Kono
Masao Uchida
Yasuyuki Shibata
Tetsuya Handa
Hiroshi Kimura
Yoshihiko Hosoi
Tasuku Mitani
Kazuya Matsumoto
Akira Iritani

Video Abstract

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Abstract

An international team of biologists has done the seemingly impossible. They've revived cell nuclei from a 28,000-year-old frozen woolly mammoth. While the world will have to wait for the first full-blown mammoth resurrection, this could be a big step in that direction. The team's findings offer researchers hope that ancient DNA, though damaged, could one day be made functional. The research team salvaged the nuclei from the muscle of "Yuka," a young woolly mammoth well preserved in Siberian permafrost since the last ice age. They then transplanted them into mouse egg cells. This process, called somatic cell nuclear transfer, is the same one used to clone animals like Dolly the sheep. But unlike for Dolly, the development of those nuclei stopped short of cell division. After the transfer, researchers observed filling of the transplanted nuclei with mouse proteins—namely, histone and tubulin— and the formation of a new nucleus-like structure. That structure drove the formation of the characteristic spindles that pull genetic material apart during cell division. In the end, the pseudo-nucleus was absorbed by the nucleus of the mouse egg cell. While the mammoth DNA proved too damaged to follow through with cell division, data indicated that the natural DNA repair machinery of the mouse egg cell lent a helping hand; it tried to reverse at least some of the bruising Yuka's genetic material sustained while frozen for thousands of years. And that could be the biggest upshot of the team's work. Although reviving ancient creatures remains elusive, they've demonstrated for the first time that fossilized DNA can be at least partially reawakened.