

## ICE AGE CYTOGENOMICS: UNVEILING ANCIENT CHROMOSOME MYSTERIES

An innovative technique has recovered intact DNA from a 52,000-year-old woolly mammoth preserved in Siberian permafrost, marking a significant milestone in paleogenomics. Researchers discovered fossilized chromosomes from ear tissue and reconstructed them, revealing the genome's organization with unprecedented resolution. Using the Hi-C technique adapted for degraded DNA, they assembled 28 chromosome-length scaffolds, uncovering preserved chromosome territories, compartments, loops, Barr bodies, and inactive X chromosome (Xi) superdomains.

Published in *Cell* (1), the study showed that the genome compartments in mammoth skin resemble those in Asian elephant skin, providing insights into gene activity and repression at the mammoth's death. They identified about 1,000 sites with differential activity, including genes related to growth, immune adaptation, and cold tolerance.

Notably, the authors speculate that the DNA was preserved over millennia in a glass-like substance called chromoglass. This raises questions about the long-term durability of genetic material under specific conditions. The discovery points to promising future applications for PaleoHi-C in examining a wide range of biological materials.

1-[https://www.cell.com/cell/fulltext/S0092-8674\(24\)00642-1](https://www.cell.com/cell/fulltext/S0092-8674(24)00642-1)