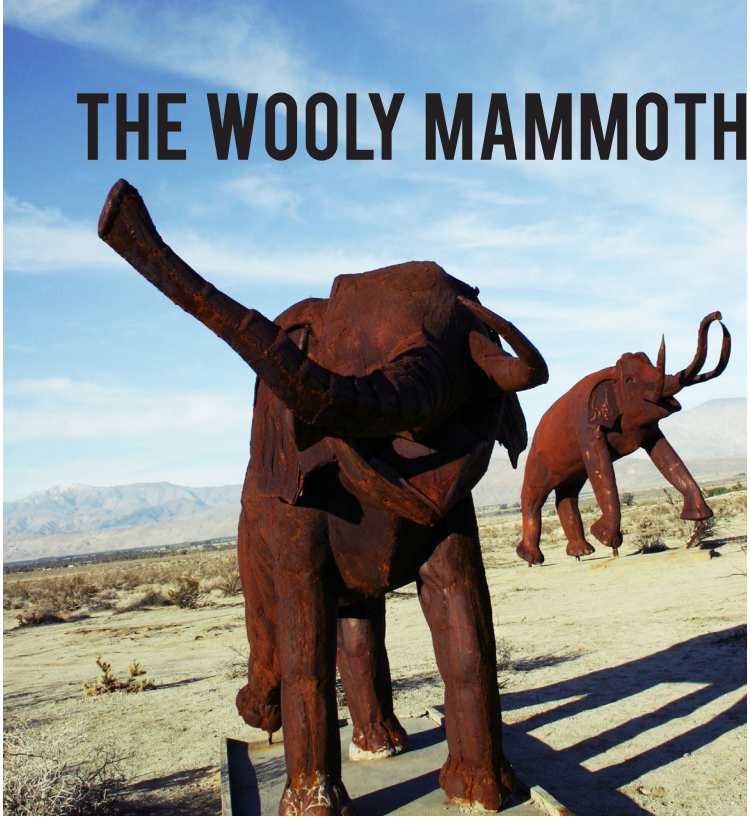

THE WOOLY MAMMOTH RETURNS

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A once unimaginable future, a feat possible only in science fiction, is now being fulfilled by scientists today. The woolly mammoth, a hairy prehistoric version of the elephant and about 8 to 14 feet tall, became extinct around 10,000 years ago. Scientists have recently deciphered the genetic code of the woolly mammoth and are now claiming to be able to recreate the long extinct mammal in a couple of decades.

In 2005, Pennsylvania State University State College, genomicist Stephan Schuster discovered that mammoths were closely related to African elephants because their ancestors split nearly 6 million years ago. Fascinated by his discovery, Schuster went on to decipher the nuclear genome. Schuster and his team sequenced the mammoth's nuclear genome using DNA extracted from the hair of a mammoth preserved in the Siberian permafrost for 20,000 years [3]. According to Schuster, "using hair is an excellent source of ancient DNA because it is less likely to contain bacteria or fungi than DNA extracted from porous bone". The million dollar project, using advanced genome sequencing techniques, has so far sequenced more than 3.3 billion base pairs of the mammoth's DNA. "Our data set is 100 times more extensive than any other published data set for an extinct species, demonstrating that ancient DNA studies can be brought up to the same level as modern genome projects", says Schuster. And the study is only 80 percent complete!

Upon analyzing the sequenced nuclear DNA, the scientists confirmed the split of mammoths from elephants and that there were also two species of woolly mammoths in Siberia. They also found that woolly mammoths have less genetic diversity than primates which made them more prone to extinction. Other discoveries include genetic mutations that helped the mammoths survive in the harsh climate of the arctic and probably also contributed to their extinction when the climate warmed about 12,000 years ago. Now that a large quantity of information is available, scientists are looking into the genome of the mammoth for clues about its extinction. Furthermore, Schuster stated that "by deciphering this genome we could, in theory, generate data that one day may help other researchers to bring the woolly mammoth back to life by inserting the uniquely mammoth DNA sequences into the genome of the modern-day elephant. This would allow scientists to retrieve the genetic information that was believed to have been lost when the mammoth died out, as well as to bring back an extinct species that modern humans have missed meeting by only a few thousand years." There are several ways to use this newfound genetic map and both involve the complex task of creating a mammoth embryo and implanting it into its elephant cousin. Both methods are very difficult since the mammoth DNA is not suitable for cloning. The first method calls for a genetically engineered elephant cell that matches the DNA code of a mammoth. The second method uses synthetic biology to create a mammoth cell essentially from scratch. Another method would be to create a hybrid using DNA of the woolly mammoth with its close relative, the African elephant. Who knows? One day people might be able to see the revived woolly-mammoth at the zoo!