

# Dire Wolf: Scientists successfully revive ancient wolf species

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**Dire Wolf - A wolf species that went extinct about 12,500 years ago has come back to life as "the world's first animal to be successfully resurrected ,"** according to Dallas-based biotech company Colossal Biosciences.



## Scientists have successfully revived an ancient wolf species - Dire Wolf

Colossal scientists created three dire wolves by using ancient DNA technology, cloning, and gene editing to alter the genes of a gray wolf, the closest living relative of the prehistoric dire wolf. The result is essentially a hybrid wolf that looks similar to its extinct ancestor.

The **dire** wolf or *Aenocyon dirus*, the inspiration for the fearsome dog in the HBO series "Game of Thrones", was a top predator that once roamed North America. It was larger than the gray wolf and had a slightly broader head, lighter fur, and stronger jaws.

Colossal has been working on resurrecting mammoths, dodos and Tasmanian tigers since 2021, but the company has never published its research on dire wolves.

*' This major milestone is the first of many to come that demonstrate that our comprehensive de-extinction technology works, ' Ben Lamm, co-founder and CEO of Colossal, said in a press release. ' Our team took DNA*

*from a 13,000-year-old tooth and a 72,000-year-old skull and created healthy dire wolves . '*

The three dire wolves live on a 2,000-acre property at an undisclosed location, surrounded by a 10-foot (3-meter) 'zoo-grade' fence, where they are monitored by security personnel, drones and live cameras. Colossal said the facility is certified by the American Animal Welfare Society and registered with the U.S. Department of Agriculture.

## **Dire Wolf Fossils and Ancient DNA**

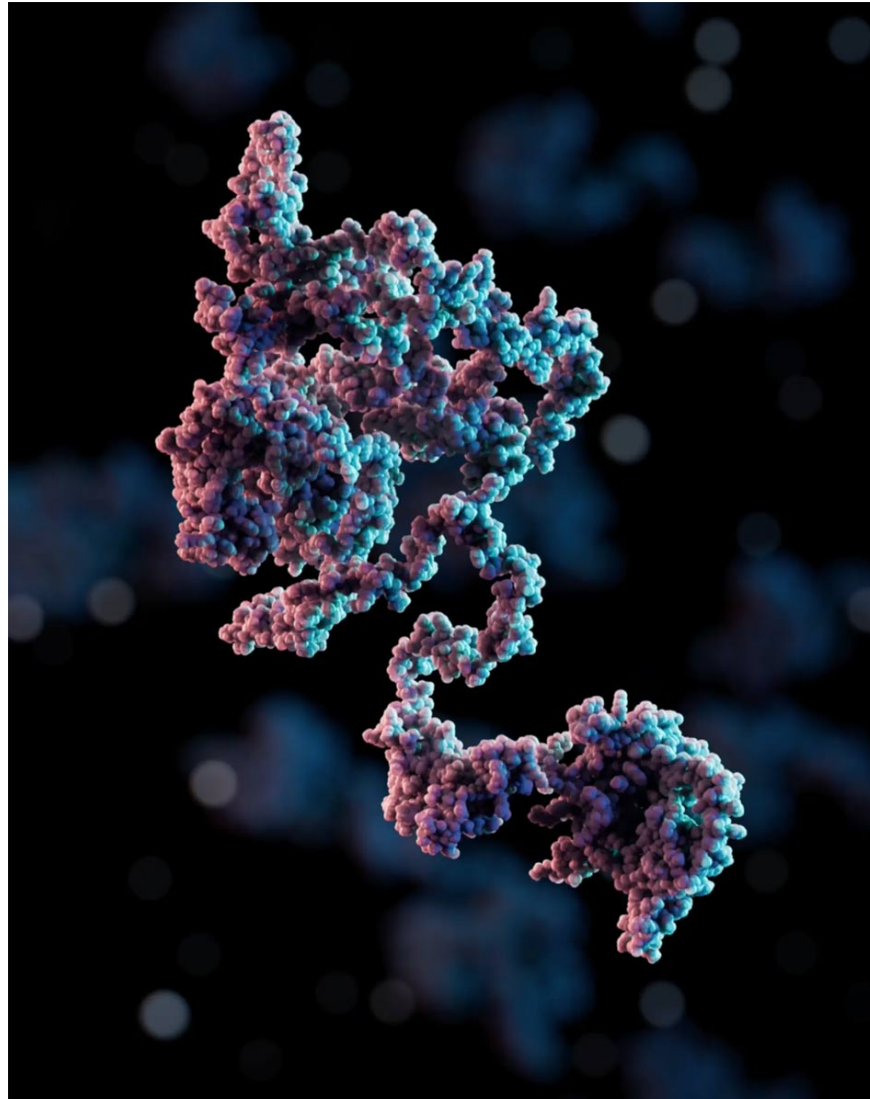
Colossal scientists and collaborators say they were able to assemble two high-quality *Aenocyon dirus* genomes, or complete sets of genetic information, using ancient DNA extracted from two dire wolf fossils.

The team compared this genome with the genomes of living canids such as wolves, jackals and foxes to identify genetic variants for dire wolf traits, such as long, thick white fur.

The company then used information from the genetic analysis to modify the gray wolf cells, making 20 edits across 14 genes before cloning the most promising cell lines and transferring them into donor eggs, according to the press release.

*' The healthy developing embryos were then transferred into surrogates for cross-species pregnancies ,'* with three pregnancies resulting in the birth of the first extinct species, Colossal revealed in its statement. The company did not immediately respond when asked what species of animal was used as a surrogate. Multiple media outlets reported that the company used domestic dogs.

According to Colossal Biosciences, two male wolf pups were born on October 1, 2024, and a female wolf was born on January 30, 2025.



## Gene editing to restore extinction

To achieve its goal, the company essentially created a hybrid genome using CRISPR technology to cut out some gray wolf gene variants and replace them with traits associated with dire wolves, said Love Dalén, a professor of evolutionary genomics at the Center for Paleogenetics at Stockholm University and an adviser to Colossal.

*' It's no secret that across the entire genome, this is 99.9% gray wolf. There will be debate in the scientific community about how many genes need to be changed to create a dire wolf, but that's really a philosophical question ,'* said Dalén.

*' It has dire wolf genes and those genes make it look more like a dire wolf than anything we've seen in the last 13,000 years. And that's cool .'*

Dalén, who said he had been 'a little involved' in the dire wolf genome analysis but had never met dire wolf pups in person or participated in the gene editing or cloning process, said the scientists' work was a 'huge step forward' compared to anything done in the past.

*" As far as I'm concerned, they've resurrected the dire wolf phenotype (the observable characteristics of a species) and we know from the genome that they probably look a little bit like these puppies. To me, it's a dire*

wolf in that sense," he said.

Colossal has raised at least \$435 million since Lamm, an entrepreneur and Harvard geneticist George Church, founded the company in September 2021 and first announced plans to revive the mammoth. That effort is taking longer than Lamm initially expected, with the company saying it is on track to introduce its first woolly mammoths by 2028.



Remus at 5 months old, currently at 80 lb, with an expected weight of 150 lb, when fully grown. Andrew Zuckerman—Courtesy Colossal Biosciences

The company hopes that the **same technology that created the Dire Wolf** can directly help endangered species.

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