

# Domesticated dogs descended from an ice age European wolf, study says

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Chasing after a pheasant wing, these seven-week-old Labrador puppies show their hunting instincts early. When and where were dogs domesticated? There are different theories, and much debate. Photo: Derek Neas/DULUTH NEWS-TRIBUNE

LOS ANGELES – Since the time of Charles Darwin, the father of evolution, scientists have argued over the origin of domesticated dogs.

But recently, this has become one major dogfight.

Some experts believe our ancestors in the Middle East and elsewhere were naturally drawn to small, furry wolf pups and took them as novelties. Others suggest they were raised as a source of meat in early agricultural societies in Asia.

Yet another theory holds that early dogs were used as helpers by bands of hunters. This was long before humankind ever began domesticating goats and sheep, the first species believed to be bred for agriculture.

## **Resolving The Big Bark**

Now, thanks to faster and cheaper DNA sequencing technology, the huge argument over what sparked the Big Bark may finally be resolved.

According to a study published Nov. 14 in the journal *Science*, evolutionary biologists have concluded that dog domestication most likely occurred in ice age Europe 18,800 to 32,100 years ago. That's much earlier, and much farther north, than previously believed. The biologists discovered this after analyzing the mitochondrial DNA of 18 ancient dogs and wolves and comparing them with the mitochondrial DNA of modern canines. Mitochondria are tiny structures inside a cell that produce energy for it.

The study's authors wrote that dogs evolved from a now extinct species of European wolf. This wolf, which died out long ago, followed bands of humans who were hunting woolly mammoths and other large prey.

Initially, the wolves sought out dead animals and scraps of meat left behind by the hunters. The researchers guess that over time the wolves began to hang around people. They filled a special role in human hunter-gatherer society.

"The initial (relationships) were probably at arm's length, as these were large, aggressive carnivores," said Robert Wayne, an evolutionary biologist at the University of California, Los Angeles. Evolutionary biologists study the evolution of life on earth. Wayne is the study's senior author.

Eventually, though, wolves entered the human community. "Maybe they even assisted humans in locating prey, or deterred other carnivores from interfering with the hunting activities of humans," Wayne said.

## **A Murky Early Picture**

After being welcomed into human society in Europe, domesticated dogs spread. However, the European wolf that got the fetch ball rolling left no living descendants other than dogs.

"Wolves living on the planet today are not the closest group to the ancestor of dogs," said Wayne. He conducted the research with scientists in Germany, Finland, Belgium, Russia, Spain, Argentina and the United States.

Until recently, many archaeologists and biologists believed that dogs were first domesticated no more than 13,000 years ago, either in East Asia or the Middle East. One key find was a burial site in Israel. It contained the 12,000-year-old remains of an elderly man cradling a puppy, evidence of the unique bond between dogs and humans.

Tracing the exact path of dog evolution has been extremely difficult. Ancient dog bones are hard to distinguish from wolf bones. Frequent interbreeding between dogs and wolves further complicates matters. Add to that mankind's active breeding of dogs for specific traits and behaviors, such as gentleness or herding sheep, and the genetic origins become murky.

In fact, Charles Darwin, who died in 1882, believed that the dizzying variety of dog breeds meant that dogs must have had more than one wild ancestor. Genetic researchers today say this is most likely not the case and that domesticated dogs evolved from one ancestor, in one region.

"On some levels, understanding the geographic origins of dogs is definitely more difficult than studying humans," said Greger Larson, a bioarchaeologist at Britain's Durham University. Bioarchaeologists study animal bones from archaeological sites.

Larson, who was not involved in the Science paper, said Wayne and the other authors had "significantly advanced" the debate on domestication.

"I really like this paper," Larson said. The origin of dogs has been hard to pin down. "There have always been crazy ideas about the process and the location." The new genetic sequencing methods have brought the research to a new level.

### **Additional Testing Planned**

There are those, however, who argue that Wayne is barking up the wrong genetic tree.

Peter Savolainen is an associate professor of evolutionary genetics at Sweden's Royal Institute of Technology. He said there was plenty of evidence that dogs were first domesticated in China, probably as a source of food.

Savolainen pointed out that Wayne and his co-authors published a paper in 2010 citing the Middle East as the origin of domestic dog. They have now abandoned this view.

The Science study lacked animal samples from the Middle East or China. "If you only have European samples, obviously you will find that Europe is the origin," he said.

Wayne said they did not include samples from outside Europe because the samples were too recent, only about 7,000 or 8,000 years old. That's well after dogs were domesticated, he said.

The study's authors said they hoped to confirm their findings with additional testing of genetic material from the nuclei of ancient cells. This type of DNA from the nucleus contains much more information than DNA taken from mitochondria.

In the meantime, experts are left to think about this latest development, and why the scientists have such strong feelings about it.

"People make up tremendously elaborate stories about the origin of our own species based on a few fossil remains here and there," said James Serpell, a professor at the University of Pennsylvania School of Veterinary Medicine. He wasn't involved in the study. "I guess we're doing the same thing now to our dogs. We view them as members of our families and we want to know where they came from and how this relationship came about."

## Quiz

- 1 In the first four paragraphs, the article shows there is much debate on where and when dogs originated by:
  - (A) providing an analogy
  - (B) providing an anecdote
  - (C) providing detailed images
  - (D) providing opposing viewpoints
  
- 2 Why did Charles Darwin believe dogs have more than one ancestor?
  - (A) Not all dogs look like wolves.
  - (B) Some dogs can be dangerous.
  - (C) He tested the DNA of ancient dog bones.
  - (D) There are so many different dog breeds.
  
- 3 Select the paragraph from "Additional Testing Planned" that provides an opinion of the primary cause of studying the origin of dogs.
  
- 4 The article includes "A Murky Early Picture" to:
  - (A) convince the reader that Charles Darwin's theory was correct
  - (B) explain to the reader the connection between wolves and humans
  - (C) convince the reader of the strong bond between dogs and humans
  - (D) show the reader that no one is certain where or how dogs originated

## Answer Key

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