

Canids Evolved with Climate Change, Says New Study

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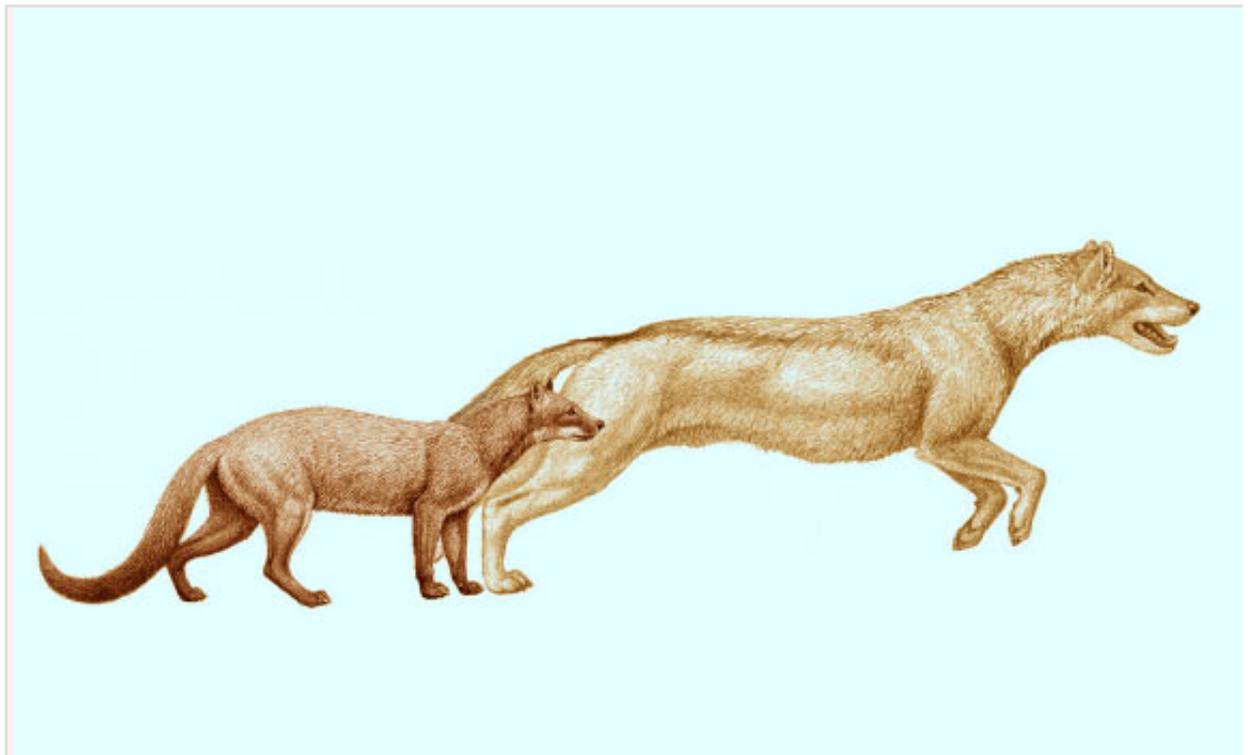
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Early canids *Hesperocyon* (left) and *Sunkahetanka* were both ambush-style predators. Image credit: Mauricio Anton.

The climate in North America's heartland back around 40 million years ago was warm and wooded.

North American canids of the time, fossils show, were small animals that would have looked more like mongooses than any dogs alive today and were well-adapted to that habitat. Their forelimbs were not specialized for running

retaining the flexibility to grapple with whatever meal unwittingly walked by.

But beginning just a few million years later, the global climate began cooling considerably and in North America the Rocky Mountains had reached a threshold of growth that made the continental interior much drier. The forest slowly gave way to open grasslands.

To find out if this transition affected the evolution of North American canids, Dr Borja Figueirido from the University of Malaga in Spain and co-authors examined the fossil elbows and teeth of 32 canid species spanning the period from 40 million years ago to 2 million years ago.

“At the same time that climate change was opening up the vegetation, canids were evolving from ambushers to pursuit-pounce predators like modern coyotes or foxes – and ultimately to those dogged, follow-a-caribou-for-a-whole-day pursuers like wolves in the high latitudes,” the scientists said.

“The elbow is a really good proxy for what carnivores are doing with their forelimbs, which tells their entire locomotion repertoire,” added Prof Christina Janis of Brown University, senior author on the study.

The telltale change in those elbows has to do with the structure of the base where the humerus articulates with the forearm, changing from one where the front paws could swivel for grabbing and wrestling prey to one with an always downward-facing structure specialized for endurance running.

“Modern cats still rely on ambush rather than the chase (cheetahs are the exception) and have the forelimbs to match, but canines signed up for lengthier pursuits,” Prof Janis said.

“In addition, the canids’ teeth trended toward greater durability, consistent with the need to chow down on prey that had been rolled around in the grit of the savannah, rather than a damp, leafy forest floor.”

The study suggests that predators do not merely evolve as an ‘arms race’ response to their prey. They don’t develop forelimbs for speedy running just because the deer and the antelope run faster.

“While the herbivores of this time were evolving longer legs, the predator evolution tracked in time directly with the climate-related changes to habitat rather than to the anatomy of their prey species.”

“If predators evolved with climate change over the last 40 million years, then they likely will have to continue in response to the human-created climate change underway now,” the scientists concluded.

B. Figueirido *et al.* 2015. Habitat changes and changing predatory habits in North American fossil canids. *Nature Communications* 6, article number: 7976; doi: [10.1038/ncomms8976](https://doi.org/10.1038/ncomms8976)