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Old Dogs Learned New Tricks For Hunting As Climate Changed



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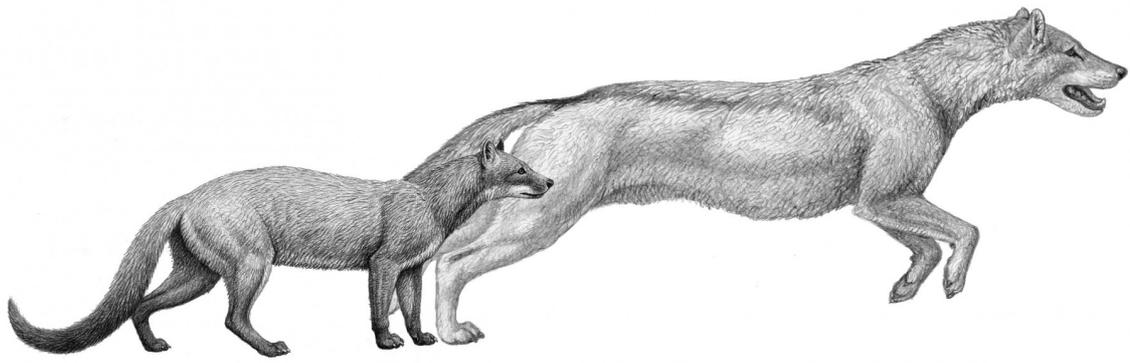
A new study out today in *Nature Communications* by Borja Figueirido and colleagues challenges the notion that climate change usually does not have a direct impact on the evolution of carnivores. Carnivores in the family Canidae, also known as dogs, or canids, have a lengthy evolutionary history dating back at least 50 million years when they split with the other lineage of carnivores—cats. The abundant fossil record of dogs in North America made them the perfect group to test the notion that climate and environmental change could alter the evolution hunting behaviors in carnivores.

It has long been known that climate change and subsequent shifts in vegetation had a distinct impact on the evolution of herbivorous mammals such as horses and other hoofed ungulates. As grasslands spread throughout the landscape of North America around 23 million years ago, the teeth of mammals that subsisted on plants became extremely high-crowned in order to prevent them getting completely filed down from feeding on gritty, abrasive grasses. Lead author Borja Figueirido of Universidad de Málaga notes:

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Hesperocyon and Sunkahetanka, two species of early dog. They were quite small and more closely resembled a mongoose. (Illustration by Mauricio Anton)

In order to try to link the predatory behavior of canids to the overall climate cooling and environmental shift to grasslands of the Cenozoic period (65 million years ago to present day), the authors of the study measured the elbow joints of 139 specimens that represented both living and extinct canids spanning the past 37 million years. “We selected the shape of the elbow because it is an established anatomical indicator of locomotor/predatory behaviour in living carnivores, as it reflects the relative range of forearm motion,” Figueirido said.

And while dogs may not seem that different today, in the past they were actually quite a large and diverse group as Jack Tseng from the American Museum of

Natural History, another author on this study, explains: “The range of body sizes and diets inferred from fossil dog specimens are broader than what is seen in living dog species for example, there are fossil records of cat-like and hyena-like dog species, specialized predators that are entirely extinct.”

Comparing the shapes of the elbow joints between different dog species over the course of the last 37 million years revealed some interesting and significant trends. The earliest fossil dogs living during the Oligocene were just generalized ambush predators. Ambush predators have forelimbs and elbow joints that allow rotation so prey can be wrestled and grappled with. More recent fossils show what seems to be a different predation adaptation. Their forelimbs are stiffer and don’t move around as much, so they are not good for grappling, but they are good for short (pounce-pursuit) and long-distance sprinting to capture prey.

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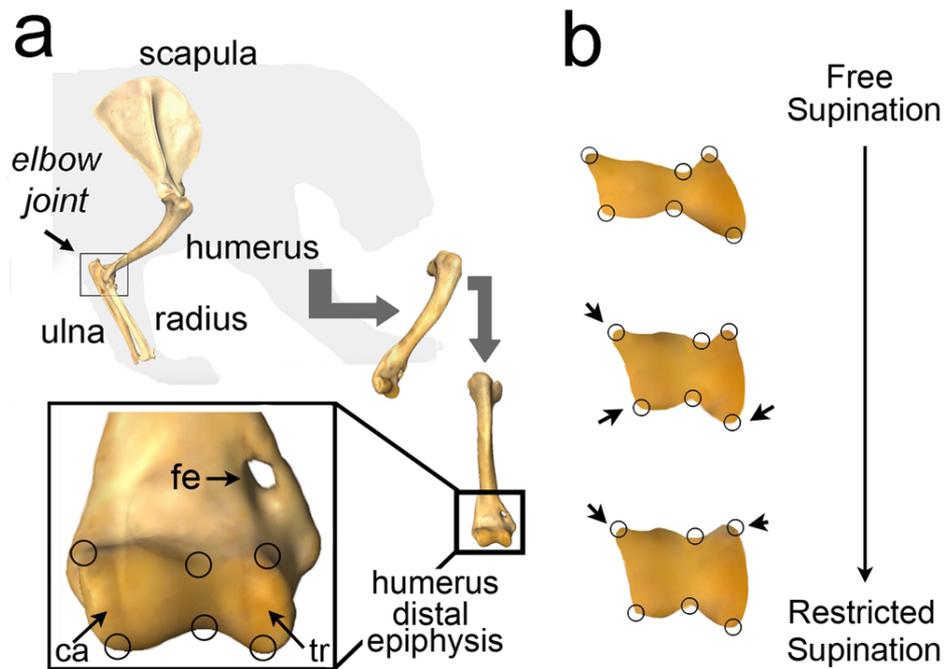


Figure 1 from Figueirido et al. 2015 illustrating the joint that was measured and compared between fossil and modern dogs. (Image courtesy of Nature Communications and Brown University)

As canids continued to diversify 16 million years ago, even more species of pounce-pursuit predators were

on the scene. Interestingly, this change in predation style for canids closely tied in to the spread of grasslands across North America. As the environment opened up and became less forested than it was during the Oligocene when most canids were ambush predators, canids were able to develop more into the pursuit-type predators they are today. While most cat species are still ambush predators (like tigers), canid species such as wolves can pursue large elk for over a mile when they are hunting. It seems the shift in habitat allowed canids to expand into new mode of hunting over long distances.