New DNA research points to origins of dogs

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A recent issue of the American journal *Science* has reported new DNA evidence indicating that humans first bred domesticated dogs approximately 15,000 years ago in east Asia.

A team of researchers led by Peter Savonainen of the Royal Institute of Technology in Sweden examined the mitochondrial DNA, which is passed on only by females, from 654 dogs in Africa, Asia, Europe and Arctic regions of North America. The findings show that more than 95 percent of dogs in this group were descended from three original female ancestors. Furthermore, the study revealed that east Asian dogs have the greatest genetic variability, indicating that dog populations have existed there the longest.

The work of Savonainen's team corroborates other recent DNA studies about the evolution and dispersal of dogs. For example, according to an earlier genetic study by Jennifer A. Leonard of UCLA, dogs descended from Asian dogs which traveled with humans across the land bridge from Siberia to Alaska 12,000-14,000 years ago.

Previously scientists had believed that the dog was domesticated somewhere in the Middle East and as long ago as 40, 000 years. The problem is that material evidence for dogs is late: most fossils of distinctly domestic dogs date from about 7,000 years ago, and only a single domestic dog skull has been discovered in northern Asia dating from as long ago as 12,000 years. Only a single domestic dog jawbone has been found in Europe from as long ago as 14,000 years. The earliest North American finds date from about 8,500 years ago.

Thus, essential chapters in the prehistory of dogs have been missing. When and where dogs (*canis familiaris*) emerged from wolves (*canis lupus*) were blanks in the evolutionary record. The new DNA research will allow anthropologists and prehistorians to speculate on the why and how of dog evolution. While any number of hypotheses may emerge, the new evidence already yields certain tantalizing possibilities.

The short period of human prehistory during which dogs now appear to have evolved is called the Mesolithic, a period between the long Paleolithic, or a strictly hunting and foraging "economy," and the Neolithic, when agriculture and animal domestication became widespread. During the Mesolithic, sophisticated hunting tools, including the spear thrower and the bow and arrow, were invented, the latter about 12,000 years ago.

This was also a period of glacial melt at the end of an Ice Age in much of the world, producing great shifts in the flora and fauna. Evidence in both Asia and North America points to a mass extinction of large herd animals such as mammoths in the Mesolithic, though this may well predate dogs.

The new evidence suggests that the dog may have been a part of this "Mesolithic Revolution." Humans clearly obtained some advantage from dogs, who, after all, are meat-eaters and ecological rivals to humans. Dogs must have improved the yield from hunting, though a variety of other causes of domestication are possible, such as the use of dogs as guards, as a food source, as traction animals. In any case, one noteworthy result of the research is the knowledge that dogs spread rapidly around the world to most human populations.

Dogs are a domestic species. That is, both genetically and behaviorally, they are conditioned by their association with human beings. They bear the imprint of human activity on their essential nature, and, as a rule, they do not exist outside of human society today.

Yet dogs have also had a reciprocal effect on human culture: society as we know it would not have developed without the domestication of plants and animals. All evidence shows that the dog was the first of these.

Just how deeply that material relation of man and dog may go is indicated by a report in the same issue of

Science on another study at Harvard, showing that puppies as young as nine weeks will respond to human cues more frequently than to those of any other animal, including those related to humans more closely, such as chimpanzees.

We should perhaps not neglect Frederick Engels's remarks on animals in his famous essay, "The Part Played by Labor in the Transition from Ape to Man":

"The dog and the horse, by association with man, have developed such a good ear for articulate speech that they easily learn to understand any language within their range of concept. Moreover they have acquired the capacity for feelings such as affection for man, gratitude, etc., which were previously foreign to them. Anyone who has had much to do with such animals will hardly be able to escape the conviction that in many cases they now feel their inability to speak as a defect, although, unfortunately, it is one that can no longer be remedied because their vocal organs are too specialised in a definite direction."