

ANCIENT DOG DNA UNVEILS 11,000 YEARS OF CANINE EVOLUTION

Genomes trace how the animals moved around the world – often with humans by their side.

By Ewen Callaway

Human history is for the dogs. The largest-ever study of ancient genomes from the canines suggests that where people went, so did their four-legged friends – to a point. The research also identified major regional shifts in human ancestry that left little mark on dog populations, as well as times when dogs changed, but their owners didn't.

The analysis of more than two dozen Eurasian dogs also suggests the animals were domesticated and became widespread around the world well before 11,000 years ago. But it does not make any claims as to when or where domestication from wolves happened, an issue that has vexed researchers and sparked sometimes heated debate.

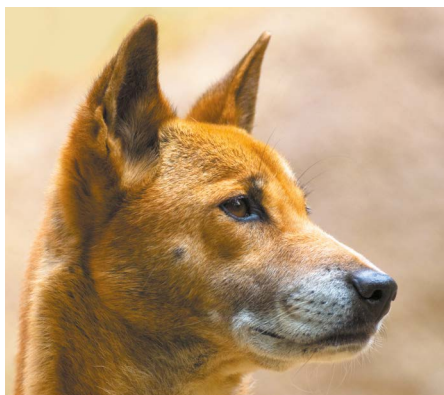
"Dogs are a separate tracer dye for human history," says Pontus Skoglund, a population geneticist at the Francis Crick Institute in London who co-led the study (A. Bergström *et al. Science* 370, 557–564; 2020). "Sometimes human DNA might not show parts of prehistory that we can see with dog genomes."

Until the past few years, canine genetic history had been told largely through DNA from modern dogs. But this has offered a muddled picture, because much of early dogs' genetic diversity was probably lost when modern breeds were established. The first studies of ancient dog genomes hinted at past changes in canine populations. But with just six ancient dog or wolf genomes available until now, such conclusions have been preliminary.

Pedigree chums

To expand the pool of ancient dog DNA, Skoglund's lab joined groups led by Greger Larson, an evolutionary geneticist at the University of Oxford, UK, and archaeologist Ron Pinhasi at the University of Vienna. The teams sequenced 27 ancient dog genomes from Europe, the Middle East and Siberia, ranging from 11,000 to 100 years old.

By modelling the relationships in and between groups of ancient and modern dogs, the researchers determined that a 10,900-year-old dog from Russia was distinct from later ancient European, Middle Eastern, Siberian or American dogs, as well as a canine



A New Guinea singing dog.

lineage characterized by modern New Guinea singing dogs (which are related to Australian dingoes). "Already, 11,000 years ago, there were at least 5 different groups of dogs across

the world, so the origin of dogs must have been substantially earlier than that," says Skoglund.

With so many genomes, the researchers could follow ancient canine populations as they moved and mixed, and compare these shifts with those in human populations. Sometimes, the dogs' travels paralleled people's. When Middle Eastern farmers started expanding into Europe 10,000 years ago, they took dogs with them, and the animals – like their owners – mixed with local populations. Ancient Middle Eastern dogs that lived around 7,000 years ago are linked to modern dogs in sub-Saharan Africa, which could be connected to 'back to Africa' human movements around that time.

But the histories of humans and dogs haven't always overlapped. A major influx of people from the steppes of Russia and Ukraine 5,000 years ago led to lasting change in the genetic make-up of Europe's humans, but not its dogs. The study also revealed that the ancestry of European dogs has become much less varied in the past 4,000 years, a period when thorough sampling of ancient human DNA has revealed less tumult.

The cause of this disconnect is a mystery, says Angela Perri, a zooarchaeologist at Durham University, UK. "Was it a case of the introduction of something like disease? Cultural preference?" she wonders. "These are likely cultural questions the DNA can't answer."

DANIEL HEUCLIN/NPL

WEALTHY FUNDER PAYS REPARATIONS FOR USE OF STOLEN CELLS

Howard Hughes Medical Institute's six-figure donation aims to compensate for research on HeLa cell line.

By Alexandra Witze

A major biomedical-research organization has for the first time aimed to make financial reparation for the continuing experimental use of cells from Henrietta Lacks, a Black woman who was the source of the historic 'HeLa' cell line, which has been a mainstay of biological research for decades. The Henrietta Lacks Foundation announced the six-figure gift from the Howard Hughes Medical Institute (HHMI) in Chevy Chase, Maryland, on 29 October.

In 1951, doctors took cancerous cells from Lacks without her consent, and later created the HeLa cell line, which today supports a multibillion-dollar biotechnology industry. Lacks died soon afterwards, and, for decades, her family saw no financial compensation and

were not consulted on other medical decisions stemming from the use of the cells in research.

"We felt it was right to acknowledge Henrietta for the use of HeLa cells and to acknowledge that the cells were gained inappropriately," says Erin O'Shea, president of the HHMI. "And to acknowledge that we have a long way to go before science and medicine are really equitable." The HHMI did not disclose the exact amount of the donation. "I can't speak for everybody, but I know some family members are grateful for this gift," says Jeri Lacks-Whyte, a granddaughter of Lacks. "Hopefully, other institutions will follow suit."

The HHMI decided to make the donation after this year's transformative protests over racial injustice in the United States, including the killing of George Floyd, an unarmed Black