No signs of local canid domestication in ancient Scandinavia

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Similarities between ancient and modern dogs in Sweden?

Modern dogs (*Canis familiaris*) were domesticated from gray wolfs at least 14 000 years ago. The clustering of the maternally inherited mitochondrial DNA (mtDNA) into several clades[1] indicates that several domestication events occurred[2,3].

Clade D is

- Geographically restricted to Scandinavia
- Comprising mainly of spitzers
- Believed to represent an ancient Scandinavian lineage

We examine the antiquity of this lineage by investigating if haplotypes assigned to clade D are found in ancient Swedish dogs.

Clade D...

...also clade D?

Figure 1. Neolithic samples from Korsnäs (n=4), Linköping (n=1), Ajvide (n=13), Visby (n=1), and medieval samples from Skara (n=2), Stockholm (n=1), Sunnerby (n=3), and Eketorp (n=3).

Bone samples & DNA analyses

Bones and teeth from 19 middle Neolithic and 9 medieval dogs (Fig. 1) were cleaned and DNA was extracted with a silica-based method.
A second extraction was carried out on 23 of the samples.
Eight samples were independently replicated.
Two mtDNA fragments (113 and 107 bp) were amplified/quantified at least in duplicate reactions using real-time PCR[4]. The amplicons were sequenced and phylogeny was inferred using a reduced median network.

NoD...!

Results

Sixteen samples yielded reproducible sequence data for both fragments and 8 samples for one of the fragments. None of the sequences clustered with clade D (Fig. 2). About half of the sequences clustered with clade C (11 Neolithic and 2 medieval samples). The remaining ones clustered with clade A (4 Neolithic and 7 medieval samples). A total of nine haplotypes were found in the samples (six in clade A and three in clade C).

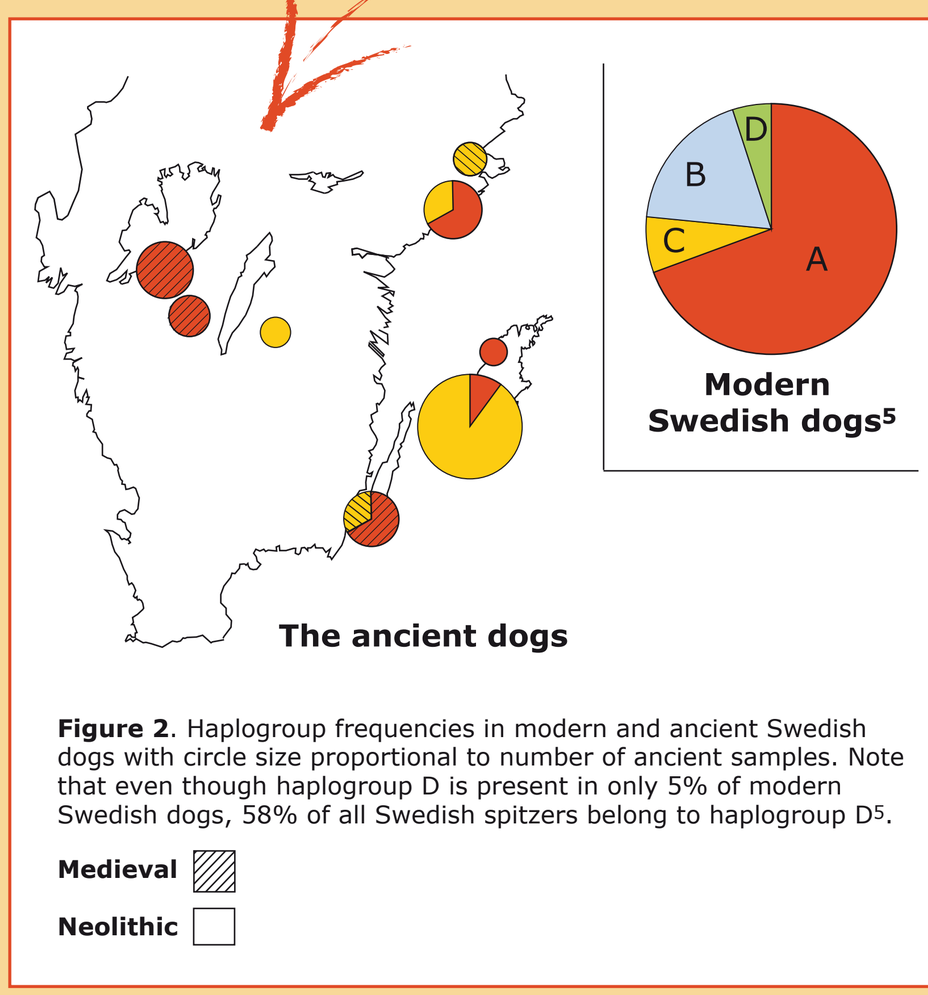

Figure 2. Haplogroup frequencies in modern and ancient Swedish dogs with circle size proportional to number of ancient samples. Note that even though haplogroup D is present in only 5% of modern Swedish dogs, 58% of all Swedish spitzers belong to haplogroup D[5].

No maternal continuity between ancient and modern dogs

We did not find any support for long-term (>1000 years) local breeding involving clade D in Sweden. The dogs in ancient Sweden (clustering with clade A and C) are more similar to dogs originating from East Asia. Intense breeding in recent times probably explains the differences in haplotypes and in haplotype frequencies between the modern and the ancient dogs.

[1]Pereira L et al. Forensic Sci Int 2004;141:99-108
[2]Víla C et al. Science 1997;276:16871689
[3]Savolainen P et al. Science 2002;298:1610-1613
[4]Malmström H et al. Mol Biol Evol 2005;22:2040-2047
[5]Angleby H & Savolainen P. Forensic Sci Int 2005;154:99-110

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