Iberian dogs - a diachronic genomic analysis

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Dogs are an important genetic patrimony and several functional breeds have been developed in Portugal. The analysis of their genomes, including those from ancient samples, can provide a good opportunity to understand the origins and evolution of dogs from more peripheral regions, as well as to infer some of the morphological characteristics exhibited by past individuals.

DOG BREEDS



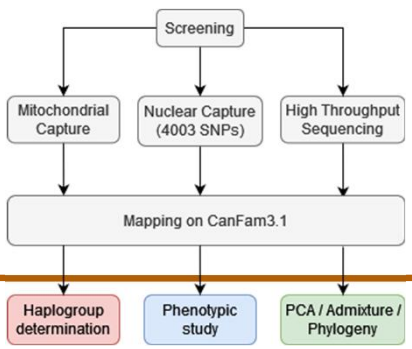


Well-established molecular biology methods were employed, such as **high-throughput sequencing** and **nuclear capture assay**, in order to

a) Recover endogeneous ancient DNA (aDNA) and SNP data from 14 ancient specimens dated from **Mesolithic** (~8,000 yBP) through the **Middle ages**.

b) Whole genomes from present-day Iberian dogs (n=46) and Iberian wolves (2) were also retrieved for a comprehensive study of dog diversity.

Regarding data analysis some specific scripts were improved by our team and adjusted to either modern or ancient samples.



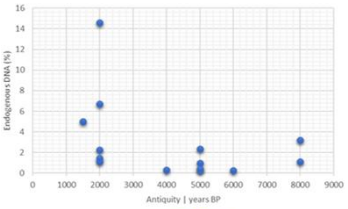




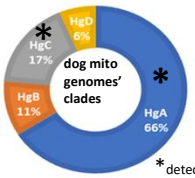



Results

aDNA was recovered and endogenous content (%) is not correlated with the antiquity of each sample (r=-0,42, ns)

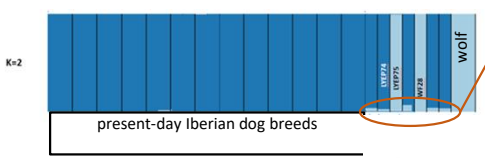


Ancient dog mitogenomes (>90%, 3x coverage) are distributed within the variability of the A and C clades, while present-day dogs show a wider range of variability: clades A to D.

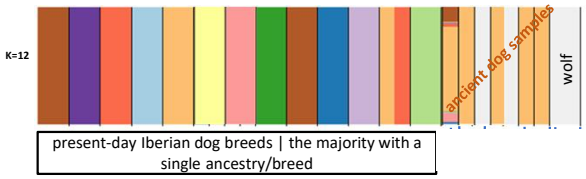


WGS allowed the identification of **12 dogs** (9 males, 3 females) and **3 wolves** (2 males, 1 female).

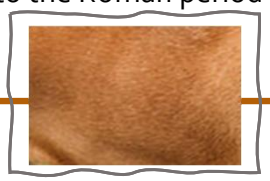
Based on autosomal markers, **ancient dogs** show either a single or a mixed ancestry, while **present-day dogs** show a single ancestry/breed meaning they are genetically well-defined breeds.

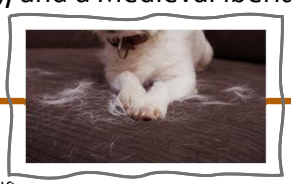


signal of dual ancestry in 5 ancient dog samples



For 3 dogs dated to the Roman period (ES), and a Medieval iberian wolf (PT) **we could detect the following:**


short hair (dogs) and straight hair (dogs & a wolf)


high hair shedding (dogs)


large-sized dogs

IBERIAN WOLF

Conclusion

Total DNA (mitochondrial and nuclear) was recovered from *Canis* archaeological samples helping in documenting **the presence of dogs in ancient Iberia** and describing their genomic composition as well as some phenotypic characteristics.

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