SHORT COMMUNICATION

Limited genetic divergence between dog breeds from geographically isolated countries


Context
Breed specifications for purebred/pedigree dogs are laid down by the organisations that register and judge dogs, such as the Kennel Club of the United Kingdom and the Kennel Union of Southern Africa. Dogs can only be registered as a specific breed if they have five previous generations of ancestors registered as the same breed, creating a ‘breed barrier’ which promotes genetic differences between breeds. It is unclear whether dog breeds maintain these distinct genetic signatures in the face of prolonged spatial separation. This study aimed to assess the degree of genetic divergence between dogs of the same breed in geographically distant countries.

Main conclusion
The assignment of labrador retrievers, German shepherd dogs and Jack Russell terriers to pedigree classes on the basis of genotype is robust across the two countries and there is little evidence for genetic drift within breeds, reflecting the similarity of the breed standards between the two countries. The results showed that each breed was genetically similar in the two countries, with Jack Russell terriers showing the greatest degree of genetic heterogeneity.

Approach
Fifteen microsatellite markers were used to assess genetic divergence within three popular dog breeds in two countries – the UK and South Africa. Labrador retrievers, German shepherd dogs and Jack Russell terriers were recruited through veterinary clinics in South Africa (n=75) and compared with dogs from the UK (n=63). Calculations of heterozygosity and relative genetic distance are reported for the three breeds in each country.

Interpretation
The potential geographical isolation of the two countries has not led to genetic divergence in these three breeds, suggesting that there has been considerable genetic exchange.

Significance of findings
Genetic diseases detected in the breeds are likely to be found in both countries and could be transmitted from founders in either country.
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