

Dog DNA tests alone not enough for healthy pedigree, experts say

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Breeding dogs on the basis of a single genetic test carries risks and may not improve the health of pedigree lines, experts warn.

Only a combined approach that makes use of DNA analysis, health screening schemes and pedigree information will significantly reduce the frequency of [inherited diseases](#).

This approach will also improve [genetic diversity](#), which helps to counteract the risk of disorders, researchers say.

Scientists at the University of Edinburgh's Roslin Institute made the recommendations having reviewed the various approaches that are being taken to minimise potential defects in pedigree animals.

Pedigree dog breeds are created for desirable physical and behavioural characteristics, which often stem from breeding between closed familial lines over years and - in some cases - centuries.

This approach means that inherited diseases can become more common in pedigree populations. Around half of all King Charles Cavalier Spaniels, for instance, are affected by an inherited heart murmur that can be life-threatening.

Health screening dogs before selecting animals to breed from has already helped to reduce the prevalence of some diseases, such as floating knee-cap in the Dutch Kooiker breed.

DNA tests are now available to help identify dogs carrying gene mutations that are known to cause some severe illnesses. It is hoped that this technology will help to eliminate disease-causing genes from pedigree lines.

But ruling out breeding dogs solely on the basis of a single failed DNA test result will reduce the gene pool of pedigree lines and make inbreeding more common, researchers say. It could also inadvertently increase the prevalence of other [genetic diseases](#) which have not been tested for.

The researchers recommend limiting the use of individual stud dogs to promote more diversity in pedigree lines.

They also recommend cross-breeding to introduce even greater genetic diversity. Breeding the offspring that result from cross-breeding with the original pedigree for ten generations can produce animals that share 99.9 per cent of their genetic material with purebred animals, but that lack the gene faults that cause disease.

This approach has been successful in generating Dalmatians lacking a genetic defect that causes kidney stones, which is common in the breed.

Dr Lindsay Farrell, of The Roslin Institute, said: "Although carrying a specific genetic variant may raise the likelihood that an animal will suffer from the associated disease, it is not guaranteed. When making breeding decisions, genetic testing needs to be considered alongside health screening and family history. That will help to keep as much genetic diversity as possible in our pedigree dogs and, at the same time, reduce the prevalence of inherited diseases."

Professor Kim Summers, of The Roslin Institute, said: "Breeders are keen to embrace DNA testing to improve the health of their breed. We

need to make sure that these powerful technologies are used to best advantage."

The article is published in the journal *Canine Genetics and Epidemiology*.

Provided by University of Edinburgh

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