### **Dogs Victoria Fact Sheet** Breeders and Breeding

## **DNA Testing for Breeders**



The introduction of DNA testing technology has revolutionised the way breeders strive towards keeping their chosen breeds healthy.

In days gone by, breeders who knew of health problems in their lines often had to do 'test matings' to determine inheritance patterns, and to work out which animals should not be bred from.

When DNA testing in dogs was first developed, breed clubs often worked closely with a team of scientists to find the 'markers' for a disease so that a test could be developed.

Clubs and breeders would fundraise to help support the research, provide 'clear' and 'affected' samples from animals with known disease status, and the scientists would work towards locating the genes that were involved.

As new tests were developed, they were often patented, meaning the only way to access the test was to send samples to a specific laboratory, making testing very costly, especially if your breed had several diseases with DNA tests developed and controlled by different laboratories.

Thankfully, with the complete mapping of the canine genome in 2005 and the advancements in DNA technology, the costs of DNA testing have become significantly cheaper.

It is now possible to test for more than 300 different traits, characteristics, and disease markers in the same test and the number continues to grow !

#### Knowledge is power

Good breeders have to balance many attributes when selecting breeding stock - understanding genetics and the inheritance of traits and diseases is just part of this screening and selection process.

Breeders now have the ability to make much more informed breeding choices based on the results of DNA testing, and their knowedge of how a particular disease or trait is inherited and expressed in their chosen breed.

DNA testing also has the advantage of providing early detection of conditions that may not be visible until much later in an animal's life.

Because an individual's DNA does not change over time, Breeders can test puppies from quite a young age and make decisions about which of their litter may go on to be suitable for breeding.

# Is there a DNA test for every disease or condition?

Not all breed health issues have a DNA test.

In some cases, one gene controls a trait which makes the selection of breeding animals based on DNA testing very simple.

In other cases there may be a number of genes that work together and influence each other.

And then there are other conditions where there is a definite genetic component, but there are other external 'modifiers' that influence whether a trait is expressed, or that influence the development of a disease.

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#### What tests do I need to do as a breeder?

Breed health testing is an important part of selection of breeding animals. Although the amount of testing you do as a breeder may vary, there are some important things to consider.

#### 1. Your obligations under the <u>Code of Practice for</u> <u>the Breeding of Animals with Heritable Defects</u> <u>that Cause Disease</u>.

This Victorian mandatory Code of Practice forms part of the **Prevention of Cruelty to Animals Act.** It sets out acceptable breeding practices and lists several important diseases where breeders <u>MUST</u> test and follow the accepted breeding combinations or risk penalties such as fines and cruelty convictions.

#### 2. Your obligations under the **Dogs Victoria Regulations** and the **Dogs Australia Code of Practice for Hereditary Disease**

Dogs Victoria Regulation **20.3 Code of Practice for Hereditary Diseases** states that 'members will take responsible action to reduce the incidence of hereditary diseases in their breeds.'

Where there is a control program, approved by Dogs Victoria, covering a breed for a disease known or considered to be inherited, then breeders within the breed should participate and comply with the requirements of the program.

#### 3. Breed Club requirements

Some breed clubs have their own set of requirements for breeder members, aimed at promoting best practice. This may include not advertising a litter or referring to a breeder unless they meet health testing standards imposed by the club.

#### 4. Your 'Duty of Care' to your Breed

It is your role as a caretaker for your breed to carefully select the parents of your litteres so that you are both working to preserve the breed and improve it - with each generation healthier than the last.

#### **Educating Puppy Purchasers**

Unfortunately, puppy farmers and puppy scammers have jumped on the DNA bandwagon, often using vague and misleading terminology in their advertisements to try to look more legitimate.

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A quick search of sites such as Gumtree will find statements such as 'DNA tested clear of all health issues' or both 'parents vet checked, DNA tested clear'.

Unscrupulous breeders take advantage of the fact that the general public doesn't have a great understanding of DNA testing – they just know it is something 'good breeders' do.

It is important that breeders take the time to explain to puppy purchasers what the DNA testing results mean, and what tests have been done.

Your puppy packs should contain information on breed health problems, testing, and also copies of the results for the parents of the litter, or the puppy themselves.

If you have tested a puppy prior to sale, you need to clearly explain any 'carrier' or 'affected' results in your Breeder Health Declaration at the time of sale.

You also need to remember that the Sale Guarantee conditions outlined in Dogs Victoria Regulation 20.1.25 provide purchasers the right to a full refund if a puppy is diagnosed with a physical defect or disease that is directly traceable to the point of sale and that has not been disclosed in the Breeder Health Declaration.

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#### Understanding the different types of DNA Tests

» **DNA Profiles** (often called DNA 'fingerprinting')

A DNA profile provides an individual's genetic identification record by recording a snapshot of the dog's unique DNA code at set locations along the genes.

Because a lot of the dog's DNA sequence remains identical across a large number of individuals, the locations chosen for looking at the DNA code are located in areas where there is known to be a lot of variation.

DNA Profiles are used for confirming parentage.

#### » Single disease or single trait tests

Breeders can select to only have a single disease or trait test conducted.

Although less common now, single disease testing was common in the early days of DNA testing where only certain laboratories could run a test, and where testing options were very limited.

These days it is often far more economical to have a breed panel test done.

#### » Breed - Specific Testing 'Panels'

A breed panel usually includes a number of different DNA tests that are relevant to that breed, bundled together to improve the pricing of DNA testing.

Instead of a breeder having to pay for each individual test separately, and potentially having to have multiple samples collected, a single sample can be used to test for a number of different diseases or traits.

Breed panels may or may not include a DNA Profile test as part of the package.

» **Comprehensive Panel Tests** (eg. Wisdom Panel, Optimal Selection, Embark)

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With testing technology getting cheaper, and with the Dog Genome mapped, there is now a move towards large comprehensive panel tests.

A single DNA sample is run against hundreds of disease and trait markers and the results are recorded for each – even if that disease is not known to affect the breed.

The argument for this type of testing is that knowing the status of these other marker sites helps researchers further investigate the incidence of disease and the inheritance patterns of traits and characteristics across different breeds.

For some people the information from a comprehensive panel test is overwhelming, and finding out that your dog is a carrier for some exotic disease or trait can be concerning, even if there is no evidence of that particular problem in your breed.

However, this type of testing has seen some amazing leaps forward in disease detection across breeds and has also led to some breakthroughs in human DNA research!

#### » Breed Mix Analysis Tests

Testing for the breed 'makeup' of mixed breed dogs has been developed in a similar way to human ancestry-type testing. Although not considered super accurate, it can be both interesting and useful to pet dog owners to have an understanding of the breed mix they have, and knowing the breeds represented may assist in guiding healthcare.

For example, a DNA breed analysis of a 'Beagle mix' adopted from a shelter may show that there are no Beagle 'markers' present, but that there are actually a large percentage of markers from other breeds that have different completely different physical and behavioural traits and disease potential.

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