

Awareness and Prevention of dogs' genetic diseases

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DNA screening of dogs' genetic diseases

Breeders are increasingly facing the problem of genetic diseases arise and therefore asking themselves many questions:

Why genetic diseases occur? What are their causes? Why are they so common in dogs?

What tools are available to breeders to detect these diseases? How best to ensure the selection of stud dogs, of inbreeding practices to limit the spread of these genetic diseases?

What is a genetic disease?

A genetic disease (also called hereditary disease) is due to dysfunction of one or more genes from parents to their offspring. To date, more than 400 genetic diseases are described in dogs.

Most genetic diseases are caused by the malfunction of a single gene. They are called monogenic diseases.

This is the case of:

- Ocular diseases like Progressive Retinal Atrophy or primitive lens luxation
- Many metabolic diseases (pituitary dwarfism, von Willebrand's disease)
- Kidney disease (PKD, cystinuria, familial nephropathy)

Other inherited diseases are caused by the malfunction of several genes: they are called « polygenic diseases ».

Most monogenic diseases are recessive:

- The disease is expressed only if the 2 copies of the gene involved are mutated.
- When 2 copies of the gene are normal: the dog is clear (normal homozygous)
- When one of the two copies of the gene is mutated: the dog is carrier. He doesn't develop the disease but can transmit the abnormality to its progeny.

How to detect a genetic disease?

Traditional solutions have existed for years to screen for canine genetic diseases; it is most often clinical examinations by a veterinarian (eye exams, echocardiography...). These clinical exams are limited because only help to identify affected dogs, not the carriers.

DNA testing has many advantages for the screening, selection and even the diagnosis of genetic diseases:

- It is reliable
- It allows to detect carriers and affected dogs
- It can be implemented early in the dog's life (from birth)
- It's valid throughout the dog's life.

However, DNA testing only identifies known genetic abnormalities. The test cannot be used to detect other forms of the genetic disease and cannot be used to highlight acquired diseases (non genetic).

From a sample taken from a dog (blood, tissue or cheek swabs) and authenticated by a veterinarian, a DNA test is realized to determine the presence of the abnormality that causes the disease or to identify the presence of one or more markers linked to the disease.

How to manage genetic diseases in a kennel?

DNA testing is a selection criterion as well as the morphological and behavioural characteristics of dogs. The breeder is then able to perform the best possible selection, taking into account the beauty, character and future health of the dog and its descendants.

Here are some tips to avoid the production of potentially affected puppies, and reduce the incidence of hereditary disease in the breed:

- Do not mate affected dogs
- Mate as many clear dogs as possible
- If a carrier dog is kept for breeding, breed him with another clear dog.

The introduction in the reproduction of a dog « carrier » allows to keep the overall genetic diversity of the breed by keeping a sufficient number of stud dogs.

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