



## **DEGENERATIVE MYELOPATHY (DM)**

Your dog has been tested for the mutation identifying susceptibility to Degenerative Myelopathy (DM) based on a DNA sample submission. The enclosed report lists the laboratory findings.

### **Explanation of results:**

**NORMAL (N/N):** This dog is homozygous N/N for the mutation that is the most common cause of DM, with two normal copies of the gene. Among the hundreds of dogs studied so far at the University of Missouri, only two dogs with test results of N/N (Normal) have been confirmed to have DM. This dog can only transmit the normal gene to its offspring, and it is unlikely that this dog or its offspring will ever develop DM.

**CARRIER (A/N):** This dog is heterozygous A/N, with one mutated copy of the gene and one normal copy of the gene, and is classified as a carrier. Carriers are far less likely to develop DM, but we have confirmed DM in a few carrier dogs. They may be used carefully in breeding programs to keep their good qualities while reducing risk of DM in future generations.

**AT-RISK (A/A):** This dog is homozygous A/A, with two mutated copies of the gene, and is at risk for developing Degenerative Myelopathy (DM). Although almost all dogs in the research study with confirmed DM have had A/A DNA test results, recent evidence suggest that there are other causes of DM in some breeds. In addition, not all dogs testing as A/A have shown clinical signs of DM. DM is typically a late onset disease, and dogs testing as A/A that are clinically normal may still begin to show signs of the disease as they age. Some dogs testing A/A did not begin to show clinical signs of DM until they were 15 years of age. Research is ongoing to estimate what percentage of dogs testing as A/A will develop DM within their lifespan. At this point, the mutation can only be interpreted as being at risk of developing DM within the animal's life. For dogs showing clinical signs with a presumptive diagnosis of DM, affected (A/A) test results can be used as an additional tool to aid in the diagnosis of DM. Dogs testing At-Risk (A/A) can only pass the mutated gene on to their offspring.

### **Guidelines for Breeding**

Owners with dogs testing as Carriers (A/N), or At-Risk (A/A) are strongly encouraged to share these results with their attending veterinarian and seek genetic counseling when making breeding decisions.

The "A" (mutated) allele appears to be very common in some breeds. In these breeds, an overly aggressive breeding program to eliminate dogs testing A/A or A/N might be devastating to the breed as a whole because it would eliminate a large fraction of the high quality dogs that would otherwise contribute desirable qualities to the breed. Nonetheless, DM should be taken seriously. It is a fatal disease with devastating consequences for the dog, and can be a trying experience for the owners that

care for them. A realistic approach when considering which dogs to select for breeding would be to treat the test results as one would treat any other undesirable trait or fault. Dogs testing At-Risk (A/A) should be considered to have a more serious fault than those testing as Carriers (A/N). Incorporating this information into their selection criteria, breeders can then proceed as conscientious breeders have always done: make their breeding selections based on all the dog's strengths and all the dog's faults. Using this approach and factoring the DM test results into the breeding decisions should reduce the prevalence of DM in the subsequent generations while continuing to maintain and improve upon positive, sought after traits.

We recommend that breeders take into consideration the DM test results as they plan their breeding programs; however, they should not over-emphasize the test results. Instead, the test result should be one factor among many in a balanced breeding program.

*Additional information on the disease can be found on the University of Missouri CVM website: [www.caninegeneticdiseases.net/DM/maindm.htm](http://www.caninegeneticdiseases.net/DM/maindm.htm)*