Degenerative Myelopathy

Other Names:	Canine degenerative myelopathy, DM
Affected Genes:	SOD1
Inheritance:	Autosomal Recessive (/glossary/#Autosomal Recessive) With Incomplete Penetrance (/glossary/#Incomplete Penetrance)
Mutation:	chr31:26540342 (canFam3): G>A

Common Symptoms

Degenerative Myelopathy is an inherited neurologic disorder caused by a Mutation (/glossary/#Mutation) of the SOD1 gene in dogs. This mutation is found in many breeds of dog, though it is not clear for some breeds whether all dogs carrying two copies of the mutation will develop the disease. The variable presentation between breeds suggests that there are environmental or other genetic factors responsible for modifying disease expression. The average age of onset for dogs with degenerative myelopathy is approximately nine years of age. Affected dogs usually present in adulthood with gradual muscle Atrophy (/glossary/#Atrophy) and loss of coordination typically beginning in the hind limbs due to degeneration of the nerves. The condition is not typically painful for the dog, but will progress until the dog is no longer able to walk. The gait of dogs affected with degenerative myelopathy can be difficult to distinguish from the gait of dogs with hip dysplasia, arthritis of other joints of the hind limbs, or intervertebral disc disease. Late in the progression of disease, dogs may lose fecal and urinary continence and the forelimbs may be affected. Affected dogs may fully lose the ability to walk 6 months to 2 years after the onset of symptoms. Affected small breed dogs often progress more slowly than affected large breed dogs and owners may postpone euthanasia until the dog is paraplegic.

Breed-Specific Information for the Toy Australian Shepherd

The toy Australian shepherd is listed as a breed susceptible to degenerative myelopathy because of its close relatedness to the Australian shepherd, which is known to develop this disease due to Mutation (/glossary/#Mutation) of the SOD1 gene. It is unknown if the toy Australian shepherd develops degenerative myelopathy due to this mutation.

Testing Tips

Genetic testing of the SOD1 gene in toy Australian shepherds will reliably determine whether a dog is a genetic Carrier (/glossary/#Carrier) of degenerative myelopathy. Degenerative Myelopathy is inherited in an Autosomal Recessive (/glossary/#Autosomal Recessive) manner in dogs meaning that they must receive two copies of the mutated gene (one from each parent) to develop the disease. In general, carrier dogs do not have features of the disease but when bred with another carrier of the same Mutation (/glossary/#Mutation), there is a risk of having affected pups. Each pup that is born to this pairing has a 25% chance of inheriting the disease and a 50% chance of inheriting one copy and being a carrier of the SOD1 gene mutation. Reliable genetic testing is important for determining breeding practices. Because symptoms may not

appear until adulthood and some at-risk/affected dogs do not develop the disease, genetic testing should be performed before breeding. Until the exact modifying environmental or genetic factor is determined, genetic testing remains the only reliable way to detect neurological disease associated with this mutation prior to death. In order to eliminate this mutation from breeding lines and to avoid the potential of producing affected pups, breeding of known carriers to each other is not recommended. Toy Australian shepherds that are not carriers of the mutation have no increased risk of having affected pups.

There may be other causes of this condition in dogs and a normal result does not exclude a different mutation in this gene or any other gene that may result in a similar genetic disease or trait.

References

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