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## Greyhound Hereditary Neuropathy

Within the last years, a few kennels throughout Europe reported on the sporadic birth of puppies, who suddenly developed abnormal gait and progressive muscle atrophy from an age of around 3 months on. First, breeders and owners assumed that they had to deal with singular cases, but soon it turned out to be a common new problem, a new Greyhound disease, not yet described in scientific literature.

### Clinical Symptoms

Usually, first signs of the disease occur at an age of 3-4 months, in some cases not before 8-9 months. Affected puppies quite suddenly show an abnormal gait with arched back and rear weakness, which may suppose an injury in loin. Within a few days or weeks, condition gets worse, the puppies visibly loose muscle and hardly can walk or run for more than 200-300 metres. Even just a few steps lead to fatigue, puppies are no more able to fully stretch the knee joints. They show a strange, "bunny-like" hopping gallop with turned-out knees, later on they collapse and cannot walk anymore. After a few minutes of recreation, they recover strength and can continue walking for another short distance.

In addition to the abnormal gait, neurologic deficits come to the fore of the pathogenesis. The spinal reflexes are highly decelerated resp. totally absent, especially the patellar tendon reflex. In contrast, sensoric and proprioceptive functions are usually not affected.

With increasing age, muscle weakness is more and more progressive, the gait gets wobbling and unstable, up to the dogs cannot get up and walk without help any more. It differs from case to case which muscle groups are particularly affected. Usually shoulder and thigh, as well as temporal, back and in some animals also the laryngeal muscles are highly atrophic. The latter are standing out because they cannot bark and are sometimes dyspnoeic. Affected puppies don't show any sign of pain or disturbed well-being, they are alert and full of joie de vivre until the end. However, they only reach an age of 9 to 13 months until they have to be put to sleep because of their progressive muscle atrophy.

## **Autopsy Findings and Pathogenesis**

Usually, autopsy doesn't show any notable macroscopic findings except of a severe general muscle atrophy. In all Neuropathy puppies who underwent autopsy a mild hydrocephalus internus could be found, but this doesn't explain the clinical symptoms in total. Only with special stainings of nerve sections the underlying defects can be detected. Affected puppies show a nearly complete degeneration of peripheral nerve axons, thus leading to an omitted neuronal stimulation of the muscle, resulting in muscle atrophy.

The supposed cause for the axon degeneration is a disturbed interaction of axon and myelin sheath, caused by a gene defect. The disease is inherited in a monogenic autosomal-recessive trait. So called "carriers" (who have one healthy and one mutated allele) are phenotypically healthy, powerful dogs - but if two of these carriers are mated and a puppy inherits a mutated allele from both, it will be affected by the disease.

## **Neuropathy Project**

Thanks to the help from a lot of responsible breeders and owners, we could collect a large amount of samples from affected puppies and their parents, grandparents, littermates, half-siblings and other relatives. Based on this material, the causative gene defect could be characterized and a gene test could be developed.

PD Dr. Cord Drögemüller at the Institute of Genetics of the University of Bern/CH is heading several research projects about genetic diseases in dogs. He kindly agreed to include the disease Greyhound Hereditary Neuropathy in his research. More information about the Neuropathy Project, together with an order form for the gene test is available on the institute's [webpage](#).

By using the gene test a reliable identification of carriers is possible now! As long as carriers are never bred to another carrier, the birth of affected puppies will be excluded in the future. The big bugbear of Neuropathy, which caused so much uncertainty among show greyhound breeders, hanging like the sword of Damocles over so many planned matings, became predictable. So many breeding plans haven't been realized in the past, because the risk of Neuropathy was estimated as being too high - nowadays it's possible to avoid the birth of affected puppies in advance. We urgently recommend to use the gene test which is available to all greyhound breeders and fanciers!