

DUNGd: A fatal neonatal disease of Gordon Setters

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What is DUNGd?

In 2000, Dr. Michael Yaeger and his colleagues reported a fatal neonatal disease of Gordon Setters. The disease had been recognized by Gordon breeders for some time before that and they referred to the disease as DUNGd (Damned Unnamed New Genetic Disease). Pups with DUNGd appear normal at first, but beginning about 3 weeks of age, they start to show neurologic problems. Signs begin as intermittent stiffness, weakness and trembling. As the disease progresses, the signs become more constant. The pups may bump into things. They will pace or circle and sometimes walk backwards. They begin to cry without reason, sometimes incessantly. Their weakness becomes worse. They have trouble keeping their heads up or getting back up if they fall over. By 5-6 weeks of age, they are unable to stand and will die if not euthanized. There were few changes in the brain at post mortem to provide a clue to why these pups are so severely impaired. More recently, however, we have found some evidence that DUNGd may be an inborn error of metabolism called an organic aciduria.



A puppy with DUNGd may cry incessantly and pace, circle or even walk backwards. They become weaker with time and die before weaning age.

What is an organic aciduria?

Brain chemistry is like an assembly line. A brain cell manufactures the things it needs to function through a series of clearly defined steps starting with simple carbohydrates, fats, or amino acids from our food. At each step in the process there is an enzyme that mediates that step. You can think of the enzymes like the workers in the assembly line. If one of those workers is asleep on the job, then the manufacturing process stops at his station and the unfinished product piles up. Like organic grapes are natural grapes, organic acids are naturally occurring acidic chemicals in the body. They form important intermediate steps in the production of the energy that a brain cell needs to do its job. A mutation in the gene for an enzyme in that pathway interferes with ability of the brain to produce the energy it needs and results in a build up of one of these organic acids. This excess organic acid gets eliminated in the urine where it can be detected with special tests. The type of organic acid in the urine provides a clue to who's asleep at the assembly line.

What else can look like DUNGd?

Many diseases can cause neurologic problems in a young puppy. Infections of the brain (encephalitis), low blood sugar, liver shunts, and many others could resemble DUNGd. It is important to ensure that some other disease is not causing a puppy's problems, since some of those can be cured whereas DUNGd cannot. Your local veterinarian will be able to perform simple blood tests to rule out some of these other causes. Sometimes a post-mortem examination is the only way to know the cause, but in DUNGd there are only non-specific findings. Thus ruling out other causes and the typical clinical signs make the diagnosis of DUNGd.

How do we find the gene responsible?

Genes contain the code that programs everything about an animal from the color of their coat to how their brains function. Genetic disease occurs when a mutation interferes with the ability of a gene to function normally. Genes are found within chromosomes in the command centers of individual cells. In dogs, there are 39 pairs of chromosomes which contain an estimated 30,000 individual genes, any one of which could contain the mutation that causes DUNGd. Finding an abnormal organic acid in the urine gives us a clue to which gene may be the culprit. We are currently investigating these candidates to see if they are the cause of DUNGd. If we find that they are not responsible, however, then we can proceed to map the gene responsible. Neonatal onset diseases like DUNGd are the ideal subjects for a gene mapping study. It is pretty clear which pups are affected and which are not. The entire family is together when the affected litter is first recognized making it easy to collect the necessary DNA samples. Using these approaches we have successfully found the gene responsible for other hereditary diseases such as neonatal encephalopathy in Standard Poodles and ceroid lipofuscinosis in American bulldogs. Mapping requires a long term commitment by the breeders involved, but we now have the tools to find the genes responsible for these diseases. Once we have identified the gene responsible for the disease, we can develop a DNA test that will aid breeders in avoiding the disease in the future.

How can I help?

If you have a litter with a pup you believe might be affected, please contact us. We can help you in determining whether or not this is the problem in your pup. In return, we would ask your help in collecting the samples and information necessary to continue searching for the gene responsible for this disease. This work has been generously supported by the Gordon Setter Club and the Canine Health Foundation. Your continuing support will be necessary to achieve our goal.

Any information provided to us will be kept strictly confidential.

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