Neonatale Cerebellaire Ataxie (Juvenile Cerebellar Ataxia)

Introduction

In November 2021, Ben Tannemaat from Wallcorners Kennel first contacted the Flatcoated Retriever Club (FRC) regarding a breeding issue, as he called it.
Problems had been identified in two successive Wallcorners litters. The puppies exhibited a kind of "drunken gait" at a young age. The problem was observed in only one puppy in the first litter, but in the second litter, multiple puppies showed the same symptoms. This suggested a hereditary issue. For both the first and second litters, contact was made with Dr. Paul Mandigers, a specialist in veterinary neurology, working at both the Genetics Expertise Centre at the Faculty of Veterinary Medicine (Utrecht University) and the Evidensia Animal Hospital in Arnhem.

Start of the Research

The fact that two successive litters from the same bitch showed the same symptoms raised a red flag. This was a hereditary condition that might be more prevalent in the Flatcoat population. Thus, the FRC, in collaboration with the Tannemaat family and Paul Mandigers, initiated research into the condition's background. It's important to note that similar cases had also been observed elsewhere: one in Utrecht and two in Germany.
The clinical picture suggested a disorder affecting at least the cerebellum. Since only minimal abnormalities were visible during the autopsy of the puppies, the problem had to lie in signal transmission. This abnormality disrupts motor coordination, resulting in a "drunken gait" and subtle head tremors.

Inheritance

The next question was, of course, how the condition was inherited. Paul Mandigers strongly suspected that the trait was inherited in a simple recessive manner. This means that the inheritance pattern closely resembles that of the brown coat colour in Flatcoated Retrievers. The trait must be passed on by both the father and the mother to produce an affected /brown-coated dog. A carrier mated with a free dog will not produce new affected dogs but may produce new carriers. Free mated with free will naturally produce only free dogs. The accompanying diagram illustrates the expected inheritance, where breeding with affected dogs is theoretical.

♀/♂	**free**	**carrier**	**affected**
free	100 % free	50% free 50% carrier	100% carrier
carrier	50% free 50% carrier	25% free 50 % carrier 25% affected	50%carrier 50%affected
affected	100% carrier	50% carrier 50% affected	100% affected

DNA Research

Assuming Paul Mandigers' hypothesis that NCA is inherited in a simple recessive manner, the chances of successful genetic research seemed high. Finding a causal mutation would enable testing Flatcoated Retrievers for the genetic presence of the trait, similar to the DNA test for coat colour.
In consultation with Paul Mandigers, the FRC board decided to financially support the research for developing a DNA marker to detect the gene's presence from the health fund.
The Tannemaat family provided research material. Using Genome Wide Association Studies (GWAS) and sequencing significant areas, Dr. Peter Leegwater, a colleague of Paul Mandigers from the Genetics Expertise Centre at the Faculty of Veterinary Medicine (Utrecht University), eventually identified the causative mutation.
On January 18, 2024, Paul Mandigers delivered the groundbreaking news: the mutation causing NCA had been found, and a reliable DNA marker was available. This was a wonderful outcome of a long-term study.

But What Can We Do With It?

Naturally, there were critical reactions from members/breeders questioning the usefulness of the research and the financial support provided by the FRC. “Isn't it hardly a major problem among Flatcoated Retrievers?” Visibly, it isn’t (yet), but within the FRC, we are accustomed to thinking ahead beyond the current situation. There may be more cases of puppies with NCA that go unreported or are euthanized based on a different diagnosis. There is a real possibility that many more carriers of this condition exist in the Flatcoat population without being known. The fact that one puppy was seen in Utrecht and two in Germany suggests it could be a bigger issue than we currently think. Using the marker, we can now specifically investigate whether parent dogs are free or carriers of NCA.

The marker is now available on the faculty's website via the following link:
https://survey.uu.nl/jfe/form/SV_cND4DtJfJVlZKDA

Strategy and Finances

Following the successful research on NCA, the board has decided to allocate a budget from the Health Fund for follow-up research in 2024. The reliable marker developed by the Faculty of Veterinary Medicine will be applied to several dogs, with the costs for implementing this marker funded by the health fund.
An estimated 30 dogs will be tested at the FRC's expense. The cost per test is €50, resulting in a total expense of €1500 for the FRC.
Additionally, 50 discount vouchers worth €15 each will be made available for members who want to test their own Flatcoats, which are not part of the research population. One voucher per member, while supplies last. First come, first served. The research results will be available to the FRC.
Members can contact the FRC guidance committee at bcsecretariaat@frc-nl.com to apply for the discount vouchers.

Conclusion

The board looks back with satisfaction on the research and the collaboration between Paul Mandigers, the Tannemaat family, and the FRC. Though the process was slower than we hoped, the patience has paid off. Generally, this project exemplifies what the health fund was established for and has led to a beautiful outcome.