

VETERINARY TECHNICAL DATASHEET

Canine Cyclic Neutropenia, Cyclic Hematopoiesis, Gray Collie Syndrome, (CN)



Mutation Found In :Collie

Disorder Type

- Immune system

Disease Severity

- Severe

Background

Cyclic neutropenia (CN) is an immunodeficiency condition characterized by cyclic oscillations in a dog's white blood cell count that causes periodic susceptibility to infections. The disease involves neutrophils, a type of white blood cell that play a key role in activating the immune system. If untreated, most affected dogs die before 6 months of age. CN affects Collies, which appear characteristically gray in color. The disease is inherited in an autosomal recessive manner and has also been encountered in other breeds.

Key Signs

- Recurrent infections
- Fever
- Slow wound healing
- Loss of appetite
- Diarrhea
- Gray-colored appearance

Clinical Description

The number of neutrophil in affected dogs can fluctuate in 11 to 14 day cycles. Due to the periodic drops in the number of white blood cells, affected dogs are extremely susceptible to infections during these 2 to 4 day periods. The gray-colored appearance can be observed at birth. Other clinical signs occur typically at 6 to 8 weeks of age and include recurrent fever and illness lasting for 3 to 5 days, susceptibility to infections, increased bleeding, and slow wound healing. An affected puppy may appear smaller and weaker than litter mates, and may also show a loss of appetite and diarrhea. If untreated, most affected dogs die before 6 months of age due to severe infections.

Mode of Inheritance

- autosomal recessive

Gene Name

- AP3B1

Next Steps

Therapy is targeted at treating secondary infections and supportive care. Humane euthanasia for affected puppies is often elected. Gene therapy and other treatments to stimulate the bone marrow have been successful on an experimental basis and could become more prevalent in future.

References

Benson KF, Li FQ, Person RE, Albani D, Duan Z, Wechsler J, Meade-White K, Williams K, Acland GM, Niemeyer G, Lothrop CD, Horwitz M. Mutations associated with neutropenia in dogs and humans disrupt intracellular transport of neutrophil elastase. *Nat Genet* 35:90-6, 2003.

Benson KF, Person RE, Li FQ, Williams K, Horwitz M. Paradoxical homozygous expression from heterozygotes and heterozygous expression from homozygotes as a consequence of transcriptional infidelity through a polyadenine tract in the AP3B1 gene responsible for canine cyclic neutropenia. *Nucl Acids Res* 32:6327-33, 2004.

