

CATALASE DEFICIENCY

HYPOCATALASIA

Catalase Deficiency (CAT) or Hypocatalasia, Acatalasemia is a gum and tissue gene mutation that is increasingly noted within the beagle breed. It is caused by a mutation of Gene:CAT on Chromosome 18 that impairs the dog's capacity to produce the enzyme known as catalase within erythrocytes (red blood cells). Catalase breaks down hydrogen peroxide which is a by product of metabolic processes, into water and oxygen.

Commonly owners complain of bad breath, early decline in dental health and a lack/loss of desire of food due to a painful mouth in young dogs without a known explanation. One name used for this condition among owners is “Trash Mouth”. Commonly these dogs need multiple extractions of teeth at a very young age with many ending up with not teeth by their elderly years. In some cases dogs develop a severe form known as Takahara's disease, characterized by progressive mouth ulcers and sometimes gangrene which are extremely painful.



(Note bottom gum line middle area of tissue deterioration)



Catalase isn't the only thing in the dog's body that helps break down hydrogen peroxide, so some dogs may carry this condition without symptoms being noted. Current scientific understanding is that this gene is inherited in an autosomal recessive manner. Meaning a copy of this recessive gene must be inherited from both parents. A dog that carries 2 copies of the gene has the possibility of being affected by these symptoms. A dog with one copy (carrier) will not be affected. A dog without this recessive gene is called clear. The current recommendation is to avoid breeding dogs that are carriers to another carrier or affected. Only breed carriers to clear and affected to clears.

There has been a report of a beagle that tested with multiple labs as “carriers” that did have shown symptoms. One of the labs that test the beagle as carrier sent this statement.

“So far, we have only found the one mutation in CAT that leads to a/hypocatalasemia in dogs, initially identified in a research colony of Beagles. It is very possible that there are more (as yet undiscovered) mutations that lead to the same or a similar disease process. If this dog has two abnormal copies of CAT, even if they do not each have the same abnormality/mutation, he may develop symptoms of the disease (this phenomenon is known as "compound heterozygosity"). If this dog has an undiscovered mutation, it will not be detectable on our testing platform.”

Several genetic testing labs offer the test for this condition:

Genomia

Laboklin (UK)

Wisdom Panel

Embark

Idexx

Diagnoses of the oral disease can be done by a veterinarian after identifying the copies of the genetic markers within the dog. Some dogs may require sedation, even for examination, due to the pain. Treatment when symptoms are identified is limited at this time. Ensuring the dog has regular dental exams & cleanings can be key to keeping ahead of oral health concerns. Use of antibiotics and mouth sprays/rinses with the prescription of a veterinarian may be a constant throughout the lifetime of the dog. It would appear that some symptomatic dogs have less pain and symptoms once affected teeth are removed via dental procedure. Consulting a veterinarian on the best course of action is always recommended.