OPTIGEN for the genetic advantage

Hyperuricosuria HUU Test Code 358

Test Pricing

For breeds: American Pitbull Terrier, American Staffordshire Terrier, Australian Shepherd, Black Russian Terrier, Bulldog, Catahoula Leopard Dog, Dalmatian, German Shepherd, Giant Schnauzer, Jack Russel Terrier, Labrador Retriever, Large Munsterlander, Parsons Russel Terrier, South African Boerboel, Vizsla, Weimaraner.

Clinical signs/Disease description

Hyperuricosuria (HUU), the excessive excretion of uric acid in the urine, is a condition that predisposes dogs to *urate urolithiasis* (bladder stones) that can result in urinary obstruction. Hyperuricosuria has been studied extensively in Dalmatians and has been associated with a mutation in the urate transporter gene *SLC2A9* [1]. It has been proposed that the inefficient transport diminishes reabsorption of uric acid in the kidney and prevents its conversion into a soluble form in the liver, thus causing an elevated level of uric acid in the urine. The same mutation causes hyperuricosuria in Black Russian Terriers, Bulldogs and other breeds [2, 3].

Prevalence of HUU mutation

The mutant allele frequency varies among breeds. The estimated percentage of affected and carrier Bulldogs is 3% and 27%, respectively [2]. For other breeds the estimates of carrier frequency range from <1% in Labrador Retrievers to 50% in the Black Russian Terrier breed [3].

HUU test

A DNA test for the hyperuricosuria mutation is now available and may be used by breeders to decrease the mutant allele frequency in breeds that carry the mutation. The test can also be used by veterinarians to investigate the underling cause of *urate urolithiasis*. The hyperuricosuria is not the only cause of *urate urolithiasis*, and conditions such as portosystemic shunts and hepatic microvascular dysplasia also may predispose dogs to this disease. The DNA-based test may be used as a noninvasive and relatively inexpensive tool to differentiate between such cases. The HUU test allows to determine genotype of a tested dog as being Homozygous Normal, Carrier or Homozygous Affected.

Testing/Breeding Recommendations

Hyperuricosuria is an autosomal recessive condition, therefore only individuals that have two copies of the SLC2A9 mutation, inherited from both parents, have a higher risk of developing clinical signs of the disease. Carriers of only one copy of the mutation will not develop the disease. Among dogs homozygous for the mutation (i.e. carrying two copies of it) males have a much higher incidence of urate urolithiasis than females but not all genetically affected males show clinical signs. For instance, only half of the homozygous affected male Black Russian Terriers of age 4 years or older had formed bladder stones [2]. For detailed recommendations on breeding strategies using results of OptiGen testing, please, refer to the Breeding strategy chart for autosomal recessive diseases below.

Expected results for breeding strategies using the mutation test for Hyperuricosuria			
Parent 1	Parent 2 Genotype		

Genotype	Normal/Clear	Carrier	Affected
Normal/Clear	All = Normal/Clear	1/2 = Normal/Clear 1/2 = Carrier	All = Carrier
Carrier	1/2 = Normal 1/2 = Carrier	1/4 = Normal/Clear 1/2 = Carrier 1/4 = Affected	1/2 = Carrier 1/2 = Affected
Affected	All = Carrier	1/2 = Carrier 1/2 = Affected	All = Affected

References:

1. Bannasch D, Safra N, Young A, Karmi N, Schaible RS, Ling GV, Mutations in the SLC2A9 Gene Cause Hyperuricosuria and Hyperuricemia in the Dog, PLoS Genetics, Vol 4, No. 11, November 2008

2. Karmi N, Safra N, Young A, Bannasch D, Validation of a urine test and characterization of the putative genetic mutation for hyperuricosuria in Bulldogs and Black Russian Terriers. AJVR, Vol 71, No. 8, August 2010

3. Karmi N, Brown EA, Hughes SS, MsLaughlin B, Mellersh CS, Biourge V, Bannasch DL, Estimated Frequency of the Canine Hyperuricosuria Mutation in Different Dog Breeds, J vet Intern Med 2010; 24:1337-1342

OptiGen®, LLC · Cornell Business & Technology Park · 767 Warren Road, Suite 300 · Ithaca, New York 14850
Tel: 607 257 0301 · Fax: 607 257 0353 · email: genetest@optigen.com or optigen@clarityconnect.com