JRTRF Newsletter

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EDITOR RUTH CAMP
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Genetic Data Information Update

Total Dogs in DNA Database

1229

Diseases/Disorder Affected

Cataracts (4.7%)	58
PLL (3.7%)	46
Seizure	11
Deafness	10
Ataxia	9
Retinal Disease	7
Legg Perthes	6
Patella Luxation	3
Heart	3
Addisons	3
Cushings	1

Now is the time to update your kennel records, focusing on any terriers that have developed eye problems (or any other disorders) in the last 2 years, especially those entered in the DNA bank as previous "normal".

Simply e-mail Stephanie Taylor brandywinejrt@adelphia.net

Lens Luxation

Primary Lens Luxation (PLL) is a very serious condition. It not only causes blindness in our dogs, but it is also potentially painful for then as well. The ligaments of the eyes, which hold the lens in place, become brittle and break. These ligaments are called zonules, which are attached to the lens; change the lens shape to allow the eyes to focus. If zonules are weak or break the lens can luxate, or shift out of place. Blindness in most cases is inevitable, and the condition is inheritable. Movement of the lens forward through the pupil into the front of the eye is anterior lens luxation. Movement of the lens backward is called posterior lens luxation. If one lens luxates, there is a significant increase in the probability that the second lens will also be affected.

Causes of lens luxation include trauma, eye disease (glaucoma, tumors, etc.), or a genetically inherited weakness of the zonules.

Primary Lens Luxation poses a threat to our breed because it is a late-onset condition, and affected dogs can and have been used in breeding programs before the condition can be diagnosed. Routine eye certification exams may not, in most cases, detect a dog pre-disposed to lens luxation – unless the ligaments are starting to weaken and a slight wobble of the lens is detected. Owners of terriers should be aware of this disease and carefully research the pedigree of any dogs being considered for breeding. Lens luxation is suspected to be an autosomal recessive trait. It is suggested that not only should affected dogs be eliminated from breeding, but care should be taken to avoid breeding two suspected carriers.

What happens then the lens luxates? When the lens falls forward the flow of the fluid in the eye, aqueous humour, does not flow out of the eye as normal. This increases the pressure in the eye may result in glaucoma. Elevated pressure in the eye will cause irreversible damage to the optic nerves and retina. An anteriorly luxated lens can also cause corneal damage. Posteriorly luxated lens may also cause glaucoma.

Know the symptoms of lens luxation! If you see these symptoms call your vet immediately.

- Excessive pus-like matter in the corner of the eyes
- Indications of pain or discomfort in the eye
- Changes in the inside appearance of the eye

Treatment of lens luxation can range from medications to surgical removal of the eye. If the problem is a partially luxated (subluxated) lens, and there is no blockage of aqueous humour or glaucoma present, medications may be used to keep the pressure low and to constrict the pupil to reduce the chances of anterior luxation. It is important to regularly check to eye pressure and to check for further luxation.

If lens luxation is recent, glaucoma is not severe and the retina and optic nerve still look healthy, an intracapsular lens extraction may be performed. In the procedure, the lens is surgically removed from the eye, this may save your dogs vision. If the

JRTRF Website

http://www.jrt-research.com/

How to Donate:

Your tax-deductible donations may be sent directly to:

JRTRF
PO Box 21202
Santa Barbara, CA 93121

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eye has already been blinded by glaucoma; emergency lens removal surgery would not help the situation.
Glaucoma in the eyes greater than 72 hours severely reduces the chances of saving the vision of your dog. At this point removal of the eye or removal of eye with prosthetic replacement is necessary.

Is it possible to design a system which can be used for risk assessment of individual dogs? We need to work together and be honest with ourselves and our breeding practices.

The study on Lens Luxation and Glaucoma at the University of Missouri is headed by Gary Johnson, DVM. If your terrier has suffered from lens luxation and/or glaucoma or is a littermate, parent, grandparent or other close relative of an affected terrier, your help is needed for this study. We need blood collected from these terriers to further the study of PLL and Glaucoma, as well as other heritable diseases in our terriers.

Anterior lens luxation with associated rupture of the cornea in a Shih Tzu

Progress Report for PLL

Submitted by Dr. Gary Johnson and Dr. Joan Coates, University of Missouri

At the University of Missouri we have been working on the development of DNA markers for two heritable diseases of Jack Russell Terriers: primary lens luxation (or PLL) and early onset cerebellar ataxia (or EOCA). We have some progress to report on both diseases.

The PLL work is funded by an extension of a lens luxation/glaucoma grant awarded a few years ago from the AKC/CHF. We have assembled a pedigree 64 Jack Russell Terriers including 27 affected with lens luxation. We are doing this work in collaboration with two English investigators, Dr. David Sargan and Dr. Cathyrn Mellersch. These English investigators have identified the chromosomal location of the mutation causing PLL in Lancashire Heelers and Miniature Bull Terriers and have shared that information with us. Our experiments indicate that the mutation responsible for PLL in Jack Russell Terriers is at this same chromosomal location. We are currently doing experiments to narrow the boarders of this chromosomal region and examining genes in this region from affected dogs to discover the PLL-causing mutation. Once the mutation is discovered, we will devise a DNA marker assay to identify puppies genetically programmed to develop PLL as adults and to identify PLL carriers that should only be bred to mates known to be "normal" by a DNA test. Our funding from this project will end at the end of this year (2006). We are working hard to complete the studies by that time; however, if this is not possible, we will be looking for additional funding to continue this study. In addition, our work will go faster if we can obtain blood for isolation of DNA from additional affected dogs and their close relatives.

Conquering Disease – Steps on the Path to Resolution, excerpt

by: Dr. Patricia Wilkie, PhD, University of Minnesota

The problem of inherited disease in dogs is somewhat different from other species. Every breeder has a commitment to decrease the incidence of inherited disease as part of their efforts to produce quality in the dogs they breed. Linebreeding, the tool largely responsible for creating the tremendous variety of dog breeds and for setting type, is also responsible for increasing the expression of recessive diseases and aggregating the necessary deleterious genes to produce polygenic disorders. Linebreeding can be thought of as "concentrating" the genes encoding both desirable and undesirable traits, including disease. The genes encoding these characteristics become more homogenous or similar between dogs of a particular breed or line. It is a far more serious situation if there is only one life-shortening inherited disease in a breed, but nearly all of the dogs of that breed either carry the disease gene or show symptoms of it, than if there are several less severe inherited diseases in the breed and the disease producing genes are rare for all of these diseases. A practical way of thinking about this issue is "How likely is it that a particular breeding will produce affected offspring?" If the particular disease gene is common in the breed and it is a close linebreeding, the answer is "very likely". Conversely, if the disease gene is rare in a breed, it is improbable that affected offspring will result, though it would be more likely when linebreeding than outcrossing.

Steps in the development of an accurate molecular genetic diagnostic test

1. Determine if the disease is of genetic or environmental origin or both.
2. Determine the inheritance pattern of the disease (dominant, recessive, sex-linked or polygenic). Once the mode of inheritance is known, more informed decisions can be made about which individuals are compatible for breeding.
3. Any experimental approach to identify markers for a disease gene requires samples for the isolation of the genetic material from both affected and unaffected dogs. Large families of three or more generations are ideal for many approaches, particularly if they include several affected members. The cooperation of many breeders/owners in sample collection is key to the success of this type of study.
4. The canine disease is compared to similar diseases in other species, most often humans, to determine if there are any possible candidate genes (i.e., genes that are known to be involved in these similar diseases or in the normal processes affected by the disease may offer important leads).
5. Various types of linkage tests have been most successful for identifying genetic markers located close enough to disease genes to be useful in diagnostic tests.
6. Searches for markers of disease genes can be done without genetic maps of the relative order and distance between markers, but will be more efficient as maps with small distances between markers (high resolution maps) become available in the future.
7. Maps of evenly spaced and highly informative (variable) markers for the breed under study make identifying a marker for a disease most efficient.
8. As markers flanking and successively closer to the disease gene are identified, the accuracy of a diagnostic linkage test is improved, but even relatively distant markers give some predictive information.
9. Identification of markers that flank the disease gene very closely make cloning the gene possible.
10. Once a disease gene is cloned, an extremely accurate diagnostic test known as a direct test (where the actual gene mutation is examined) becomes possible and the disease gene can be studied to determine how it causes the disease process. At this point, it becomes possible to rid the breed of this particular disease very rapidly.

Complete article can be found http://www.beaconforhealth.org/Inherited-Disease.htm

Eye Certification Examination
C.E.R.F (Canine Eye Registration Foundation)

An important step in being an informed breeder includes annual CERF examinations on all of your breeding stock. Puppies should also be examined for early onset eye diseases. During a routine eye certification examination, a board certified veterinarian whom specializes in ophthalmology will dilate the pupils of the dog with eyedrops called tropicamide. The CERF examination consists of indirect ophthalmoscopy looking for major abnormalities as well as a slit-lamp biomicrocope. This will locate corneal, lens and anterior chamber abnormalities. The eyes and associated structures are evaluated for disease using instrument to measure eye pressure, check for cornea and lens disease and determine the retinal health. The tropicamide drops usually keep the pupils dilated for 6-8 hours.

After the examination, the veterinarian will complete the CERF form and indicate any abnormalities found. This eye examination is good for one year from the date of the examination. Yearly re-examinations are important to maintain certification. In order to have your dogs registered with CERF they must have permanent identification, i.e. – microchip, tattoo or DNA profile. It is not necessary to register your dog with CERF, but it is imperative to have the examination done. Original CERF registration is $10.50, recertification is $8.00.

Breeding advice is based on guidelines established by the genetics committee of the American College of Veterinary Ophthalmologists. The genetics committee derives its guidelines from recent research and standards. There are certain ocular disorders the genetics committee recommends against breeding in all dogs because these conditions have evidence of heritability and frequency of blindness. Some of the heritable ocular disorders are: cataracts, lens luxation or subluxation, glaucoma, persistent hyperplastic primary vitreous, retinal dysplasia, retinal detachment, progressive retinal atrophy, and optic nerve coloboma.

It is important to note that heredity is not the only cause for some of the above listed disorders. Nutrition and trauma are two influencing causes, as well as systemic disease. Also, these examinations cannot identify clinically clean dogs who are carriers of genetic abnormalities.

Link: www.vmdb.org/cerf.html