COLRC UNLEASHED

Volume 33 Issue 5 A publication of the Central Ohio Labrador Retriever Club May 2022

2022 Meeting/Event Dates

Meeting: Wednesday, June 8
6:30p.m.
At the home at the home of Jan Eichensehr
Burgers + Baked Beans for Picnic Dinner
Please bring a side dish to share!
B.Y.O.B.

Meeting/Event Dates

June 8	**Wednesday**
July 6	**Wednesday**
September 7	**Wednesday**
October 5	**Wednesday**
November 2	**Wednesday**
December	**TBA**

Inside This Issue:

Check out Central Ohio Labrador Retriever Club on Facebook
https://www.facebook.com/groups/575516432535825/

Next COLRC Meeting

Wednesday, June 8, 2022

COLRC Meeting & Puppy Match

Steve Hrinko Judge

John Bentine Steward

Topics for Discussion at meeting:

- 2022 Specialty Wrap-Up
- Health Clinic Report
- Treasury Report
  - ◊ Future Programs/Projects for 2022/2023

Awarding/retirement of the David Gerhan Trophy.

Winner is "Billy" owned by Nicole & Beth McCarthy, Piccadilly Labradors

Health Clinic Report

Our annual health clinic was held at Dr. Mann's veterinary clinic on May 1. After a two year lay off due to COVID, we were back and saw many of our regulars. We did not have the numbers of dogs that we have had in the past, but did do 59 heart exams and 56 eye exams.

Many thanks to my two vital helpers from the club.....Brian Tipton and Linda Bednarski. Linda deals with the money, which I hate and Brian did a little of everything as needed. Due to last minute unforeseen circumstances, we lost one of our workers but it all worked out because Brian was everywhere helping with whatever we needed. Dennis also helped with eye drops early in the day. Bill Cox is not a club member, but is also a tremendous help, steadying dogs for Dr. Metzler during eye exams. (Although I used the word steadying, it sometimes is more like wrestling :)

Next year, I hope for a few more dogs. My heartfelt thanks to those who helped .

~Jennifer

Litter Listings

2 year old black female "Dottie"

crate trained, lead trained, UTD on all vaccines and preventatives
very sweet, smaller girl

Contact: Jennifer Stotts

Down 'n Backs

GCH ClearCreek Second to None
BOSS Hoosier LRC
3-27-22
BOB specialty Midwest LRC
4-2-22
BOB specialty Midwest LRC
4-3-22
Owner: Jennifer Stotts

Shannon's Back in Black
BOS in sweeps Midwest LRC
4-2-22
BOS in sweeps Midwest LRC
4-2-22
Owner: Jennifer Stotts

Captain Nick's Kon Tiki
Medina Swarm Agility Club
4-11-2022
Intermediate Trick Dog Title
Owner: Christine Nickerson

Captain Nick's Kon Tiki
Carnation City Kennel Club
5/7/22
Winners Bitch & BOW
Owner: Christine Nickerson

Captain Nick's Barnacle Bill
Carnation City Kennel Club
5/7/22 & 5/28/22
Winners Dog & Best of Winners
Owner: Christine Nickerson

Captain Nick's Ship's Belle
Medina Swarm Agility Club
4-23 & 24-2022
Qualified 3 of 4 Agility Runs
Owner: Christine Nickerson

Comparative Orthopaedic Research Laboratory

Canine Genetic Testing

Genetic testing for cruciate ligament rupture in the Labrador Retriever

We are now able to undertake genetic testing for risk of cruciate ligament rupture in pure-bred Labrador Retrievers. Briefly:

- Cruciate ligament rupture in dogs is a painful, debilitating, and expensive disease
- Between 5-10% of Labradors rupture their cruciate ligaments within their lifetime
- Using DNA from a saliva or blood sample, we can now predict whether your dog is at high risk of cruciate ligament rupture
- We can determine genetic risk, meaning that even if a dog is at high risk for cruciate ligament rupture, there are treatments that can help mitigate clinical risk

Why test your Labrador Retriever?

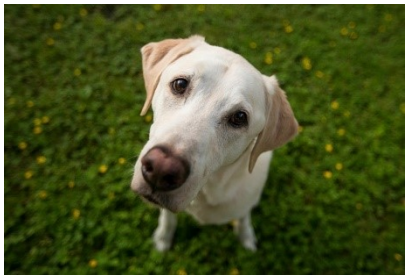
- **Pet dogs:** Gold-standard treatment for cruciate ligament rupture costs between $4,000-$7,000 per affected knee. At least 50% of dogs that rupture one knee's cruciate ligament will go on to rupture the other side. Treatment is undertaken to decrease debilitating and painful arthritis. Knowing your dog is at risk for cruciate ligament rupture will enable you to work with your veterinarian to help minimize risk and monitor for disease initiation.
- **Athletic dogs:** Early intervention has been repeatedly shown to provide the best outcomes for dogs. Performance or working dogs at high risk for cruciate ligament rupture should be closely monitored for early "pre-clinical" disease, such that any necessary treatment can occur early in the disease process to maximize function and minimize development of osteoarthritis.
- **Breeding dogs:** Cruciate ligament rupture is a heritable disease. Understanding risk of disease development in breeding dogs should be considered in breeding decisions. Just as ocular examinations and hip radiographs are obtained before breeding, genetic risk for cruciate ligament rupture can help minimize disease risk in the breed.
- **Puppies:** Individuals looking to buy a new puppy, particularly a puppy intended for hunting or athletic work, can request or order testing to help minimize the risk that their new dog will develop cruciate ligament rupture.

How much will this cost?

- Testing is expected to cost ~$250 per dog

Why is does this cost more than other genetic tests available for dogs?

- Most other genetic screening currently available for the dog tests for Mendelian recessive or dominant disease conditions, meaning the tests look for a single mutation in a single location in a dog's DNA code to say whether a dog has a disease-causing genetic mutation or not. These diseases are typically rare conditions.
- Cruciate ligament rupture is a common complex disease in dogs. Complex diseases have both genetic and environmental factors that contribute to risk where the genetic contribution is defined by the heritability of the disease. This is one of the first genetic tests for a common complex disease in dogs, which means instead of checking just one part of a dog's DNA, we need to evaluate many genetic markers across the genome and analyze the results using bioinformatics to predict disease risk for each dog.



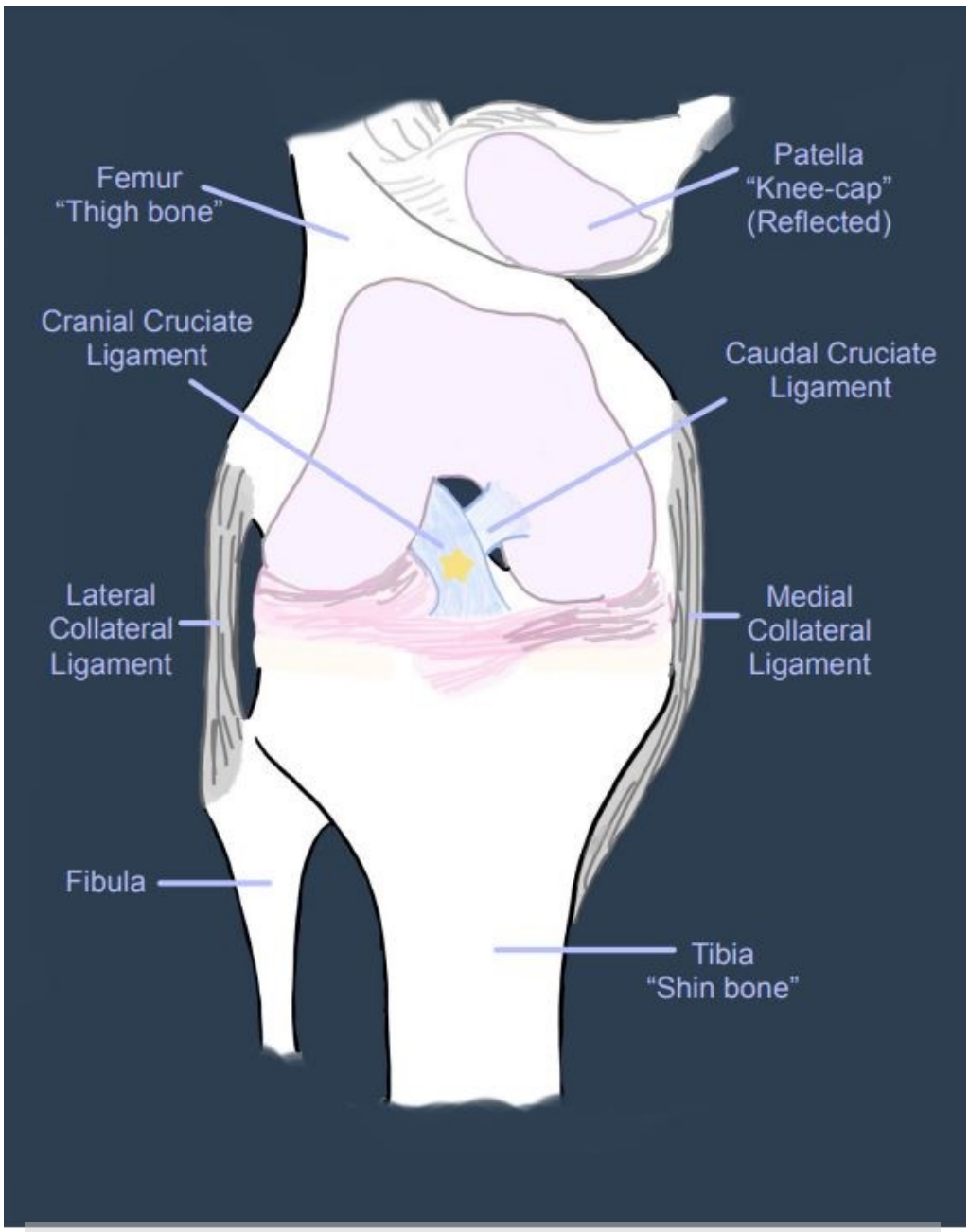
What will results mean?

- **Our test is very accurate, and owners will receive a report categorizing their dog's risk.**
  - ◊ Predicted to be a case: A dog found to have marker genotypes that predict it to be a case is very likely to experience cruciate ligament rupture. However, environmental intervention may help prevent this from occurring.
  - ◊ Predicted to be a control: Dogs found to have marker genotypes that are protective from cruciate ligament rupture are unlikely to rupture their cruciate ligaments. However, this does not eliminate of the possibility that they will rupture a cruciate ligament if the dog has other environmental factors that can contribute to disease development.
- Cruciate ligament rupture has both genetic and environmental risk factors. For dogs predicted to develop disease, early interventional changes in lifestyle may be able to help minimize overall risk for disease development.

Learn more below!

Background: the cruciate ligament

Both dogs and humans have knee joints, although in dogs these joints are referred to as the stifle rather than the knee. Just as in people, dogs have two cruciate ligaments in each stifle. In dogs, these ligaments are called the cranial cruciate ligament and the caudal cruciate ligament. In humans, these ligaments are called the anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL). The difference in names is simply because dogs walk on 4 legs and humans walk on 2 legs. Most people know someone who has ruptured their ACL or seen an athlete injury their ACL during sport. What many people don't appreciate is that the risk of people injuring their ACL is also influenced by genetics. In dogs, the role genetics plays in risk of cruciate ligament rupture in certain breeds is better defined than in people.



The anatomy of the knee. The cranial cruciate ligament is highlighted with a star.

When we discuss cruciate ligament rupture here, we are referring to the cranial cruciate ligament, which is like the ACL in people. However, it is important to realize that in dogs that rupture their cranial cruciate ligament, the caudal cruciate ligament is often also damaged.

Cruciate ligament rupture is a disabling disease that is common in many breeds of dog. Breeds with particularly high risk of cruciate ligament rupture include the Labrador Retriever, Rottweiler, and Newfoundland breeds amongst others. This disease is an economically important condition across the world and a very large number of dogs are treated surgically each year to manage lameness and stifle instability associated with cruciate ligament rupture. Cruciate ligament rupture is an acquired disease that usually develops when the dogs are at least several years old. Many older dogs experience disability and osteoarthritis of the stifle because of cruciate ligament rupture.

Background: genetic testing

Routine use of genetic testing for cruciate ligament rupture screening of dogs from high-risk breeds would be a very valuable advance. Knowledge of whether individual dogs had high or low genetic risk for developing cruciate ligament rupture would be valuable for selection of dogs for breeding, pre-purchase examination of puppies at the time of sale, and for personalized veterinary care of dogs to mitigate risk of developing cruciate ligament rupture in dogs have not yet developed cruciate ligament rupture but have a predictive test indicating high genetic risk.

Currently available genetic tests for the dog screen for simple diseases, meaning they look for a specific DNA mutation that results in a dog either having a disease or being a carrier for a disease, depending on whether the disease has a simple dominant or recessive mode of inheritance. Unfortunately, most common diseases in dogs, like cruciate ligament rupture, are complex diseases. A complex disease is the result of hundreds to thousands of genetic variants that occur through an animal's genome, in addition to environmental risk factors. Until now, genetic testing for complex diseases in the dog has not been feasible.

Genetic contribution to cruciate ligament rupture

Our laboratory has focused on the Labrador Retriever. Over several years we have recruited many dogs to our genome-wide association study (GWAS) project with community support. We have collected DNA on more than 1,000 Labrador Retrievers who have all been closely screened for the presence or absence of cruciate ligament rupture. Using what is termed SNP (single nucleotide polymorphism) marker genotyping, we then looked at markers throughout the genome (DNA code) for each dog. This data set has allowed us too accurately estimate what is termed heritability. In the Labrador Retriever, heritability of cruciate ligament rupture is 0.62±0.1. This means that 62% of the risk of developing cruciate ligament rupture is genetic, with the remaining 38% of risk arising from environmental factors, such as body condition, for example.

Our research has shown that the genetic risk of cruciate ligament rupture in the Labrador Retriever is made up of thousands of genetic variants across the entire genome. Each individual variant in an animal's genome generally has small to moderate effects on disease risk that act additively. If an individual dog is born with many DNA risk variants acting together, then genetic risk of developing cruciate ligament rupture will be high.

Genetic testing for risk of cruciate ligament rupture in the Labrador Retriever

We are now able to undertake genetic testing for cruciate rupture in Labradors, which is complex diseases with high heritability, as we have a sufficiently large reference population made up of the 1,000 Labradors mentioned above. To undertake testing, we will collect a DNA sample, obtained from cheek swab saliva or a blood sample. SNP marker array genotyping (Illumina CanineHD BeadChip) is then performed. The SNP marker data from the reference population is then used to predict whether a dog will develop cruciate ligament rupture. Using our reference population, our predictive testing has an accuracy of ~98% for predicting Labrador Retrievers as a cruciate ligament rupture case or control.

Because the genetic screening test only uses SNP markers and sex of the dog, testing can be performed on dogs of any age including young puppies. In this scenario, the puppy will not yet have

developed the disease. Predictive testing as a cruciate ligament rupture case means that the individual dog has high genetic risk for the disease. In such dogs, health management should focus on addressing environmental risk to minimize the likelihood that cruciate ligament rupture will develop later in life.

With regards to breeding, consistent breeding of Labrador Retrievers with low genetic risk of cruciate ligament rupture will lead to reduced disease prevalence in the population over time. Because cruciate ligament rupture is a complex disease, affected dogs may still have a sire and a dam that never develop the condition. However, breeding dogs with high genetic risk means that it is more likely that their puppies will also have high genetic risk and develop cruciate ligament rupture during their lifetime.

Genetic testing for risk of cruciate ligament rupture in other high-risk breeds

Currently, we can only offer genetic testing for cruciate ligament rupture in the Labrador Retriever. Our current research is focused on extending this testing to other high-risk breeds. This is a challenging research problem, but we are optimistic that we can develop predictive testing without having to spend many years build a large reference population for each breed of interest. We are currently working on developing across-breed predictive testing for the Rottweiler and the Newfoundland breeds.

Implementation of genetic testing for cruciate ligament rupture in the Labrador Retriever

We are now setting up this genetic testing service at the School of Veterinary Medicine, University of Wisconsin-Madison. We welcome expressions of interest or questions about this important development in the Comparative Genetics and Orthopaedic Research Laboratory at the University of Wisconsin-Madison.

Questions or interest in genetic testing for cruciate ligament rupture in Labradors

Please contact SVM Genetics – genetics@vetmed.wisc.edu

Pictures from the Specialty

Thank you Sue Frazier and Lori Bentine

General COLRC Information

The **UNLEASHED!** is a publication by and for the members of the **Central Ohio Labrador Retriever Club** and others interested in the betterment of the sport and advancement of cooperative communication within the Labrador community and the dog fancy.

The articles and information contained in this publication have been deemed by the editor to be of interest to our readers but do not necessarily reflect the beliefs or the opinions of the editor or COLRC members. Reader input is actively solicited.

Please address or email all articles, announcements, comments and suggestions to newsletter@colrc.com . Unleashed is published ten to twelve times per year. Closing for each issue is the 20th day of the month prior to publication.

Dues are $25 annually for a single membership and $40 for a joint membership. Business cards will be placed on the COLRC website for the year at a cost of $50 for members and non-members.

Club members who wish to utilize the Litter Listing Column of the newsletter and website will be required to pay $50 per litter listing unless they have worked at two of our three club events during the course of the year.

Meetings General meetings shall take place the first Wednesday of every month unless otherwise noted.

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