



Identifying Genes Associated with Cruciate Rupture in Labradors

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Rupture or tear of the cranial cruciate ligament (CCL), a major structural component of the canine knee, is one of the most common orthopedic conditions in dogs. Partial or complete CCL tears are responsible for about 20 percent of all cases of canine lameness. Clinically, a CCL tear is painful and debilitating and can be associated with poor mobility. Treatment recommendations typically involve costly surgery and prolonged recovery times.

Though CCL rupture occasionally occurs as a result of trauma (contact injury), it occurs most commonly independent of contact trauma. Genetically, CCL rupture is a complex trait, which means that multiple genes contribute to the risk of developing the condition and the genes that contribute to risk of CCL rupture may vary between breeds. To date, specific gene mutations that contribute to this condition have not been identified.

Morris Animal Foundation-funded researchers from the University of Wisconsin are looking for genes that have a causative role in CCL rupture. They are collecting DNA samples from Labrador Retrievers, a high-risk breed, to help pinpoint genomic regions that contribute to this condition. The dogs are separated into two groups, dogs with CCL rupture and control dogs for data comparison. Control dogs undergo a clinical examination and radiographic screening to ensure that they are not affected with CCL rupture.

So far, researchers have obtained data from 193 Labrador Retrievers (80 dogs with CCL rupture and 113 control dogs) and anticipate the recruitment of 50 additional dogs into the study over the next few months. The researchers have also begun statistical analysis to look for genetic markers of CCL rupture, which will help them achieve their goal of developing a genetic screening test. So far, they have identified more than 75 genomic regions of interest associated with the CCL rupture trait and have submitted a patent based on these discoveries. Preliminary results suggest that the genetic contribution to CCL rupture consists of many variants that have small effects on the risk for developing CCL rupture. Consequently, genetic screening for at-risk dogs is likely to require genomic analysis.

Although this initial study focuses on Labrador Retrievers, the findings will ultimately benefit all breeds affected by CCL rupture, including but not limited to, Newfoundlands, Rottweilers, Boxers, Bulldogs, Golden Retrievers, German Shorthaired Pointers, St. Bernards and Alaskan Malamutes. Genetic screening will enable early identification and improved clinical management of at-risk dogs as well as selective breeding to reduce disease incidence, particularly in breeds in which the condition is prevalent. (D13CA-020)