RESEARCH PROGRESS REPORT SUMMARY

Grant 02624: Embracing Polygenicity of Common Complex Disease in Dogs: Genome-wide Association of Cruciate Ligament Rupture

Principal Investigator:	Peter Muir, BVSc, PhD
Research Institution:	University of Wisconsin, Madison
Grant Amount:	$154,116
Start Date: 5/1/2019	**End Date:** 4/30/2022
Progress Report:	Mid-Year 1
Report Due: 10/31/2019	**Report Received:** 1/27/2020

(The content of this report is not confidential and may be used in communications with your organization.)

Original Project Description:

Cruciate ligament rupture (CR) is a common disabling, degenerative condition of the knee. It places a large financial burden on the American public. Inflammation of the stifle and fraying of cruciate ligament fibers, particularly in the cranial cruciate ligament, eventually leads to ligament rupture with associated stifle instability in affected dogs. CR is a moderately heritable, complex disease with genetic and environmental risk. CR is common in certain breeds, such as the Labrador Retriever, and rare in other breeds. There is a critical gap in knowledge regarding the genetic contribution to CR, as the number of genes influencing disease risk has never been studied in detail. Our main goal is to comprehensively analyze the genetic features of the disease across the genome and use this knowledge to develop a genetic test for CR disease risk using genomic prediction. We aim to robustly estimate heritability, analyze the genetic architecture of CR, and advance genetic testing using genomic prediction in the Labrador Retriever, the most common purebred dog breed. The rationale for this work is that detailed knowledge of the genetic features of CR will advance development of a genetic test for CR risk using genomic prediction. This work will fundamentally advance knowledge of the genetic architecture of CR, a very common canine disease. Consequently, such knowledge will provide an invaluable guide to future research into other canine complex diseases. CR genetic testing would enable early identification of at-risk dogs for precision medical care, and selective breeding to reduce the disease burden.

Publications: None at this time.

AKC Canine Health Foundation, Inc. • 8051 Arco Corporate Drive, Suite 300 • Raleigh, NC 27617 • 888-682-9696 • www.akcchf.org

Page 1 of 2

Presentations: None at this time.

Report to Grant Sponsor from Investigator:

We have met our recruitment trajectory for this study during the first six months of the project. We will continue to work hard to recruit additional dogs over the coming months. Dog DNA is currently being prepared for genotyping. Our final dataset will include at least 899 Labrador Retrievers for updated genome-wide association study (GWAS), heritability, and genetic architecture analyses. We anticipate being able to include more than the ~1000 Labrador Retriever dogs in our final data set with ongoing recruitment over the next nine months. We are extremely grateful for the outstanding engagement with this project by the community of Labrador Retriever owners and breeders that we work with.

AKC Canine Health Foundation, Inc. • 8051 Arco Corporate Drive, Suite 300 • Raleigh, NC 27617 • 888-682-9696 • www.akcchf.org

Page 2 of 2