



RESEARCH PROGRESS REPORT SUMMARY

Grant 01937-B: Evaluating the Complex Genetic Basis of Bloat

Principal Investigator: Dr. Elizabeth A Rozanski, DVM

Research Institution: Tufts University

Grant Amount: \$251,097.00

Start Date: 1/1/2014 **End Date:** 12/31/2016

Progress Report: End-Year 3

Report Due: 12/31/2016 **Report Received:** 12/16/2016

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Original Project Description:

Gastric dilatation and volvulus (GDV), or bloat, is a common condition in large and giant breed dogs with an unacceptably high morbidity and mortality rate. Due to the importance of GDV in many dog breeds, several previous studies have investigated potential risk factors for the development of GDV. It is known that there is no single cause for GDV, rather its occurrence is multifactorial, with both genetic and environmental factors likely contributing. This study will allow for further investigation of how these risk factors cause GDV through the application of genomic and molecular methods. Samples from purebred dogs with GDV will be analyzed and compared to control dogs of similar age and breed that have not developed GDV. A genome wide association study (GWAS) will help to identify differences in the genetic makeup of dogs with GDV, and see which genes are turned on and off in GDV (epigenomics). The study will also determine if dogs with GDV have different types or amounts of proteins, hormones and other molecules in their blood and tissues (transcriptomics, proteomics and metabolomics). The investigators hypothesize that only when all of this information is considered together (genomic, epigenomic, transcriptomic, proteomic and metabolomic) will we truly understand what causes GDV, and guide more effective preventive and treatment strategies.



Grant Objectives:

1. To establish a biobank (a repository of biological samples with associated data) for use in this and future GDV research.
2. To identify susceptibility genes for GDV through a discovery genome-wide association study in German shepherd dogs and a validation study in other purebred dogs with GDV.
3. To perform gene expression profiling (transcriptomics) in blood and target cells/tissues (PBMCs, gastric smooth muscle and gastric ligaments), and compare gene expression between dogs with GDV and control dogs.
4. To identify epigenetic modifications associated with differential gene expression in GDV, specifically evaluating DNA methylation and histone modification.
5. To perform proteomics using Millipore multiplex assays for evaluation of key cytokines and gastrointestinal hormones for comparison between dogs with GDV and control dogs.
6. To characterize the metabolome in dogs with GDV.

Publications:

None at this time.

Report to Grant Sponsor from Investigator:

This study is progressing well with over 500 affected dogs enrolled. Due to some health issues with our collaborators, and a move by another investigator, data collection has been slower than we would like, particularly for the sub-groups. We feel confident that more samples will strength the ultimate results.