RESEARCH PROGRESS REPORT SUMMARY

Grant 02318: Genetic and Environmental Risk for Lymphoma in Boxer Dogs

Principal Investigator: Lauren Trepanier, DVM PhD

Research Institution: University of Wisconsin, Madison

Grant Amount: $112,861.00

Start Date: 1/1/2017 **End Date:** 12/31/2018

Progress Report:

Report Due: 12/31/2017 **Report Received:** 3/15/2018

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Original Project Description:

Lymphoma is a fatal cancer of the blood cells that can occur in any dog. Lymphoma is more common in Boxers, Golden Retrievers, and several other purebreds, which suggests involvement of inherited genes. Recent research has focused on gene mutations in the tumors of dogs with lymphoma. However, we do not understand why these mutations accumulate in certain dogs, and this understanding is essential for disease prevention. Canine lymphoma resembles Non-Hodgkin lymphoma (NHL) in humans, which is more common in industrialized countries and is associated with chemicals found in tobacco smoke, certain household products, pesticides, herbicides, and fungicides. Glutathione-S-transferases (GSTs) are enzymes that can break down toxic chemicals in the body and prevent tumor mutations. Inherited gene defects in the 3 major GST enzymes, GST-theta, GST-pi and GST-mu, each increase NHL risk, and simultaneous defects in more than one enzyme further increase NHL risk.

The investigators have characterized two GST-theta enzymes in dogs, and both have defective gene variants. So far, their findings suggest one variant is a risk factor for lymphoma in dogs of varying breeds. However, the genes for canine GST-pi and GST-mu enzymes have not yet been explored. This research will determine whether defective GST genes along with certain household and yard chemicals are associated with lymphoma in dogs, with a focus on the high-risk Boxer breed. The overall goal of this study is to identify combinations of genes and environmental chemicals that contribute to the development of lymphoma in dogs, so that better cancer prevention strategies can be developed.

Publications: None at this time.

Presentations: None at this time.

Report to Grant Sponsor from Investigator:

Our goal for this study is to determine whether GST genes, which defend against environmental chemicals that could cause cancer, are more defective in the boxer breed and are a risk factor for developing lymphoma in this breed. We are actively recruiting dogs from two groups across the country: boxers with lymphoma at any stage of treatment, and healthy boxers 10 years of age or older (with no lymphoma or other systemic cancer), for DNA cheek swabs and an environmental questionnaires.