



## RESEARCH PROGRESS REPORT SUMMARY

**Grant 02297-MOU:** Understanding the Genetics of Hepatic Copper Toxicosis in the Dalmatian

**Principal Investigator:** Andrew Mason, PhD  
**Research Institution:** University of Alberta  
**Grant Amount:** \$100,000.00  
**Start Date:** 3/1/2017      **End Date:** 8/31/2019  
**Progress Report:** End-Year 2  
**Report Due:** 2/28/2019      **Report Received:** 3/22/2019

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### **Original Project Description:**

Copper toxicosis, leading to early death from liver disease, was first described in Bedlington Terriers in 1975, with similar diseases described in other dog breeds including the Labrador Retriever, West Highland White Terrier, Skye Terrier, and Doberman Pinscher. Genes have been linked to copper toxicosis in the Bedlington Terrier and the Labrador Retriever, but the genes differ by breed. In most breeds the genes are not known. Copper toxicosis was considered rare in the Dalmatian but may be more common than previously believed. Symptomatic dogs may be misdiagnosed as having other liver diseases, never appropriately diagnosed or only diagnosed with copper overload at a terminal stage. The investigators aim to identify the faulty gene(s) in Dalmatians using an advanced whole genome sequencing strategy to obtain the genome sequences of carefully selected members of an affected Dalmatian pedigree. Identification of the problem gene is the first step towards genetic testing and to improved breeding practices necessary to eradicate hepatic copper toxicosis from the Dalmatian breed. Gene identification will help raise awareness of copper toxicosis in the Dalmatian breed, lead to more rapid diagnosis of the condition, and support the search for the most effective therapy.

*Funding for the research is provided through the efforts and generosity of the Dalmatian Club of America and Dalmatian Club of America Foundation. The AKC Canine Health Foundation supports the funding of this effort and will oversee grant administration and scientific progress reports.*

**Publications:** None at this time.



### **Presentations:**

Twedt DC. Hepatic Copper Storage Disorder in the Dalmatian. Dalmatian Club of America, Betty Garvin Memorial Speaker Series, Colorado Springs, USA. May 9, 2018 (ORAL).

Macintyre G, Stothard P, Twedt D and Mason AL. Understanding the Genetics of Hepatic Copper Toxicosis in the Dalmatian. GI Research Day, Division of Gastroenterology, Medicine, Faculty of Medicine & Dentistry, U Alberta, Edmonton, Canada. May 1st, 2018 (POSTER)

Macintyre G, Stothard P, Twedt D, and Mason AL. Hepatic copper toxicosis in the Dalmatian: analyses of known canine CT-associated genes. Annual City-wide GI Research Day on Tuesday, April 30, 2019. Hosted by the Division of Gastroenterology, Medicine, Faculty of Medicine & Dentistry, U Alberta, Edmonton, Canada (submission in preparation).

### **Report to Grant Sponsor from Investigator:**

Dalmatians may be at risk of inheriting a rare copper storage disorder of the liver, canine copper toxicosis (CT). CT can be fatal and can quickly spread through a pedigree if left unmanaged. The disease is known to affect several breeds, including the Bedlington Terriers and Labradors. The problem genes have been identified in these two breeds. Many dogs respond to copper chelation therapies. It is important to catch dogs early in their disease process, even before symptoms appear. A genetic test can help identify dogs-at-risk early in the disease process. The test can also help to reduce the spread of problem genes by enabling breeders to make informed choices prior to breeding carriers of CT-associated genes.

We are working with the DCA Copper Storage Disorder Study Group (CSDSG) to try to understand the extent of the problem in Dalmatians in the US and Canada. Early indications are that the CT is an inherited condition, as in other breeds, but we need more information to be sure. Our goal is to find the culprit gene, or genes, with a view to understanding the disease, to develop a genetic test to improve the lives of affected dogs, and to help eradicate CT from the Dalmatian breed.

We would like to thank the CSDSG, DCA and CHF for the opportunity to evaluate CT in the Dalmatian breed, and all the concerned breeders who have committed funds and information in support of these studies. The opportunity to join our study is ongoing. Knowledge is power, and information on your dog and its relatives might be all that we need. For further information, please contact our study coordinator, Dr. Georgina Macintyre, at [gm3@ualberta.ca](mailto:gm3@ualberta.ca).