



## RESEARCH PROGRESS REPORT SUMMARY

**Grant 02806-MOU:** Strategic Prevention of Canine Hemangiosarcoma: Lifetime Follow-Up

**Principal Investigator:** Jaime Modiano, VMD, PhD  
**Research Institution:** University of Minnesota  
**Grant Amount:** \$269,238.00  
**Start Date:** 8/1/2020      **End Date:** 7/31/2024  
**Progress Report:** Mid-Year 2  
**Report Due:** 1/31/2022      **Report Received:** 1/29/2022

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### **Original Project Description:**

The Shine On project is designed to utilize complementary technologies to reduce the impact of hemangiosarcoma in companion dogs. This novel, potentially disruptive approach is the first of its kind where artificial intelligence applied to the results of a blood test will be used to assign dogs to a risk category for the development of hemangiosarcoma. The test, called the Shine On Suspicion (SOS) Test is designed to detect hemangiosarcoma at its earliest stages of development before it becomes a clinically-detectable disease. Dogs that are considered to be at high risk based on the SOS Test results will be eligible to receive the drug eBAT for strategic prevention; that is, to eliminate emergent hemangiosarcoma tumors before they form. eBAT is a rationally designed drug developed in the laboratory to attack the cells that initiate and maintain the cancer, as well as to make the environment inhospitable for their growth. For the initial phase of the Shine On project, investigators developed and refined the SOS Test and the artificial intelligence methods to assign dogs to specific diagnostic categories and started to establish the utility of the test in early detection in a group of 209 presumably healthy, pedigreed Golden Retrievers, Boxers, and Portuguese Water Dogs, 6 years of age or older. In this continuation phase of the Shine On project, this group of dogs that had the SOS Test will be followed for their lifetimes to identify any diagnosis of cancer or another chronic disease, the cause of death, and date of death. In addition, a subset of dogs determined to be at high risk using the SOS Test will receive eBAT in the setting of prevention and also followed over their lifetime to establish their outcomes. This project expects to develop firm proof of concept to support larger clinical trials, and eventual deployment of this approach to the veterinary community setting for all dogs at risk of developing hemangiosarcoma.



Funding for the research is provided through the collaborative efforts and generosity of the American Boxer Charitable Foundation, the Golden Retriever Foundation, the Portuguese Water Dog Foundation and the AKC Canine Health Foundation, which will oversee grant administration and scientific progress.

### **Publications:**

DePauw TA, Khammanivong A, Schulte AJ, Winter AL, Lewellen M, Kim JH, Stuebner K, Vallera DA, Cutter GR, Borgatti A, Dickerson EB, Henson MS, Modiano JF. Identification of hemangiosarcoma-associated cells in liquid biopsies for early detection. Manuscript in preparation. (This was previously reported. We are still working on the paper).

### **Presentations:**

DePauw TA, Khammanivong A, Modiano JF. (2020). Machine Learning for Early Detection of Hemangiosarcoma. Proceedings of the Annual Meeting of the Veterinary Cancer Society (virtual). Abstract was selected for an oral platform presentation by Taylor DePauw.

Modiano JF, DePauw TA, Khammanivong A, Schulte AJ, Winter AL, Kim JH, Stuebner K, Fahrenkrug AM, Vallera DA, Borgatti A, Dickerson EB, Henson MS. (2020). Early detection for strategic prevention of a terminal canine cancer: A model to reduce the impact of cancer in our society. (Abstract 4592). Proceedings of the Annual Meeting of the American Association for Cancer Research (Conference was conducted virtually due to COVID-19)

DePauw T, Khammanivong A, Lewellen M, Schulte A, Kim JH, Winter AL, Bergsrud K, Chehade A, Pracht S, Stuebner KM, Daniel J, Wolf-Ringwall A, Husbands B, Henson MS, Dickerson EB, Cutter GR, Vallera DA, Borgatti A, Modiano JF. (2021). The Shine On Program for Early Detection and Prevention of Canine Hemangiosarcoma. Proceedings of the Annual Meeting of the Veterinary Cancer Society

Modiano JF. (2021). Cellular Origin and Molecular Vulnerabilities of Canine Hemangiosarcoma – the Next Chapter in Treatment and Prevention. Proceedings of the Annual Meeting of the Veterinary Cancer Society

Modiano JF. Early Detection and Strategic Prevention of Canine Hemangiosarcoma: An Update on the Shine-On Project. A free University of Minnesota/Animal Cancer Care and Research Program Webinar, November 9, 2021 (virtual lecture)

Modiano JF. Changing the Face of Cancer through Effective Prevention. Fetch DVM360 Conference. December 5, 2021, San Diego, CA 2021



**Report to Grant Sponsor from Investigator:**

The goal of this project is to develop a reliable, accessible, and actionable test to identify dogs at risk for hemangiosarcoma during the earliest stages of the disease and to use a strategic, rationally designed approach to prevent its occurrence in these high-risk dogs before it becomes clinically detrimental and life-threatening. The study has two objectives. The first is to determine the most reasonable duration of an SOS test result. In other words, how long can a low-risk SOS test result be trusted and how much time might elapse between a high-risk SOS test result and the development of hemangiosarcoma. The second aim is to continue periodic testing for dogs previously enrolled in the Shine-On study whose test result would have placed them in a high-risk category for the development of hemangiosarcoma and to provide eBAT as a strategy for prevention in 12 of these dogs.

To complete the first objective, we are conducting surveys to determine the health status of every dog enrolled in Shine-On phase-3 (the early detection phase) at 6-month intervals. This effort will continue throughout the duration of the study.

To complete the second objective, we have continued serial testing (2-3 times per year) in a subset of approximately 45 dogs enrolled in the original study. Dogs assigned to the high-risk category that do not have a detectable tumor are eligible for eBAT prevention. Several dogs have completed screening, but so far, all of the dogs assigned to the high-risk category that completed screening were diagnosed with existing tumors. At this time, sixteen dogs are scheduled or in process to be scheduled for additional screening at the University of Minnesota. Dogs that do not have a detectable tumor will be eligible for eBAT prevention.