Personalized Medicine for Canine Mast Cell Tumor Treatment

By Sharon Albright, DVM, CCRT
Manager of Communications & Veterinary Outreach, AKC Canine Health Foundation

Personalized medicine is a concept of great interest in human and veterinary medicine. It examines an individual’s unique molecular and genetic characteristics to determine their susceptibility to various diseases and how they will respond to medical treatments. Thanks to AKC Canine Health Foundation (CHF) funding, researchers at Colorado State University have explored personalized medicine options for treating canine mast cell tumors (MCT), the most common skin tumor of dogs. Since MCTs display a wide variety of biologic behavior – from small, benign growths to fatal, systemic disease – any tools that indicate a tumor’s aggressiveness or identify the most promising medical treatment are valuable for improving the prognosis of affected dogs.

Mast cells are a type of white blood cell found throughout the body that contain histamine, heparin, and enzymes that break down proteins. Normally an important part of the immune system, like all cells, they are susceptible to becoming cancerous when they grow out of control. Many canine MCTs exhibit a genetic mutation affecting a protein normally found on the cell surface, known as c-KIT. The presence of this mutation indicates a more aggressive tumor, but also one that may be more susceptible to treatment with a class of drugs known as KIT inhibitors.

With funding from CHF Grant Q1426: Personalized Medicine for the Treatment of Canine Mast Cell Tumors, researchers explored the potential sensitivity of MCTs with c-KIT gene mutations to KIT inhibiting drugs. They compared the effectiveness of toceranib (a KIT inhibitor sold as Palladia™) and vinblastine (a commonly used chemotherapy drug with a different mechanism of action) in canine MCTs with and without c-KIT gene mutations in a prospective, randomized trial. While progression free survival time was improved in dogs with c-KIT gene mutation that received toceranib, the benefit was not statistically significant and did not carry over into a longer overall survival time. Even though c-KIT gene mutation status may not be useful when deciding continued...

WHERE TO FIND US

May 9-11
Irish Setter Club of America National Specialty, Asheville, NC

June 3-4
Spinone Club of America National Specialty, Loveland, CO

July 17-21
Houston World Series of Dog Shows, Houston, TX

UPCOMING WEBINARS

Register at akcchf.org/vetvine.

May 21
What the Flu! Protecting Dogs and Communities from Canine Influenza Virus.
Presented by: Jason Stull, VMD, MPVM, PhD, DACVPM

July 19
How Mothers Matter: The Influence of Early Maternal Interaction on Offspring Behavior and Development.
Presented by: Emily Bray, PhD

Read the latest update on the FDA Investigation into the Potential Link Between Certain Diets and Canine Dilated Cardiomyopathy at https://www.fda.gov/AnimalVeterinary/NewsEvents/ucm630993.htm
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continued

between treatment with these two drugs, progression free survival time may be a more clinically relevant measure of treatment response, since owners want a good quality of life for their pets after a cancer diagnosis.

Glossary

- Progression free survival time is the length of time during and after the treatment of a disease, such as cancer, that a patient lives with the disease but it does not get worse.
- Overall survival time is the length of time from either the date of diagnosis or the start of treatment for a disease, such as cancer, that patients diagnosed with the disease are still alive.

The same research team also created a novel test for activated KIT enzyme expression that showed some correlation with existing MCT descriptors and demonstrated decreased levels following treatment with the drug toceranib. Since this test can provide information on a tumor’s c-KIT gene mutation status in a relatively short time and using samples routinely collected during tumor biopsy, it may be a valuable tool to predict which patients will respond to toceranib and those that are unlikely to respond and therefore warrant a different treatment approach.

Additional research is needed to refine our understanding of the biomarkers and genetic characteristics that can help us personalize and maximize the efficacy of treatments for canine MCT. With the renewed focus of its Canine Cancer Research Initiative, CHF and its donors are committed to finding and funding the high-quality research studies needed to accomplish this goal. Learn more at akcchf.org/caninecancer and join us as we work toward a future where all dogs can live longer, healthier, cancer-free lives.

Improving the Recognition and Diagnosis of Tick-Borne Disease in Dogs

By Sharon Albright, DVM, CCRT
Manager of Communications & Veterinary Outreach, AKC Canine Health Foundation

Each year, as people and their dogs venture outside to enjoy the warming temperatures of spring, the AKC Canine Health Foundation (CHF) renews its commitment to improve the understanding of tick-borne disease in dogs. CHF’s Tick-Borne Disease Research Initiative was started in 2016 to fund much-needed research on these diseases to find new ways to recognize, diagnose, treat, and prevent them before they become debilitating or even fatal to dogs. More than $650,000 has been invested over the past three years to accomplish this goal, but more help is needed.

Ticks are blood-sucking arthropods found throughout much of North America that feed on mammals such as deer, mice, dogs, and humans. They often carry disease-causing bacteria and protozoa and can transmit these organisms during a blood meal. The Centers for Disease Control and Prevention (CDC) reports that Lyme disease is the most common vector-borne disease (one spread by a blood-feeding insect) in humans and the sixth most common reportable infectious disease in humans, with more than 300,000 people estimated to be infected with Borrelia burgdorferi (the bacteria that causes Lyme disease) each year. The Companion Animal Parasite Council (www.petsandparasites.org) reports that more than 318,000 U.S. dogs tested positive for Lyme disease, over 180,000 tested positive for Anaplasmosis, and more than 160,000 tested positive for Ehrlichiosis in 2018.

With new tick species being discovered in the United States and existing tick populations expanding their geographical range, humans and canines face a tough battle to conquer ticks and the diseases they carry.

The first step in the fight against tick-borne diseases in dogs is improving our recognition and diagnosis of them. CHF’s Tick-Borne Disease Research Study Initiative has provided funding to study the prevalence of Lyme disease in dogs (Grant 02284-A) and the prevalence of the organism that causes American Canine Hepatozoonosis in Gulf Coast Ticks (Grant 02386-A). Peer-reviewed publications have already described the pathogens found in tick populations in Western Tennessee and Southern California, as well as the prevalence of vector-borne pathogens in dogs with immune-mediated disease. (The important relationship between tick-borne disease and immune-dysfunction was also presented in a CHF-sponsored webinar, “Immune-Mediated Hemolytic Anemia (IMHA): Underlying...

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PPCP Donation Is Helping to Advance Canine Health
By Barbara Fawver
Purina Manager of Pet Influential Communications

The Purina Parent Club Partnership (PPCP) Program raised a record $473,829.39 in 2018 to support canine health research funded by the American Kennel Club Canine Health Foundation (CHF). Members of 195 parent breed clubs participated in the program.

The annual donation to CHF, which represents half of the 2018 PPCP earnings, goes to the clubs’ Donor Advised Fund at the AKC Canine Health Foundation to be used for research. A matching amount goes directly to the parent clubs for canine health research, breed rescue and educational efforts to positively impact the general well-being of dog breeds.

“Purina is proud to offer the PPCP Program and to partner with the AKC Canine Health Foundation,” says Ann Viklund, Purina Director of Conformation. “When you look at the wealth of research and the many discoveries this program has helped to support, it is apparent that this work often impacts not only the health of an individual breed but all dogs.”

“The PPCP Program gives clubs the opportunity to support specific areas of health research for their breed,” says Dr. Diane Brown, CEO of the AKC Canine Health Foundation. “We are grateful to Purina for being a longtime partner of the AKC Canine Health Foundation and a true friend to dogs.”

Since it began in 2002, the PPCP Program has provided approximately $8 million for canine health research, breed rescue and educational efforts. Learn more at akcchf.org/ppcp.

Improving the Recognition and Diagnosis of Tick-Borne Disease in Dogs
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Disease Screening in Dogs. What Should I Be Looking For?” available at akcchf.org/vetvine.) Additional CHF grants are exploring better methods to detect Bartonella (Grant 02287) and other disease-causing organisms transmitted by ticks (Grants 02292 and 02528). The data collected will help us understand the impact of tick-borne diseases on dogs, recognize new pathogens, and accurately test for exposure and disease. Only then, can we create appropriate prevention and treatment strategies.

CHF and its donors will continue to find and fund the best research studies to help defend against the continued spread of ticks and tick-borne disease in dogs. Through better diagnostics, treatment options, and prevention strategies, more dogs can live longer, healthier lives free of these insidious infections. Learn more from CHF resources such as webinars, podcasts, and articles, and support the Tick-Borne Disease Research Initiative at akcchf.org/ticks.
Recent CHF-Awarded Grant Highlights

**02653-A: Evaluation of the Serum and Cutaneous Levels of Chemokines in Atopic Dogs**  
Principal Investigator: Domenico Santoro, DVM, MS, DrSc, PhD; University of Florida  
Investigators are evaluating the levels of inflammatory molecules in the blood, cells, and skin of dogs with atopic dermatitis as a new way to monitor response to treatment.

**02614-A: Validation of Fine Needle Aspiration as a Minimally Invasive Sampling Method for Gene Expression Quantification of Pharmacogenetic Targets**  
Principal Investigator: Jennifer M. Reinhart, DVM, PhD; University of Illinois  
Investigators are determining if liver fine needle aspirate can be clinically useful in gene expression measurements for understanding how a dog’s body will respond to various drug treatments.

**02561: Is Gut Dysbiosis Associated with Canine Idiopathic Epilepsy?**  
Principal Investigator: Karen R. Muñana, DVM, MS; North Carolina State University  
Investigators are exploring if alterations in dogs’ gut microbial populations are associated with epilepsy development and outcome.

See our full research grants portfolio at akcchf.org/research.

How You Can Help

**Double Your Donation!**

In 2019, The American Kennel Club (AKC) will match donations from new and lapsed* donors to the AKC Canine Health Foundation (up to $400,000) and donations to CHF’s Canine Cancer Research Initiative (up to $250,000) with an equal donation to CHF for canine health research.

Double your impact and support canine health research today at [akcchf.org/match](http://akcchf.org/match).

*Last gift to CHF was prior to 1/1/18

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