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 <u>CHF Grant 01426</u>: <u>Personalized Medicine for the Treatment</u> of <u>Canine Mast Cell Tumors</u>, 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



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CALENDAR OF EVENTS

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 <u>akcchf.org/vetvine</u>.

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 <u>https://www.fda.gov/</u> <u>AnimalVeterinary/NewsEvents/</u> ucm630993.htm

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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 <u>akcchf.org/caninecancer</u> 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 <u>Tick-Borne Disease Research</u> <u>Initiative</u> 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 diseasecausing 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 Initiative has provided funding to study the prevalence of Lyme disease in dogs (<u>Grant 02284-A</u>) and the prevalence of the organism that causes American Canine Hepatozoonosis in Gulf Coast Ticks (<u>Grant 02386-A</u>). 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

PPCP Donation Is Helping to Advance Canine Health

By Barbara Fawver

Purina Manager of Pet Influential Communications

The <u>Purina Parent Club Partnership (PPCP) Program</u> 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 <u>akcchf.org/ppcp</u>.





From left, Pat Mullen, Purina Vice President, and Ann Viklund, Purina Director of Conformation, present the 2018 PPCP donation to Dr. Diane Brown, CEO, and Dr. Charles Garvin, Chairman of the Board, of the AKC Canine Health Foundation. The presentation was made during the live broadcast of the Westminster Kennel Club Dog Show Feb. 11 on FS1 (Fox Sports 1).

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

continued

Disease Screening in Dogs. What Should I Be Looking For?" available at <u>akcchf.org/vetvine</u>.) Additional CHF grants are exploring better methods to detect *Bartonella* (<u>Grant 02287</u>) and other disease-causing organisms transmitted by ticks (Grants <u>02292</u> and <u>02528</u>). 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 <u>akcchf.org/ticks</u>.



MISSION: The mission of the American Kennel Club Canine Health Foundation, Inc. is to advance the health of all dogs and their owners by funding scientific research and supporting the dissemination of health information to prevent, treat and cure canine disease.

Donor Spotlight



Carolyn and Gary Koch

Carolyn and Gary Koch helped their oldest daughter acquire a Pug when she moved out on her own. After meeting the dog, Carolyn knew she had to have one too! Since then, the Kochs have enjoyed great success with their Pugs in the show ring and the extra affection Pugs bring their family. As long-time supporters of the AKC Canine Health Foundation, they saw the positive impact that CHF-funded research on Pug Dog Encephalitis had on their beloved breed. Following the tragic and unexplained death of their dog Rumble, they found a way to create something positive out of their pain and established the AKC Canine Health Foundation "GCHP Hill Country's Let's Get Ready To Rumble" Clinician-Scientist Fellowship. By supporting the next generation of canine health researchers, the Kochs contribute in their own way to future advancements in canine health and share the joy that dogs bring into their lives. 🤽

Learn about Blastomycosis and Antimicrobial (Antibiotic) **Resistance in Dogs** from CHF's latest infectious disease fact sheets at akcchf.org/tophealthconcerns



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 **Ouantification 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!

AMERICAN KENNEL CLUB

CANINE HEALTH

REVENT TREAT & CURE*

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 <u>akcchf.org/match</u> * last gift to CHF was prior to 1/1/18





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