



AMERICAN KENNEL CLUB
**CANINE HEALTH
 FOUNDATION**
 PREVENT TREAT & CURE®

DISCOVERIES

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MISSION:

The Foundation is dedicated to advancing the health of all dogs and their owners by funding sound scientific research and supporting the dissemination of health information to prevent, treat and cure canine disease.

UPDATE FROM THE CEO

Update from the AKC Canine Health Foundation CEO, Dr. Terry T. Warren

The AKC Canine Health Foundation (CHF) is proud to announce the achievement of a **4-star rating from Charity Navigator**, America's largest independent charity evaluator. This designation is bestowed upon charities that adhere to the highest standards of fiscal management, accountability and transparency. Receiving four out of a possible four stars places CHF in an elite group of charitable organizations that demonstrates a superior commitment to sound governance, quantifiable results and fiscal responsibility. According to Charity Navigator, only a quarter of the charities it evaluates have received its highest 4-star rating.

Discoveries is the **"Best Canine Newsletter for 2012"** as chosen by the Dog Writers Association of America (DWAA). CHF is honored and pleased to receive this recognition from DWAA, the highly regarded professional writing association devoted to encouraging quality writing about dogs in all aspects of their lives.

We are looking forward to the 9th biennial **National Parent Club Canine Health Conference**, August 9–11, 2013, in St. Louis. **Nestlé Purina Petcare Company will once again generously sponsor this conference.** We are pleased to announce Dr. Brian Hare as the keynote speaker. Dr. Hare is renowned for his canine cognition work, and his presentation, "The Genius of Dogs," will offer revolutionary new insights into dog intelligence and the interior lives of our incredibly smart dogs! All AKC Parent Clubs and clubs participating in the Purina Parent Club Partnership Program are guaranteed one conference attendee at the base registration price of \$250. Remaining conference

Story continued on page 4

THIS ISSUE AT A GLANCE

- Champion of Canine Health..... 2
- Why Participation in Canine Health Research Matters 3
- May is Pet Cancer Awareness Month..... 4
- New Acorn Grants..... 5
- CHF Funds Trial for Novel Brain Tumor Medication ... 8
- The Value of Supporting Research Outside of Your Breed..... 9
- CHF is Committed to Groundbreaking Regenerative Medicine Research 11

CHAMPION OF CANINE HEALTH: James T. Stevens

Mr. James T. Stevens is the recipient of the 2012 AKC Canine Health Foundation President's Award. Lee Arnold, chairman of the AKC Canine Health Foundation (CHF), made the announcement at the December 2012 board meeting, stating, "Jim has been an ardent supporter of CHF, and his tenure on the board has benefited the Foundation by implementing sound fiscal policies so that we can continue to advance our mission to help dogs live longer, healthier lives."

Stevens was the chief financial officer at the American Kennel Club for 10 years before retiring in the fall of 2012. From 2002 to 2007 Stevens served CHF as a financial advisor in an informal capacity, before being elected to the CHF board in 2007 and serving five years.

During Stevens' tenure on the CHF board, he helped establish an audit committee, which is charged with assisting the Board of Directors with oversight of the Foundation's financial statements; he was instrumental in hiring KPMG, the Foundation's current auditor; and he provided strategy concerning the Foundation's investments that helped CHF weather the lengthy recession. With Stevens' leadership, CHF gained financial stability and growth, helping position the organization on the forefront of canine health research and education.

In addition to Stevens' contributions as a CHF board member, he has also worked to support health research in his family's breed, Soft-Coated Wheaten Terriers. While never breeding or showing these dogs, Stevens has found them to be exemplary family pets.



"Jim has been an ardent supporter of CHF, and his tenure on the board has benefited the Foundation by implementing sound fiscal policies so that we can continue to advance our mission to help dogs live longer, healthier lives."

This President's Award is presented annually to individuals, clubs or organizations that have made an exceptional contribution to advancing canine health. The chairman of the CHF Board of Directors selects the recipient of this award. The permanent award, designed by Cavalier King Charles Spaniel fancier and sculptress Janet York, is on display in the CHF offices in Raleigh, NC. 🐾



Reason to celebrate!

The Dog Writers Association of America (DWAA) has awarded our *Discoveries* newsletter top prize in their writing competition's "canine newspaper or newsletter" category for 2012.

Thank you for the recognition!

Why Your Dog's Participation in Canine Health Research Matters

In science, progress is measured in small steps along the way to major discoveries. By consistently funding the most innovative research, CHF is realizing both small milestones and major breakthroughs in canine health. All our successes show progress toward our goal to prevent, treat and cure canine disease.

In order to make strides in canine health, researchers depend on help from the dog-owning community. Whether it be participating in a research project where weekly blood-draws are necessary, or in a clinical trial where cutting-edge medications are being utilized to treat a health issue, or providing DNA samples to a bank for use in the research to understand a disease at the molecular level, these are just a few of the ways dog owners can help move canine research forward.

Louise Gregg of Newville, PA, an owner and breeder of Cavalier King Charles Spaniels, has participated in several studies to benefit the health of dogs. She encourages other breeders and pet owners to become involved in clinical trials and to participate in research studies. "Because of research, we have newer, better medications and treatments being developed," said Gregg. "Some people may think that the dogs will become nothing more than 'lab rats,' but that could not be further from the truth." Sometimes a study simply involves providing blood samples and information about your dog. For the studies involving drug trials, "Every precaution was taken with my dogs," said Gregg. "At no time did I feel that my beloved pets were at risk from the drugs being tested. They were closely monitored, and their safety was always put first."

On the CHF website, information can be found on current research studies being conducted throughout the United States. These studies involve a number of different canine health concerns and involve many different breeds. "Participating in the research studies allowed my dogs to be more closely monitored and cared for than I ever would have been able to afford," said Gregg. "And I was happy to be able to contribute to working toward my dogs, and all dogs, living longer, healthier lives."

CANINE HEALTH INFORMATION CENTER (CHIC) DNA REPOSITORY

The CHIC DNA Repository, co-sponsored by the Orthopedic Foundation for Animals (OFA) and CHF, collects and

stores canine DNA samples along with corresponding genealogic and phenotypic information to facilitate future research and testing aimed at reducing the incidence of inherited disease in dogs. DNA samples from any purebred dog may be submitted. There are now over 16,000 samples in the DNA bank from 171 breeds. Any canine health researcher may apply for use of these samples; however CHF-funded studies are pre-approved for sample access. Learn more at the CHIC website, www.caninehealthinfo.org.

CANINE COMPARATIVE ONCOLOGY AND GENOMICS CONSORTIUM (CCOGC)

The CCOGC began as an informal collaboration of veterinary and medical oncologists, pathologists, surgeons, geneticists and molecular and cellular biologists. Together, they sought to leverage opportunities that would result from a better-defined understanding of the genetics and biology of cancers in companion animals, to provide a forum for discussion and sharing of resources and reagents, and to guide the development of novel technologies that would allow the study and use of appropriate canine cancers in the global study of cancer biology and therapy.

The CCOGC collects tissues and fluids from dogs with specific cancer types, following strict guidelines. These procedures ensure all samples are of high quality and can be used consistently across multiple research projects. The samples are accessible to any research project with scientific merit. Learn more about CCOGC and find a collection site near you at the CCOGC website, www.ccohc.net.

Story continued on page 11



May is Pet Cancer Awareness Month

Fifty percent of dogs aged 10 years or older develop cancer at some point during their lives. To help dog owners better understand the treatment options, cutting-edge research and ways to support canine cancer research, the AKC Canine Health Foundation (CHF) kicks off Pet Cancer Awareness Month (PCAM) in May. In this edition of *Discoveries*, learn about clinical trials, the importance of supporting canine health research outside your breed and CHF's funding of a joint grant between the University of Georgia (UGA) College of Veterinary Medicine and Emory University to test a newly developed experimental drug to treat brain tumors in dogs.

"Cancer affects all dogs," said Dr. Shila Nordone, CHF chief scientific officer. "Canine cancer research is a major funding priority of our parent clubs and individual supporters. As stewards of their contributions, we make sure that cancer research continues to be a major component of our research portfolio." Currently, about one third of our grant funding concerns various types of canine cancers. A listing of recently approved grants, four of which are in the Oncology Program Area, can be found beginning on **page 5**.

Since 1995, CHF has funded over **\$9 million** in canine cancer research. This research has provided breakthroughs in treatment options and diagnosis, and has helped scientists study cancer at the cellular level, allowing veterinarians to diagnose cancer earlier and treat it more effectively. CHF-funded research also has a One Health impact, extending beyond dogs with an application to human cancer diagnosis and treatment.



During Pet Cancer Awareness Month, CHF will be posting articles, podcasts and other resources concerning canine cancer to our website and social media pages. If you missed any of our podcasts from PCAM 2012, they can be found by logging on to www.akcchf.org/cancer.

Dog owners and dog lovers are encouraged to take part in the Foundation's goal to help raise funds for canine health research through two special honor and memorial-gift programs. The Celebration Wall is an online photo gallery in memory of much-loved dogs. This memorial is a fitting tribute for dogs that have died from cancer or another disease. www.akcchf.org/celebrationwall.

The Heroes for Health Research pages are custom-built personal donation webpages. Pages can be created for any canine hero – whether it is a dog battling cancer or a dog that has been a great companion. Participants are encouraged to invite family and friends to donate to their page. <http://support.caninehealthfoundation.org/heroes>.

Contributions raised through the Celebration Wall and Heroes for Health Research will help CHF advance the health of all dogs by funding sound, scientific research to prevent, treat and cure canine disease. 🐾



UPDATE FROM THE CEO

(cont. from page 1)

spaces will be available on a first-come, first-served basis for \$500 per attendee. Sign up online today at www.akcchf.org/npcchc.

CHF has just returned from an exciting weekend promoting the Canine Athlete Initiative at the AKC Companion Events Extravaganza in Tulsa, OK. Every participant in the National Rally Competition and the National Obedience and Agility Championships received a *Fit for Sport. Fit for Life.*™ commemorative bandana. Receive your **free bandana today** by making a donation

of \$50 or more to the Canine Athlete Initiative now through June 30, 2013.

Warm congratulations to GCH Banana Joe "Joey" V. Tani Kazari on winning Best in Show at the 2013 Westminster Kennel Club Show. Joey is co-owned by a very loyal supporter of CHF. In one of many gestures of support, Joey was featured in our 2012 calendar that raises funds for canine health research. 🐾

New Acorn Grants

New ACORN research grants are detailed here. For more information about any of these studies, including ways to provide financial support, visit us at www.akcchf.org.

Cardiology Research Program Area

01898-A: Enhancing Diagnosis and Treatment of Cardiomyopathy through Identification of Biological Markers of Disease

Principal Investigator: Dr. Suzanne M. Cunningham, DVM

Institution: Tufts University

Total Grant Amount: \$12,960.00

Grant Period: 2/1/2013 – 1/31/2014

Project Abstract: Cardiomyopathy is a common heart disease associated with irregular heart rhythm (arrhythmia), cardiac dilation or both. The recent discovery of a mutation in the striatin gene in dogs with cardiomyopathy allows us to identify carrier animals that are at increased risk for developing the disease. However, genetic tests are imperfect and genetic screening usually entails a combination of family history, genetic testing, Holter monitoring and echocardiographic findings. Dr. Cunningham hypothesizes that dogs with cardiomyopathy will have increased levels of a cardiac biomarker known as NT-proBNP and inflammatory markers when compared to healthy dogs, and that these changes will be more profound in dogs with cardiac dilation. The results of this study are anticipated to improve our understanding of cardiomyopathy in the dog, and to open exciting new avenues for screening and treatment of affected dogs.

General Canine Health Research Program Area

01915-A: The Reciprocal Impact of a Healthy and Active Lifestyle on the Physical and Mental Well-Being of Dogs and Their Owners: Physical Activity and Walking (PAW)

Principal Investigator: Dr. Elizabeth Ann Richards, PhD

Institution: Purdue University

Total Grant Amount: \$12,927.60

Grant Period: 3/1/2013 – 2/28/2014

Project Abstract: While it is well-established that an active lifestyle and healthy diet can control obesity, there is a paucity of research that has considered the full spectrum of human-dog interactions that contribute to the physical and mental health of a dog and its owner. It is likely that a dog's health, behavior and overall well-being are affected by its owner's lifestyle, including their social interactions and activity level.

Dr. Richards believes that in the absence of an active and interactive lifestyle, physical stress, psychological stress and behavior problems likely occur in dogs. Dr. Richards believes that this, in turn, contributes to the documented 47% of owners who report surrender of their dog to an animal shelter because of behavior problems. Dr. Richards will conduct a novel three-month dog-walking intervention, with a follow-up at three months and six months post intervention. She believes that increased dog walking will improve the health, behavior and psychological well-being of dogs and their owners. The results of this study would provide general recommendations for new dog owners, as well as contribute to the standard of care for dogs maintained in laboratories and shelters.

Immunology and Infectious Disease Research Program Area

01894-A: Documentation of Disease-Causing Ticks in a Field Trial Environment for the Purpose of Developing Practical and Cost-Effective Strategies for Tick Control

Principal Investigator: Dr. Rebecca T Trout Fryxell, Assistant Professor Entomology and Plant Pathology

Institution: The University of Tennessee

Total Grant Amount: \$12,909.72

Grant Period: 2/1/2013 – 1/31/2014

Project Abstract: Ehrlichia is a type of bacteria that is spread by tick bites and causes serious canine health problems, including chronic inflammatory disease, bleeding problems and kidney damage. Unfortunately, Ehrlichia incidence is increasing in the southeastern United States and is of emerging concern to hunting and field trial dogs. To address this health concern, Dr. Fryxell will conduct an in-depth Ehrlichia prevalence study. Focusing on the 18,400-acre Ames Plantation® in western Tennessee (site of the National Field Trial Championship for all-age bird dogs), she will complete three main objectives: 1) Collect ticks from different habitats and dogs visiting the Ames Plantation for field trial events, 2) Screen all collected ticks for Ehrlichia prevalence and document the Ehrlichia species present and 3) Correlate Ehrlichia presence and absence with environmental data (e.g., climate, land use, land cover and soils data) to identify variables associated with pathogen presence and absence. Knowledge of

Acorn Grants continued

the preferred habitat and environmental variables for Ehrlichia is essential for the implementation of current vector-control strategies and for the development of novel management strategies that improve the efficacy of currently available vector-control methods.

01900-A: Increasing Awareness of Tick-Borne Disease in Dogs Suffering from Immune-Mediated Hemolytic Anemia, Thrombocytopenia and/or Joint Pain through Accurate Diagnosis of Infection

Principal Investigator: Dr. Linda Kidd, DVM

Institution: Western University of Health Sciences

Total Grant Amount: \$7,253.28

Grant Period: 2/1/2013 – 1/31/2014

Project Abstract: Disease initiated by immune system dysregulation (immune-mediated disease) is an important cause of illness and death in dogs. Infectious diseases transmitted by tick and flea vectors can trigger immune-mediated disease, most commonly leading to hemolytic anemia, thrombocytopenia and/or joint pain. Failure to diagnose tick-borne, immune-mediated disease leads to treatment failure and exacerbation of disease, and is of critical importance to those dogs that work and play in a field or wooded setting. To more accurately determine the prevalence of infection in dogs with immune-mediated disease, Dr. Kidd will retrospectively test banked samples for multiple tick-borne pathogens, as well as for an emerging new species of Ehrlichia. Research will combine both antibody (serologic) and DNA (PCR) testing. Dr. Kidd believes this study will bring awareness to the prevalence of tick-borne disease, and ultimately, change how clinicians test for underlying infections in patients with signs of immune-mediated disease.

Oncology Research Program Area

01912-A: Enhancing the Safety and Efficacy of Anti-Cancer Drugs in Dogs

Principal Investigator: Dr. Javier G. Blanco, PhD

Institution: Research Foundation of State University of New York

Total Grant Amount: \$12,960.00

Grant Period: 2/1/2013 – 1/31/2014

Project Abstract: The anti-cancer drugs doxorubicin and daunorubicin are used to treat a wide variety of cancers in dogs. The clinical utilization of these drugs is hampered by the development of cardiotoxicity in 69% of canine patients. Dr. Blanco will investigate a potential

causative agent behind drug-related cardiotoxicity: the enzyme carbonyl reductase 1 (CBR1). Dr. Blanco will perform a detailed kinetic characterization of canine CBR1 and determine whether this enzyme causes the production of cardiotoxic products when it acts on doxorubicin and daunorubicin in vitro. Dr. Blanco will also evaluate whether a new drug on the human market, monoHER, inhibits the activity of canine CBR1, thus enhancing the safety of these drugs in dogs. Completion of this project will result in the first detailed kinetic characterization of this prominent canine drug-metabolizing enzyme CBR1, and potentially identify a new drug that can be used to enhance the safety of two drugs currently used in canine cancer patients.

01914-A: Defining the Genes That Contribute to the Development of Soft Tissue Sarcomas

Principal Investigator: Dr. Kim Miranda Boerkamp, DVM

Institution: Utrecht University

Total Grant Amount: \$12,960.00

Grant Period: 3/1/2013 – 11/30/2013

Project Abstract: Soft tissue sarcoma (STS) defines a group of tumors that originate in structural and connective tissue, and are responsible for 15% of all tumors that occur in dogs. STS is characterized by generalized infiltrative growth into soft tissue. This infiltrative growth and their Relative resistance to chemotherapy and radiotherapy make these tumors very difficult to treat. Labrador Retrievers are at greater risk for STS than other breeds. Dr. Boerkamp has identified two genomic regions associated with STS in Labrador Retrievers, and will continue her





research by further defining the responsible mutations in these regions by large-scale DNA sequence analysis. Dr. Boerkamp believes that once mutations that cause STS have been identified, a DNA test can be developed to assist breeders in reducing the incidence of the disease. In addition, she intends to compare European and American Labrador Retriever samples in order to determine whether genetic mutations are shared in different populations within the breed.

01911-A: Enhanced Hemangiosarcoma Therapy Using a Novel Combination of Drugs That Target Tumor Proliferation

Principal Investigator: Dr. Nicholas Andersen, PhD

Institution: Van Andel Research Institute

Total Grant Amount: \$12,873.00

Grant Period: 2/1/2013 – 1/31/2014

Project Abstract: Hemangiosarcoma (HSA) is a common canine cancer of blood vessels for which there are few treatment options. In previous research, Dr. Andersen showed two different drugs, a mitogen-activated protein kinase (MEK) inhibitor and a receptor tyrosine kinase (RTK) inhibitor, were effective in slowing the growth of HSA tumor cells. There is emerging evidence from human oncology that multiple drug targets are necessary to prevent drug resistance in cancer. Dr. Andersen's current objective is to test his previously evaluated drugs in combination in a rodent model of canine cancer. He hypothesizes that tumor size will be smaller in mice treated with both drugs than each drug alone. He further hypothesizes the combination treatment will have a longer duration and decrease drug failure rate compared to each drug alone. The long-term objective is to use this treatment in the clinic to treat dogs with HSA.

01903-A: Defining the Anti-Tumor Activity of Monocytes in Osteosarcoma

Principal Investigator: Dr. Duncan Lascelles, PhD

Institution: North Carolina State University

Total Grant Amount: \$12,960.00

Grant Period: 2/1/2013 – 1/31/2014

Project Abstract: Osteosarcoma is the most common bone cancer in dogs. Despite aggressive therapy, surgical tumor removal and chemotherapy, the cancer

often spreads (metastasizes) and dogs usually die of metastatic disease within an average of 12 months after diagnosis. Although survival times have not greatly improved over the last 20 years, clinicians have noted that survival times double in osteosarcoma patients who develop infections after surgical removal of the primary tumor. One hypothesis is that infection activates white blood cells such as monocytes to promote anti-tumor activity. In order to better understand and ultimately exploit the anti-tumor capabilities of monocytes, Dr. Lascelles proposes to characterize phenotypic (surface receptor expression) and functional differences of monocytes in normal dogs and osteosarcoma dogs either with or without a concurrent infection. The goal is to define changes that occur in monocytes of an infected osteosarcoma dog and enhance our understanding of the monocyte's ability to suppress tumor activity. The long-term goal is to harness the anti-tumor potential of monocytes to develop new therapies using these cells to increase survival in dogs with osteosarcoma.

Reproductive Conditions and Disease Research Program Area

01905-A: Identification of Enhanced Methods for Semen Preservation

Principal Investigator: Dr. Margaret V. Root Kustritz, DVM PhD

Institution: University of Minnesota

Total Grant Amount: \$12,776.94

Grant Period: 2/1/2013 – 3/31/2013

Project Abstract: Semen is not sterile and cannot be collected without bacterial contamination due to presence of normal bacterial flora on the urethral mucosa. Bacterial growth in stored semen is presumed to be controlled by addition of an extender to the semen, a liquid medium containing nutrients, buffering agents and antibiotics. There is evidence in large animal species of varying efficacy of antibiotics in controlling bacterial growth in extended semen, raising concerns about passage of disease through semen. To date, there are no studies in the dog documenting control of growth of aerobic and anaerobic bacteria and mycoplasma through use of antibiotics in commercially available canine semen extenders. Dr. Kustritz will evaluate whether growth of aerobic, anaerobic and mycoplasma species will be controlled in semen extended with commercial canine extender when held at refrigerator (5°C) or room (20°C) temperatures for up to 48 hours. The results will provide practical information to breeders who ship and receive semen. 🐾

CHF Funds Trial for Novel Brain Tumor Medication

Man's best friend helping man: Canine trial tests novel medication for brain tumors

The American Kennel Club Canine Health Foundation, Inc., has awarded the University of Georgia (UGA) College of Veterinary Medicine and Emory University a \$119,000 grant over three years to test a newly developed experimental drug to treat dogs with naturally-occurring brain tumors, following partial surgical removal of those tumors.

The goal of the research is to help translate new brain cancer therapies to humans by assessing results in dogs with similar diseases. According to the researchers, the tumors in dogs, known as spontaneous gliomas, are very similar to human malignant brain tumors both by imaging and biology, and both tend to grow back rapidly. The poor prognosis for dogs with gliomas is similar to human patients. The researchers are hoping the novel treatment being tested will slow down tumor growth.

A seven-year-old pit bull named Petey was the first dog enrolled in the initial pilot trial at UGA in 2011. Following discovery of a brain tumor after a seizure, Petey underwent surgery in September 2011 to remove a portion of the tumor. Simon Platt, BVM&S, a professor of veterinary neurology at UGA, performed the surgery and diagnosed Petey with a glioma. After surgery and for three days, an investigational drug was directly infused into the glioma tumor area via catheters, targeting any residual tumor cells. Petey underwent blood testing and complete neurologic testing confirming no toxicity of the therapeutic agent.

Six weeks after surgery, Petey had a follow-up MRI that revealed the therapeutic agent still within the remaining brain tumor. Petey had another MRI five months after surgery showing a marked reduction in tumor size. Petey remains alive and well now 15 months after surgery and is seizure-free.

"We are very pleased with Petey's progress following surgery and medication delivery," says Platt. "Seizure activity experienced prior to surgery has not returned and Petey's owner reports he is doing well."

The experimental agent was developed in the Winship Cancer Institute Brain Tumor Nanotechnology Laboratory of Costas Hadjipanayis, MD, PhD, assistant professor



Photo Credit:
Emory University
and UGA

Petey was the first dog enrolled in the pilot trial at UGA in 2011. He is doing well today.

of neurosurgery, Emory University School of Medicine and chief of neurosurgery at Emory University Hospital Midtown. The agent is the FDA-approved monoclonal antibody known as cetuximab, attached to an iron-oxide magnetic nanoparticle (IONP). The IONP allows for direct visualization of the agent in the brain by MRI due to the magnetic properties of the nanoparticle.

"We have translated this agent to canines with spontaneous gliomas to study its safety and feasibility," says Hadjipanayis. "By targeting the same receptor in canine gliomas that is over-expressed in human brain cancer, known as glioblastoma (GBM), we hope to have a clearer picture of the safety and therapeutic efficacy of the agent."

Initial pilot funding for this research came from the UGA College of Veterinary Medicine, the Winship Cancer Institute and Dana Foundation grant money received by Hadjipanayis, as well as the Boo Radley Foundation. Dog-owner Ken Johnson formed the not-for-profit foundation after his dog, Boo Radley, a Black English Lab, passed away from a malignant brain tumor. Boo participated in three canine clinical trials in three different states before he died.

"This foundation was started to support research in medicine that has a direct correlation between dogs and humans," says Johnson. "Our mission is to support the efforts to heal man and man's best friend in the best way we can. The Boo Radley Foundation looks forward to continued support of the extraordinary efforts of Emory University and the University of Georgia."

The grant money from the American Kennel Club Canine Health Foundation will fund a clinical trial at UGA in approximately 15 canines with spontaneously-occurring brain gliomas. The canine trial may lead to human testing if further safety and tumor control can be confirmed. 🐾

This article was reprinted with permission from Emory Healthcare and UGA College of Veterinary Medicine.

The Value of Supporting Research Outside of Your Breed

One of the most common concerns of breed clubs is that their breed is not specifically being utilized in a particular study. Sometimes this leads to the interpretation that the research being done does not have application to their personal dogs. Many clubs hold out for the definitive research study that will utilize their breed and solve their greatest health concerns.

CHF asked five recognized researchers in canine health whether there is value in supporting research outside of a specific breed for health problems that cross all breeds such as cancer and infectious disease, as well as diseases that appear to segregate within specific breeds, such as bloat, heart and ophthalmic diseases. It is evident to most dog owners that broad-based studies that focus on novel diagnostics and treatment strategies could have an impact across breeds, but is there value in collaborative funding when the goal is to identify the genetic basis for disease? Are there examples where identification of genetic mutations in one breed have facilitated discovery in other breeds?

An excellent example of potential collaborative funding power is aortic stenosis, a serious heart defect that leads to sudden cardiac death in many large-breed dogs including Golden Retrievers, Newfoundlands and Rottweilers. Each of these breeds has some subtle breed-specific differences in disease phenotype, which suggests that the disease is likely a bit different between the breeds. Dr. Kathryn Meurs, a cardiologist and associate dean of research, and Dr. Josh Stern, a cardiologist at North Carolina State University, started their research into aortic stenosis in Newfoundlands and Golden Retrievers. In both of these breeds, the results pointed to the same chromosomal location for a defect. Dr. Meurs believes that, "Although we have not yet found the exact defect, this work demonstrated to us that this is probably the same disease in each breed, and that identification of the causative mutation in these breeds will allow faster identification in other breeds."

Quite often, research is initiated in more common breeds simply for sample size collection, but Dr. Meurs is confident that her research in Golden Retrievers, Rottweilers and Newfoundlands will have an impact on other breeds such as the Bouvier des Flandres, Dogue de Bordeaux, Flat-Coated Retriever, German Shorthaired Pointer, Great Dane, Greyhound and Miniature Bull Terrier. Similarly, Dr. Danika Bannasch, professor of genetics at University of California Davis School of Veterinary Medicine, notes that ancestral mutations are more likely to be shared across related breeds, and points to Dalmatian hyperuricosuria (urinary stones) as a prime example. Research for this disease was funded and discovered based on samples from one breed, but the mutation occurs in many other breeds, and the test was rapidly transferable to other breeds with urinary stone disease.

Dr. Jaime Modiano, Perlman professor of oncology and comparative medicine at the University of Minnesota Masonic Cancer Center, extends these observations into the realm of cancer and provides two relevant

Story continued on page 10

Kudos

Our sincere gratitude to **Mr. Cecil Mann** for his generous memorial donation toward the Bull Terrier Donor Advised Fund.

Great work **United States Australian Shepherd Foundation** for contributing \$5,000 toward Grants 1787, 1759 and 1782.

Many thanks to **Ms. M. Linda Parker** for donating to the Renal Program Area to help fund research for kidney disease.

More tails are wagging thanks to the **Three Rivers Kennel Club** of Missouri for their unrestricted donation of \$1,000.

We recognize the **Clumber Spaniel Health Foundation** for helping fund Grant 1787 with their contribution of \$3,000.

Mr. and Mrs. Robert C. Tonnancour expressed their support by donating to the Great Dane Donor Advised Fund.

Helping fund Grant 1731, the **Yorkshire Terrier Club of America Foundation, Inc.** showed their support with a \$2,500 donation.

Thank you **Mr. Edward A. Neupert** for your generous contribution to help all dogs live longer, healthier lives.

Tails are wagging thanks to the **Doberman Pinscher Club of America!** They are helping to sponsor Grant 1760 with \$25,000.

Champion Sponsors

Wow! Terrific work Champion Sponsors of our Bloat Initiative. Thanks for your commitment to this health issue!

Irish Setter Club of America Foundation
Greyhound Club of America
Collie Health Foundation

Calendar of Events

Stop by our booth at the **Penn Vet Working Dog Conference** at the Purina Event Center April 8–11.

examples from his research. Dr. Modiano says, "In the case of lymphomas, there are probably more than 20 subtypes of this condition, about six of which are commonly seen in dogs. As it turns out, the subtype of lymphoma tells us more about the disease and its behavior than the breed of origin. So, studying one type of lymphoma in a breed removes some of the heterogeneity (and thus the uncertainty) in the experimental system, and makes the results more readily interpretable and applicable to many breeds." Evidence of this was found in a recent study performed by his research group in which they characterized molecular subtypes of lymphoma, developing a simple test to classify the tumors and showing the clinical benefit of reaching that diagnosis.

Dr. Modiano points out that, "Even though the work was biased to include more Golden Retrievers than other breeds because of sample availability, the results seem to be broadly applicable to almost any breed." Finally, Dr. Modiano points out that osteosarcoma has similarities related to breed of origin, but these are not the principal drivers of tumor behavior. What Dr. Modiano and his team learned from tumors of Rottweilers allowed them to develop a system to organize bone tumors into different categories of aggressiveness that may respond to different treatments. Dr. Modiano emphasizes that this will likely apply to dogs from any breed that are diagnosed with osteosarcoma.

Data from the laboratory of Dr. Matthew Breen, professor of genomics at North Carolina State University, further supports the concept that genetic studies are highly transferable across breeds. Dr. Breen's primary focus is on identifying genomic signatures in canine cancers. Importantly, he is using this information to create personalized medicine strategies for dogs with cancer.

Dr. Breen states that, "In general, if we begin the discovery process working with a few select breeds that have a remarkably high incidence of a particular cancer, we are more likely to be able to obtain the number of cases needed to power a study in a shorter period of time. That said, once we have identified genomic changes associated with key factors, such as subtype and prognosis, we are then able to quickly assess other breeds for the presence of the characteristic genetic signatures." Dr. Breen feels that collaborative funding is a very efficient way for them to launch studies that ultimately will have maximum impact on the health of many breeds. Case in point is when Dr. Breen and his team developed a test to predict duration

of first remission in canine lymphoma patients; much of the earlier work was performed with samples from select breeds, simply because they could access sufficient sample numbers. With preliminary data from these few breeds, the study then expanded to include all breeds and they were able to produce an assay that is breed-independent.

Finally, Dr. Urs Giger, Charlotte Newton Sheppard professor of medicine at the University of Pennsylvania School of Veterinary Medicine, points out the power of One Medicine Research and its translation to humans and multiple breeds of dogs. Dr. Giger cites research into storage disorders, a group of hereditary disorders causing abnormalities in the skeleton, eyes and/or central nervous system as an excellent example. Storage disorders have been recognized in people and dogs for many decades. While considered orphan (very rare) disorders in people, some of them occurred more frequently in certain canine breeds, for example mucopolysaccharidosis in Schipperkes and Miniature Pinschers.

Originally dogs were studied as disease models for humans. "If it were not for the original breed-specific studies done for the sake of human patients, we would have never understood the underlying genetic component of disease in any species. Ultimately the study of a storage disease in one breed led to the research of related storage disorders in various breeds. Thanks to those founding studies, we now understand genetic-based errors of metabolism in multiple breeds, including Miniature Pinschers, Miniature Schnauzers and Miniature Poodles."

Collaborative research funding clearly becomes a powerful tool to solve our greatest canine health problems. As CHF strives to be responsive to our breed clubs, our goal is to initiate projects and then facilitate translation of results across all relevant breeds. Individually, each breed's footprint in canine health is relatively small, but the impact when we all work together is significant progress toward dogs living longer, healthier lives. 🐾



CHF is Committed to Groundbreaking Regenerative Medicine Research

Regenerative medicine is changing the landscape of modern veterinary medicine. Diseases that were once thought to be incurable are no longer hopeless, and injuries that were once debilitating are now treatable. CHF intends to be at the forefront of supporting this exciting new area of research, and we have already substantially contributed to studies that will usher in treatments for cranial cruciate ligament disease and urinary incontinence.

Groundbreaking research is not without risk. One of the greatest concerns with regenerative medicine is the potential for the introduction of tumorigenic cells; those cells that can promote the growth of cancer. Regenerative medicine involves the transfer of stem cells that are derived from a healthy individual to the individual needing treatment, or alternately, laboratory-based expansion and reintroduction of self-derived stem cells. Stem cells are unique in their capacity to differentiate and stimulate tissue healing. Because they possess tremendous stimulatory activity, there is conceivable risk for introduction of tumorigenic cells. In order to address this risk, CHF funded Dr. Douglas H. Thamm, VMD, of Colorado State University to



work on a grant entitled “Ensuring That Emerging Stem Cell Treatments Do Not Activate or Exacerbate Cancer in Dogs” (1876-A). In this pilot study, Dr. Thamm will investigate the effects of canine stem cell factors on proliferation, cell death, invasion and migration of cells. This project is an in vitro study – meaning cells being investigated are derived from multiple canine tumor and blood-vessel cell lines. The knowledge of whether stem cells (or their by-products) can promote tumor growth will address a key safety concern regarding the application of stem cell-based therapies in dogs, and will inform decision making regarding stem cell use in the aged dog population who are at greatest risk for tumor development.

Through the funding of this grant, CHF is showing its commitment to fully support all aspects of canine health. As Dr. Shila Nordone, CHF chief scientific officer stated, “Research is not conducted in isolation. All research is complementary, and all our funded studies work in sync to prevent, treat and cure canine disease.” 🐾

FOCUS ON RESEARCH

Why Your Dog's Participation in Canine Health Research Matters *(cont. from page 3)*

By providing samples to CCOGC, dog owners are contributing to the bank of cells that researchers can access in their study of comparative oncology – helping not only their four-legged friends, but their human friends as well.

INDIVIDUAL RESEARCH PROJECTS

On the CHF website at www.akcchf.org/research/participation-needed, dog owners can search for projects by research area, breed of dog and type of participation needed – blood sample, DNA sample, tissue sample or clinical study. While this list is by no means exhaustive of the canine health research projects that are ongoing, it is an excellent resource, placing dog owners with scientists who are developing cutting-edge treatments.

If your dog has recently been diagnosed with a disease, there may be a clinical trial in your area investigating a treatment for that disease. Clinical trials help veterinarians investigate methods to improve detection and treatment of canine health issues, as well as improve the quality of care each patient receives. Participating in a clinical trial brings with it a commitment to follow through on therapies and testing and may help your dog's prognosis. The benefits can include access to cutting-edge medicine, advancing veterinary science and helping future generations of dogs.

The requirements to participate in clinical trials vary greatly. Some offer financial compensation and others will require the dog owner to pay for the medical treatment. You and your dog will likely have to travel to the trial site multiple times, so look for trials in your geographic region. 🐾



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Conference registration includes:

-  All conference materials
-  Most meals
-  Hotel accommodations

Register: www.akcchf.org/npcchc