

AMERICAN KENNEL CLUB CANINE HEALTH FOUNDATION PREVENT TREAT & CURE

Discoveries

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.

THIS ISSUE AT A GLANCE

 FIRE FROM THE

Update From the AKC Canine Health Foundation CEO, Terry T. Warren, PhD, J.D.

Happy New Year! Yes, it is an exciting 2011 start of the new year for the AKC Canine Health Foundation. On December 2, 2010, the AKCCHF Board of Directors voted to adopt a new mission statement for the Foundation as follows: "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." This new statement reflects our diversity in funding research and the translational value of canine research to humans. The 17 funded research projects for 2011 (see page 6 for details), distributes our funding dollars equally

between prevention and treatment to help us find cures for canine disease.

The Foundation is excited to present its newly designed Website which has officially launched. Please visit us at *www.akcchf.org* to explore the new Celebration Wall, which is a special photo gallery to memorialize canine friends, to read the homepage Success Stories, and to search the new Canine Health section that provides health tips and disease information. Give us feedback and let us know how you like the new look, the ease of finding research data and general canine health information. All this excitement of success and advancement is because of each one of you. We thank all of you for your continual support. Without the generosity of our corporate alliances the American Kennel Club, Nestlé Purina PetCare Company, Pfizer Animal Health, and the Parent Clubs, the All Breed Clubs, the Specialty Clubs and each individual donor, we could not be celebrating fifteen years of supporting canine health research in the amount of 25 million dollars. Thank you. Together, we look forward to a very successful and productive 2011, wishing you all a very Happy New Year!

Major Histocompatibility Complex and Autoimmune Disease in Dogs

The Major Histocompatibility Complex (MHC) can best be described as the "factory floor" of the immune system. The MHC is an area of the human, and canine genome, which has been identified to code for the creation of proteins that the immune system uses to distinguish between foreign and non-foreign bodies. All cells within the body are "tagged," if you will, with "self" proteins produced by the MHC. Basically the way that both the human and canine immune system functions is that the T-cells of the immune system interact with the protein coat of any material they encounter in the body-it is the MHC that gives the body's own cells the "secret password" that tells the T-cells this is a friend, not a foe to be destroyed.

ENTH EDUCATIO

These "friend or foe" protein markers are also called antigens. In humans, they are known as human leukocyte antigens (HLA) and in canines, dog leukocyte antigens (DLA).

"Autoimmunity" literally means "immunity against self." The symptoms of autoimmune disease are caused by the body mounting an immune response to antigens that would normally be recognized as "self."

When the T-cell encounters a material and determines that the antigen does not belong there—it will take steps to attack and kill the cells that are surrounded by the foreign protein. This is how the immune system kills bacteria and other microorganisms, which get into your dog's body. When a virus gets into the body, it hijacks the reproductive system of the cells it invades, forcing it to make duplicates of itself, and in effect changes the protein signature of the cell. This is how the immune system can identify cells, which have been infected by viruses, and attack them to try to stop the spread of the infection.

In humans it is the MHC that leads to rejection problems in organ transplant surgeries, and why transfusion of the "wrong" blood type can be fatal. Recently, protocols for both kidney and liver transplants in dogs have been developed. As such procedures gain more widespread acceptability among practitioners- deeper understanding of the functionality of the MHC in tissue rejection will need to be explored and anti-rejection treatments expanded, as they have in humans. However, just as it is in humans, the most significant aspect of the Major Histocompatibility Complex to your dog's health is the role the MHC plays in so-called autoimmune diseases.

What is an Autoimmune Disease?

An autoimmune disease is basically a condition where something "goes haywire" with those codes produced by the MHC, and the body starts treating "friends" as "foes"—and basically turns on itself.

"Autoimmunity" literally means "immunity against self." The symptoms of autoimmune disease are caused by the body mounting an immune response to antigens that would normally be recognized as "self." Most autoimmune diseases in dogs, as well



Recent studies have shown that the MHC may form the scientific basis for the continuing anecdotal reports of dogs with the ability to "sniff out" cancer in humans. The olfactory ability of dogs is well documented.

as in humans, have a genetic basis. It is believed that there is genetic variance in the MHC that causes the individual or dog to be more susceptible to an autoimmune reaction, and that various environmental factors from viruses, bacteria, and allergens, to toxins can set off that susceptibility. Veterinarians

(continued on page 3)



continued from page 2

identify four major factors relevant to causes of autoimmune disease in dogs,

- Genetic predisposition
- Hormonal influence
- Viral Infections
- Stress

In dogs that may be predisposed to autoimmune reactions, common vaccines for canine disease such as distemper and parvo have been known to trigger the response.

Common Canine Autoimmune Diseases

As stated, Lymphocytic thyroiditis, is the most common MHC related autoimmune disease in dogs, and as such actually serves as a marker for susceptibility to a myriad of other autoimmune diseases. Some of these are:

- Autoimmune hemolytic anemia (AIHA)
- Immune-mediated thrombocytopenia (IMTP or ITP)
- Autoimmune thyroiditis (hypothyroidism)
- Hypoadrenocorticism (Addison's disease)
- Systemic lupus erythematosus (SLE)
- Rheumatoid arthritis (RA)
- Myasthenia gravis

Certain regularly used canine drugs have also been associated with aggravating immune response blood disorders, such as the newer combination of monthly heartworm preventives. Keep in mind too, that any drug has the potential to cause immuno–related side effects in such susceptible individuals. Because it is known that autoimmune diseases are linked to genetic predispositions in the MHC—this is yet another reason why potential dog owners of purebred dogs should only deal with respected and reputable breeders who are aware of, and employ breeding practices designed to limit genetic disorders.

The thyroid gland plays a key role in the immune system, and thyroid disease is one of the most common autoimmune diseases in dogs. Since proper thyroid function is critical to a healthy immune system, if the dog is susceptible to thyroid disease, by inference it is also likely susceptible to other autoimmune disorders. This is why genetic screening for thyroid disease can be used in healthy animals to determine their fitness for breeding.

The animal's blood is tested for the presence of antithyroid autoantibodies. Any dog that has such antibodies circulating in the bloodstream, could potentially develop thyroid disease, and/or be vulnerable to other autoimmune diseases because his or her immune system is compromised. Responsible dog breeders use thyroid prescreening as a very important tool for selecting good breeding stock.

Other MHC Functions

It would be remiss in an article about the MHC and canines not to mention this interesting sidebar. Recent studies have shown that the MHC may form the scientific basis for the continuing anecdotal reports of dogs with the ability to "sniff out" cancer in humans. The olfactory ability of dogs is well documented. Dogs can identify chemicals diluted to parts per trillion in solutions. There have long been reports of dogs alerting owners to the presence of melanomas by constantly sniffing at a skin lesion. There have been several clinical studies published in respected medical journals that have tested and confirmed the ability of dogs to detect melanomas, bladder, breast, and lung cancers. Now, a recent study published in the journal Medical Hypotheses, indicates that anomalies in the MHC of the humans presenting with those cancers may be the mechanism for these dogs' remarkable diagnostic abilities.

KALTH EDUCATION

It is known that human body odor is determined by the human leukocyte antigens (HLA) that are produced by the Major Histocompatibility Complex. The study concluded that "the volatile organic compounds produced by tumors, and detected by dogs, are products of MHC genes. These HLA molecules in humans have "soluble and detectable isoforms that are present in body fluids such as blood, urine and sweat, and there is a strong association between changes in HLA and cancers."

(For an electronic copy of this article, please contact Erika Werne, MIM, CFRE, Director of Education & Communications for the AKC Canine Health Foundation, eaw@akcchf.org or 888.682.9696.)

Why Are Purebred Dogs So Important to Health Research?

Vive la différence! The very things that make dogs so different from other species also make them ideal genetic research subjects.

HALTH EDUCATIO

The dog has a wider range of body morphologies than any other species, living or extinct: There are huge dogs, tiny dogs, thin dogs, and chunky dogs, not to mention hairy dogs and hairless ones. Dogs have a plethora of skull shapes. Their coats vary in length, texture, color and pattern. Specific combinations of these physical traits are what define pure breeds. Different breeds exhibit highly specialized behaviors shaped through their long association with humans to suit a wide range of purposes. And all of this marvelous variety is due to their DNA.

The AKC Canine Health Foundation has played a significant role in funding these studies, as well as those of researchers exploring different aspects of behavioral genetics in dogs, including noise phobia in Border Collies and obsessive tail-chasing in Bull Terriers.

Recent discoveries in canine genetics include genes responsible for very short legs, diminutive size, and several coat colors and patterns. The AKC Canine Health Foundation (CHF) has played a significant role in funding these studies, as well as those of researchers exploring different aspects of behavioral genetics in dogs, including noise phobia in Border Collies and obsessive tailchasing in Bull Terriers. CHF has also funded the development of a behavioral assessment questionnaire designed to assist rescue and shelter workers as well as researchers in evaluating behavior in individual dogs.

Canine behavior and physical characteristics are endlessly fascinating for those who breed, show or trial dogs, but discoveries based on genetic research in individual breeds may ultimately have spin-off benefits for not only other dogs but their fellow mammals, too, including humans. Nature is conservative. If something works in one species the same developmental or metabolic function often causes a similar outcome in other species. Because dogs exhibit so much physical and behavioral variety, the more that is known about how the actions of genes shape the ways dogs look and act has the potential to lead to better understanding of the genetic influences on the appearance and behavior of other types of mammals.

Because each dog breed possesses a particular suite of physical and behavioral traits that help distinguish it from other breeds, purebred dogs provide an optimal opportunity to scientists trying to puzzle out the genetics of physical traits and behaviors. Most of our dogs' 19,000 genes have their counterparts, called "homologous genes" or "homologues," in other mammals. Most of the genes on canine chromosome 34, for example, are homologues for a sequence of genes found on human chromosome 3. Therefore, when something is discovered about what a dog gene does or how it does it, that knowledge may reveal something about how the homologous gene is functioning in people or some other type of mammal. The discovery may also indicate why things go wrong.

Most genetic diseases found in dogs are analogous to similar diseases in people. Perhaps one of the most important



Calendar of Events

JANUARY 15 – 19, 2011 NAVC Presentation

FEBRUARY 12, 2011 Westminster Cocktail Party, New York, NY

FEBRUARY 20 – 24, 2011 Western Veterinary Conference Presentation

Visit Our Booth!

FEBRUARY 14 & 15, 2011 Westminster Kennel Club, New York, NY

FEBRUARY 24 – 27, 2011 International Kennel Club, Chicago, IL

APRIL 14 – 16, 2011 America's Pet Expo, Palo Alto, CA

is cancer; both dogs and humans are cancer-prone. CHF recognizes the importance of cancer research for both species. It has funded over 135 cancer grants, providing in excess of \$6.95 million to research a wide range of cancers.



Kudos

- We applaud the Orange Blossom Owner Handlers Association of Florida for their unrestricted contribution of \$5,335.00.
- The Briard Medical Trust sponsored two of our new Grants for 2011: Grant 1426 in memory of Michael Clevenger and Grant 1429 in memory of Stephanie Katz. Visit our website, www.akcchf.org to see which grants you want to support!
- Special thanks to the American German Shepherd Dog Charitable Foundation for supporting more than \$15,000 in research to benefit the breed.
- Excellent work Naugatuck Valley Kennel Club, supporting Grant 1345-A for \$2,500.00!
- Our sincere gratitude to Dr. Bonnie Burman and Mr. Terry Burman who made an unrestricted contribution of \$1,500.00.
- We offer a resounding thank you to our 2010 Gala Sponsors and our Corporate Sponsor, The Canine Chronicle, for their tremendous support this year.
- Thanks to the United States Australian Shepherd Foundation for contributing \$30,000 to canine health research.
- We appreciate the support of the Soft Coated Wheaten Terrier community which has donated \$25,000 in support of Protein-Losing Enteropathy and Protein-Losing Nephropathy research in the breed.
- The American Boxer Charitable Foundation sponsored Grant 1445: Granulomatous Coliltis in Boxer Dogs to the tune of \$40,000. Thank you!

All cancers are due to gene mutations or re-arrangements of chromosomes. The interactions between mutant or misplaced genes and normal genes make cells multiply abnormally, leading to tumors and other types of cancer. Humans' long life span and generation interval, as well as our greater individual genetic diversity, make studying cancer in humans a greater challenge than it is in dogs. Individual breeds' reduced genetic variety enables researchers to find those genes and gene-regulation sequences that are different in an individual with cancer. And, while most cancers are acquired, some genetic defects that predispose an individual to the disease are clearly inherited. A researcher can easily assemble and study a large multigenerational family of purebred dogs. Dogs not only have shorter life spans and generation intervals, but they usually have more offspring by more mates than is the case in any human family.

Breed phenotypic traits are more than just a canine curiosity. The gene version that causes short legs in Basset Hounds and Dachshunds, a finding also supported by CHF, is not only normal but required for those breeds. However it is anything but normal for an Alaskan Malamute or a human. The identifying of the gene variation associated with chondrodysplasia, a common cause of abnormally short limbs in dog and human alike, has important implications if you breed Malamutes or your own child is at risk. When research leads to a DNA test, knowing which variations of a gene your child or dog has can be very important.

No one interested in the health and well-being of purebred dogs can deny the supreme importance of the DNAbased tests currently available for a wide variety of canine ills. These tests let breeders know with certainty what the genotype of a dog is. As more and more is learned about why dogs look and act the way they do and what gene versions lend themselves to particular results, breeders may someday be able to use this testing technology to

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And, while most cancers are acquired, some genetic defects that predispose an individual to the disease are clearly inherited. A researcher can easily assemble and study a large multi-generational family of purebred dogs.

determine genotype for some aspects of conformation or behavior. With such tests, breeders will be able to make more informed breeding decisions and avoid some of the educated guesswork currently necessary when making mating decisions. Meanwhile similar tests and scientific studies built upon purebred dog research will lead to a better understanding of other species and improved human healthcare, as well.

(For an electronic copy of this article, please contact Erika Werne, MIM, CFRE, Director of Education & Communications for the AKC Canine Health Foundation, eaw@akcchf.org or 888.682.9696.)

Focus on Research

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Below is a list of new OAK research grants that began January 1, 2011. For detailed information about any of these studies, visit our website at www.akcchf.org. We encourage you to make a secure online donation in support of any of these new studies.

1410 Positional Cloning of Histiocytic Sarcoma (HS) in the Bernese Mountain Dog (BMD) and Flat Coated Retriever, Dr. Elaine Ostrander, PhD, National Human Genome Research Institute Dr. Catherine Andre, PhD, CNRS – University of Rennes 1/1/2011 – 12/31/2011 \$75,000.00

1413 Investigation into the Genetics of Scottie Cramp: a Genome-Wide Association Study, Dr. Natasha J. Olby, VetMB PhD, North Carolina State University 1/1/2011 – 12/31/2011 **\$46,505.00**

1415 Development of Anti–IgE Peptide for Treatment of Canine Allergy, Dr. Bruce Hammerberg, DVM PhD, North Carolina State University 1/1/2011 – 12/31/2012 **\$84,861.00**

1418 PET 2.0: Providing Engineered T-cells (PET): New Genetic and Immunotherapy Targeting Canines with Spontaneous B-cell Lymphoma Dr. Heather M. Wilson, DVM, Texas A&M University 1/1/2011 – 12/31/2012 \$100,000.00

1421 Genomic Resources for the Control of Canine Pyoderma, Dr. Stephen A. Kania, PhD, University of Tennessee 1/1/2011 – 12/31/2012 **\$42,466.00**

1422 Targeting iNOS in Canine Oral Melanoma Dr. Julie A. Ellerhorst, MD, PhD, University of Texas 1/1/2011 - 12/31/2011 \$59,301.00

1424 Genetic Analysis of Cleft Palate/Lip Dr. Danika L. Bannasch, DVM PhD, University of California, Davis, 1/1/2011 – 12/31/2011 \$50,000.00

1425 Identification of Epilepsy-Causing Mutations from the Associated Loci by Next-Generation Resequencing, Dr. Hannes T. Lohi, PhD, University of Helsinki 1/1/2011 – 12/31/2011 \$86,400.00

1426 c-Kit Mutation and Localization Status as Response Predictors in Canine Mast Cell Tumors Treated with Toceranib or Vinblastine: A Response-Adaptive Randomized Trial, Dr. Douglas H. Thamm, VMD, Colorado State University 1/1/2011 – 12/31/2012 \$90,000.00 1429 Mechanistic Relationship of IL-8 in Cell Proliferation and Survival of Canine Hemangiosarcoma, Dr. Jaime F. Modiano, VMD PhD, University of Minnesota 1/1/2011 – 12/31/2012 \$100,000.00

1445 Granulomatous Colitis In Boxer Dogs: Genetic Analysis of Disease and Functional Analysis of Bacterial Killing, Dr. Kenneth W. Simpson, BVMS, PhD, Cornell University 1/1/2011 – 12/31/2012 \$75,000.00

1455 Mapping Genes Associated with Necrotizing Meningoencephalitis in Dogs, Dr. Scott J. Schatzberg, DVM PhD, University of Georgia 1/1/2011 – 12/31/2012 \$75,000.00

1467 Characterization of Geriatric Onset Laryngeal Paralysis Polyneuropathy in Labrador Retrievers Dr. Bryden J. Stanley, BVMS, Michigan State University 1/1/2011 – 12/31/2012 \$113,449.00

1472: Treatment with Liposomal Clodronate to Restore Tumor Sensitivity to Chemotherapy in Malignant Histiocytosis, Dr. Steven W. Dow, DVM PhD, Colorado State University 1/1/2011 – 12/31/2012 \$57,526.00

1480 Leptospirosis: A Forgotten Disease in Dogs Dr. Janet Foley, DVM, PhD, University of California, Davis 1/1/2011 – 12/31/2012 \$73,620.00

1484 Identification and Characterization of a Canine Derived Single Chain Antibody that Binds and Neutralizes Canine VEGF., Dr. Nicola J. Mason, BVetMed, PhD, University of Pennsylvania 1/1/2011 – 12/31/2011 \$70,907.00

1485: Study of PLE/PLN (Protein-losing Enteropathy/Nephropathy) in Soft-coated Wheaten Terriers, Dr. Meryl P. Littman, VMD, University of Pennsylvania 1/1/2011 – 12/31/2011 \$50,000.00

For 2010, the AKC Canine Health Foundation made grant payments in the amount of \$2.3 million to veterinary schools and research institutions worldwide.



THANKS TO EVERYONE WHO HELPED US REACH OUR GOAL IN 2010! Together, we're helping dogs live longer,

healthier lives!



Helping Future Generations

When Faith Bult's six-year-old Rottweiler started limping on his left leg, she figured Punch tore another ligament.



"Three years ago when he blew his ligament on the other leg, the orthopedic surgeon said he had a 50-50 chance of doing the same thing with this leg," explains the Washington dentist.

After scheduling surgery to repair the assumed rupture, Bult was blindsided by what happened next: Punch's limp suddenly worsened, accompanied by knee swelling. Rushing him to the vet, a rapidly-growing lump between the size of a golf and tennis ball was found on the inside of his leg. The diagnosis: An aggressive bone cancer called osteosarcoma.

"I couldn't speak and could barely breathe when I received the news," says Bult. "I went to the bathroom and vomited." Punch is affectionately called Bult's "Velcro dog," because "he never leaves my side," she says. "He's my heart. He and I live inside each other. Every morning he greets me wiggling his body and crying from happiness. He's so excited to see me. When I come home from work, he stands on top of the stairs and smiles by pulling his teeth back. It's so appropriate for a dentist's dog," she says, chuckling. "Punch is also my running partner, helping me prepare for triathlons and races. He's probably run 4,000 to 5,000 miles with me."

Bult immediately began researching the best course of treatment for her beloved dog. "It's been a gutwrenching emotional week talking to vets, radiologists and oncologists," she relates, shortly after the diagnosis. "This is ripping my heart out."

Despite her devastation, Bult enrolled Punch in a canine research project focused on pinpointing diseased genes associated with osteosarcoma. "As a dentist, I've seen what research has been able to accomplish for my patients," she says. While Bult knows osteosarcoma will eventually claim Punch's life, she hopes contributing to this research by donating samples of Punch's blood and DNA will potentially help future generations of dogs diagnosed with this disease. The most common malignant bone cancer in dogs, osteosarcoma accounts for five to six percent of all canine cancers, or 8,000 to 10,000 cases reported annually in the United States. Large breed dogs have a higher risk of developing osteosarcoma within their lifetime than other breeds, typically diagnosed between seven to eight years of age. In most cases, metastasis and death follow within a few months or years. The median survival time for dogs treated with amputation plus chemotherapy is 12 months, with only 20 percent surviving two years.

To determine the cause of canine osteosarcoma, scientists are working to identify inherited mutations in genes that may make certain breeds susceptible to this devastating disease. Hot on the heels of such research is Kerstin Lindblad-Toh, Ph.D., of the Broad Institute of MIT and Harvard in Cambridge, Massachusetts.

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Leading the Institute's dog diseasemapping group (part of a continuation of the institute's Dog Genome Project), Lindblad-Toh is also professor of comparative genomics at Uppsala University in Sweden and director of vertebrate genome biology at the Broad Institute. She headed the Broad Institute's team credited in 2005 with first sequencing the complete dog genome. With results published in 2005, this blueprint of a dog's genetic material paved the path for today's osteosarcoma project at the Broad Institute, funded by the AKC Canine Health Foundation.

By analyzing hundreds of samples of dog blood and DNA, researchers have detected three chromosomal regions in greyhounds and three chromosomal regions in Rottweilers suspected of causing osteosarcoma. Lindblad-Toh and her team are also honing in on gene mutations linked to this deadly disease in using ten additional breeds.

Researchers have been working to collect a sufficient number of cases *(continued on page 9)*

Spotlight on Genetic Tests: Test Developed for Determining Risk of Pug Dog Encephalitis

Introduction

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Approximately 1.2% of Pug dogs die of necrotizing meningoencephalitis (NME), also known as Pug dog encephalitis (PDE). NME is an inflammatory disease of the central nervous system that is usually progressive and fatal. Symptoms of NME include seizures, depression, ataxia, abnormal gait and blindness'. Female, fawn-colored Pug Dogs younger than 7 years of age are more apt to develop NME than older, male and non-fawn colored individuals². Recent research has revealed that susceptibility to NME is associated with the dog leukocyte antigen (DLA) region of dog chromosome 12³. The association is at or near the region containing the DLA class II genes. Dogs that have two identical copies of the NME associated markers in this region, have an observed risk (OR) of 12.75 for NME in their lifetime over Pugs that have only one or no copies of these markers (OR 0-1.08).

ORDER TEST KITS from

http://www.vgl.ucdavis.edu/services/ dog.php — Allow 5-10 business days for test results.



Results reported as:

N/N–No copies of the NME associated markers (homozygous for normal). These dogs have a low risk of developing NME.

N/S—One copy of the NME associated markers (heterozygous for susceptibility). These dogs have a low risk of developing NME.

S/S—Two copies of the NME susceptibility associated markers. These dogs are 12.75 times more likely to develop NME in their lifetime.

OUTCOMES OF MATINGS BASED ON NME TEST RESULTS:

Detailed Information

1. N/N x N/N = all puppies will have two copies of the low NME risk markers (N/N) and will have a significantly reduced risk of developing NME during their lifetime.

2. N/N x N/S = One half of the puppies will have two copies of the low NME risk markers (N/N), and have a significantly reduced risk of developing NME during their lifetimes. One half of the puppies will carry one copy of the susceptibility

markers (N/S), but will also be at low risk for developing NME.

3. N/S x N/S = One fourth of puppies will be N/N and at low risk for NME; one half will be N/S, carry the susceptibility marker, but will also be at low risk for NME; one fourth will be S/S and will be at high risk for NME.

4. N/S x S/S = One half of the puppies will carry the susceptibility marker (N/S), but will not be at increased risk of NME; one half of the puppies will have two copies (S/S) of the susceptibility marker and be at high risk of NME. *(continued on page 9)*



and control dogs in the past few years. "We're happy to report that we have analyzed 155 osteosarcoma cases and 120 controls (Greyhounds) with the latest genome-wide screening technology," she says. "The results look very promising with one major gene and several additional genes contributing to the disease."

The next step for Lindblad-Toh and her team will be to find the actual mutations and then develop DNA tests to detect dogs susceptible to osteosarcoma and dogs that may pass these genes on to offspring. This will allow owners and veterinarians to more closely follow dogs susceptible to tumors before possible life-threatening symptoms surface.

"For a major disease like cancer, the really fun part will come next year when we can start offering genetic testing," notes Lindblad-Toh. "Our hope over the next five years is to really understand how the different genes and gene combinations work together to cause this disease so we can customize treatments for specific disease genes, along with offering the best guidelines on when to test and what do to when you get the test results."

Since dogs and people are genetically similar, this research could also help humans. "We share around the same 20,000 genes and we live in the same environment to a large degree," notes Lindblad-Toh. "Osteosarcoma is a disease that behaves very similar in dogs and humans, which means there's a very good chance of a drug having the same effect on both dogs and humans."

Meanwhile, Bult is focusing on enjoying quality time with Punch. "I'm going to do whatever I can to keep him comfortable and happy. He's a happy dog right now. He went swimming yesterday, which helps keep his muscle tone up. Unless you know what you're looking for, you wouldn't even know he has cancer at this point."

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For information about contributing a blood sample from a purebred dog for this research, visit the Broad Institute's website at http://www.broadinstitute. org/mammals/dog/donate.html. "These samples are critical to be able to find these disease genes and mutations," says Lindblad-Toh. "We still need as many blood and tumor samples as possible because we have a lot more work to do to really understand the disease, in addition to just finding these genes. This research will give us a better understanding of the biology of this disease, allowing us to develop preventative measures and effective new treatments. We're therefore very grateful to the dogs and pet owners who have helped us."

SPOTLIGHT ON GENETIC TESTS: TEST DEVELOPED FOR DETERMINING RISK OF PUG DOG ENCEPHALITIS continued from page 8

5. S/S x S/S = All of the puppies will carry two copies of the susceptibility marker (S/S) and be at high risk for NME.

Notes: This is not a diagnostic test for NME in Pug Dogs or for NME disease or risk in other breeds. The test is only to determine risk for developing NME in Pug Dogs and for selecting matings that will produce puppies that are at decreased risk (N/N, N/S). Although a significant proportion (11%) of Pug Dogs is S/S, only about 1 in 8 of this group will develop NME during their lifetime.

Also, breeders are advised against breeding out the S genotype, because

40% of Pug Dogs have the S genotype in a heterozygous (N/S = 29%) or homozygous state (S/S = 11%). Eliminating the S genotype will lead to a considerable loss of genetic diversity. Therefore, breeders should carefully select matings that do not produce S/S puppies.

The NME report includes DNA types for a panel of 8 markers selected from the International Society of Animal Genetics (ISAG) canine parentage panel. These markers provide individual identification for each sample tested.

References:

1. Talarico LR, Schatzberg SJ. Idiopathic granulomatous and necrotising

inflammatory disorders of the canine central nervous system: a review and future perspectives. J Small Anim Pract 2010: 51: 138–149.

2. Levine JM, Fosgate GT, Porter B et al. Epidemiology of necrotizing meningoencephalitis in Pug dogs. J Vet Intern Med 2008: 22: 961–968.

3. Greer KA, AK Wong, H Liu, TR Famula, NC Pedersen, A Ruhe, M Wallace and MW Neff. Necrotizing meningoencephalitis of Pug Dogs associates with dog leukocyte antigen class II and resembles acute variant forms of multiple sclerosis. Tissue Antigens 2010: 76:110–118.

Planned Giving Spotlight: Charitable Gift Annuities

Charitable Gift Annuities are a way to make a donation to the AKC Canine Health Foundation and receive guaranteed fixed payments for life. There are three kinds of Charitable Gift Annuities:

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- Immediate: the Foundation promises to immediately begin making lifetime payments to the beneficiary of the annuity in return for your contribution. Payments may be much higher than the return on securities or CDs.
- Deferred: payments begin one or more years after the annuity is created and are higher than an immediate annuity. They are ideal for supplementing retirement income while getting the tax benefits now.
- Flexible: the start date for this annuity is flexible so a gift annuity can be established even if you do not know when you are going to retire.

Gift Annuities are the most popular type of planned gift that offer lifetime income. For more information call us toll free at 1-888-682-9696. Planned gifts of any type qualify you for recognition in the Canine Health Foundation Heritage Society. Benefits of the Heritage Society include listing in printed materials, event invitations and a Heritage Society lapel pin.

CHF Remembers Betty J. Moore



The AKC Canine Health Foundation lost a beloved employee in October. Mrs. Betty Moore started with the Foundation in 1998 and was the executive assistant for all three executive directors of the AKC Canine Health Foundation.

In the early days, Betty traveled to several dog shows and events, always representing CHF in the most professional manner. She attended the first dinner in memory of Bill Trainor at the Thanksgiving Turkey Cluster in 1998 in Maryland, as well as numerous International Kennel Club shows in Chicago and National Parent Club Canine Health Foundation Conferences in St. Louis. Those were early mornings and long days. A morning person anyway, Betty was always ready to greet people with a smile and a cheerful "hello."

When we moved into a larger office space, still in Aurora, Betty was instrumental in getting everything organized for the move. She never shied away from hard work, always willing to roll up her sleeves and pitch in whenever necessary. And even though she had plenty of her own work to do, she was always willing to provide assistance to a colleague when asked; sometimes we didn't even have to ask.

In 2003, Betty chose not to move to North Carolina when CHF made the move to the AKC offices in Raleigh. She did, however, spend several months traveling back and forth between Cleveland and Raleigh, assisting the new staff of CHF in getting things set up and organized. In 2005, Betty reconsidered and moved to Raleigh to rejoin the staff. We were thrilled when Betty moved to Raleigh! She jumped right in as if she hadn't missed a thing. She kept us all moving forward; never letting us just "get by." Betty always made us want to be better—better at our jobs, and better people in general. While she wasn't judgmental, we all wanted her approval!

A devoted mother and grandmother, Betty often shared stories of her family with her co-workers, and delighted in hearing about others' children and grandchildren, as well. Not being one to have pets herself, Betty was also always interested in hearing about the antics of her co-workers dogs, and enjoyed visiting with them when they came into the office.

Always pleasant, Betty was a calming influence on all who spent time with her. "Betty was the kindest person I've ever met," said Dr. Terry Warren, CEO of the AKC Canine Health Foundation. Her sentiments have been echoed by many others. Betty will be dearly missed by the Board and Staff of the AKC Canine Health Foundation.

Champions of Canine Health: AKC Canine Health Foundation President's Award Goes to Dr. Bill and Tina Truesdale

Raleigh, NC–Cindy Vogels, chairman of the AKC Canine Health Foundation (CHF) has announced that Dr. Bill and Tina Truesdale have received the organization's 2010 President's Award for significant contributions to canine health. This award is presented to individuals, clubs, or organizations who demonstrate excellence in advancing the health of purebred dogs.

Club Members

as of November 24, 2010 (new since August 5, 2010)

Afghan Hound Club of America, Inc. American Lhasa Apso Club, Inc. Austin Kennel Club, Inc. Australian Terrier International Chaparral Kennel Club, Inc. Chinook Club of America Dandie Dinmont Terrier Club of America, Inc. **Des Moines Obedience Training Club** Fox River Valley Kennel Club, Inc. Havanese Club of America Ladies' Dog Club, Inc. Lawrence Jayhawk Kennel Club, Inc. Los Encinos Kennel Club, Inc. Mid Hudson Kennel Association New England Old English Sheepdog Club Northern New Jersey Great Dane Club Plum Creek Kennel Club of Colorado Poodle Club of America Foundation, Inc. Port Chester Obedience Training Club, Inc. **Progressive Dog Club** Rhodesian Ridgeback Club of the United States, Inc. Schooley's Mountain Kennel Club Siberian Husky Club of America, Inc. Spanish Water Dog Club Tibetan Terrier Club of America, Inc.

Upon presentation at the Foundation's signature fundraising event, "The Gala by the Bay" in Long Beach, California, Vogels noted, "Each year it is the privilege of the Chairman to select the recipient of the President's Award. This year I am delighted to honor two individuals who have given generously and selflessly for years." She continued, "They have contributed, not only monetarily-often anonymously-but have also devoted their

energies, intelligence and spirit helping engage others in our quest. From the bottom of my heart, my thanks to Bill and Tina Truesdale."

Dr. William Truesdale, a small animal veterinarian and reproductive specialist in Massachussetts, joined the board of the AKC Canine Health Foundation in 2002. A member of the grants committee since then, Dr. Truesdale is also the founder of the American Boxer Charitable Foundation, and he and Mrs. Truesdale are members of the Founders Society of the AKC Canine Health Foundation. Mrs. Truesdale has been a tireless supporter of AKC Canine Health Foundation events. volunteering at many annual Galas and events during Westminster weekend over the years.



LEP TAILS WAGGIN

"Without good canine health there would be no such thing as dog shows, not to mention the devastating effects of loosing your pet to a ravaging disease such as cancer."

"We are priviledged and fortunate to have an organization such as the AKC Canine Health Foundation," said Dr. Truesdale. "Without good canine health there would be no such thing as dog shows, not to mention the devastating effects of loosing your pet to a ravaging disease such as cancer." Added Mrs. Truesdale, "We are responsible to help create a healthier life for our beloved dogs; that is our driven mission. I cannot think of a better purpose in our lives, but to work with diligence towards the cause of Good Canine Health."

The permanent award, designed by Cavalier King Charles fancier and sculptress Janet York, is on display in the AKC Canine Health Foundation offices in Raleigh, North Carolina.



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SATURDAY, FEBRUARY 12, 2011 6:00 - 8:00 PM

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Issue 35 • Winter 2011

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