WESTIE FOUNDATION OF AMERICA, INC
*Leading the Way to Westie Health*

# Westie WELLNESS

***Spring • Summer • Fall • Winter 2021***

## IN THIS ISSUE



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## PRESIDENT'S MESSAGE

*Bebe Pinter*

We have a HUGE surprise! Prepare to settle down with something to drink and read this MEGA newsletter. Year 2021 zipped by as a blur with new variants of COVID emmerging. You may notice that this Westie Wellness issue combines 2021 issues to overview the year. The next issue will be Spring 2022.

The Annual Board Meeting of the Westie Foundation of America, Inc. (WFA) was held on November 2021, via Zoom. The Board of Directors again missed meeting in person but was grateful to view each other via Zoom. After some catch up time, we had an overview of the new website that became live soon afterwards. There was discussion about current research studies, the scholarship program, holiday mailing, and the 2022 budget. The highlights of the meeting were that work has begun in earnest on the WFA Biobank project and the scholarship was awarded for 2022.

I am delighted to announce the board welcomes your participation. I wish to thank our officers, committee chairs and directors for their diligent, focused works.

In this issue, our own Dr. Valerie Fadok again does not disappoint with her article *"Food Allergy in Dogs and Cats: What We Know and What We Don't"*. She says, "Food allergy in dogs and cats is one of the most difficult allergies." Then, she goes on to discuss how common food allergy in dogs is, what are the most common food allergens for dogs, and how do we test dogs for food allergy. Finally, Dr. Fadok provides several valuable links for more information.

Did you know PJ Kessler? I am so sorry to report that we lost her way too soon. Teresa Barnes provides insight into how passionate PJ was about helping owners with Westies having Pulmonary Fibrosis, currently a terminal disease. The WFA sends condolences to PJ's family and close friends.

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*"Understanding Breeds as Populations"* by Jerold S. Bell, DVM goes into depth in several areas: Breed Formation & Chromosomal Inheritance, Differences Between Breeds and Species, and Improving Breed Population Health Through Health Conscious Breeding. If a reader is not familiar with genetic terminology, this is the perfect article to start to "dip your toe in the water"! Reading it a second time is helpful.

*"Pet First Aid"* by Dr. McGuire is a helpful reference for your first aid kit. The article includes a list of 14 drugs and other items to keep at home or take with you when traveling with your pet.

*"Financial Report—Fiscal Year 2020"*—Once again, we are proud that Program Services represents a robust 93% (increasing from 89% 2019) while Management (3%) and Fundraising (4%) are closely monitored. We are enormously proud of our investment subcommittee's members who closely monitor the investment portfolio to ensure it complies with the Investment Policy.

We have a new addition to our newsletter and hope word puzzles of some sort will be included in every issue. Try your skill at "Wild Westie Words" created by Gary Sackett. Let us know how much you like it so we can encourage him to create others.

WFA Scholarship Award 2018 winner Chie Tamamoto-Mochizuki writes an open letter to update us on her achievements since winning. She said, "The WFA Scholarship supported me to obtain the diploma of veterinary dermatology, which was one of the most important achievements of my career."

Please allow some time to peruse the Donors, Memorials and Honorariums pages. We thank our donors one and all! Without our dedicated donors, the WFA would be unable to undertake the work necessary to help improve the health of all Westies. We need your support and encourage you to become an annual or monthly donor. We are an active board for a canine foundation that functions as an advocate and catalyst for genuine progress in the health arena through research and education. You may contact Jim McCain, Donor Manager at donormanager@westiefounation.org or visit our website www.westiefoundation.org for assistance. In addition, I would be delighted to visit with you about what the WFA has accomplished, major projects, and research underway, as well as ways you may volunteer if you are interested. My email is president@westiefoundation.org.

Check out these five Research Progress Report Summaries: (1) End-Year 1, Grant 62597: *"Molecular Epidemiology of Methicillin-resistant Staphylococcus Pseudintermedius in the United States"*; (2) Mid-Year 1. Grant 02890: *"Characterizing the LINE-1 Transcriptone in Canine High-grade Peripheral T-cell Lymphoma by RNAseq to Gain Insight into Mechanisms of Drug and Immune Resistance"*; (3) Final, Grant 02651: *"Discovery of Novel Biomarkers of Canine Atopic Dermatitis through Lipid Profiling"*; (4) Mid-Year 1, Grant 02864-A: *"Luteinizing Hormone Receptor Activation in Canine Hemangiosarcoma Cells"*; and (5) Mid-Year 1, Grant 02829: *"Investigating the Potential of Phage Therapy to Tackle Staphylococcus Pseudintermedius Infections in Dogs."* These reports will be added to the website coordinated with their respective research projects so you can follow the project as it progresses.

All the way from Scotland, Professor Brendan Corcoran MVB, PhD, DipPharm provides his status report on the *"Westie Lung Disease Project"* (funded by WFA) at the University of Edinburgh Veterinary School. According to Professor Corcoran, there is a belief based on high tech Cat Scans that Westie Lung disease aka Idiopathic Pulmonary Fibrosis (IPF) is in fact more like a rare human disease called Non-Specific Interstitial Pneumonitis (NSIP). Therefore, Dr. Corcoran is requesting help from Westie owners. NSID is treatable; on the other hand, IPF is not. Please follow the link in his article for more information and how you can help.

Thank you for your continued involvement and support of the WFA but most of all, your love of Westies!

**Questions? Comments?**
**Suggestions?**

Bebe Pinter

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# What's On the Health Front?

By Kay McGuire, DVM, MS

The last couple of years have been stressful for the entire planet; now we are permitting ourselves to be excited about the future. The Westie Foundation of America, Inc. (WFA) is proud to announce that our dream of a Biobank for Westie DNA is about to become a reality. Our entire Board of Directors, especially WFA's Health Committee, has been working diligently to develop necessary forms and the process necessary to begin collection of Westie DNA samples.

Why Westie DNA? Thanks to the amazing, scientific advances in all of medicine (human/animal), the process of running an entire DNA genome has now advanced to become much more affordable than it was five years ago. If we are fortunate to have a collection of DNA samples available that are stored in the WFA Biobank, and even more important, samples which have completed health questionnaire's that correspond to each sample. we will be able to effectively support many future scientific studies.

The WFA will provide you with a postage paid box container with includes instructions to your vet for blood collection and the specialized blood tube(s) with cushion wrap. You will then ship the postage paid box container of blood sample(s) unrefrigerated to ***Resero Genomics***, who stores the WFA's samples. The WFA is funding the shipping and storage of the first 1,000 Westie blood samples to Resero Genomics to have DNA drawn and banked. Watch for further news about the launch of the program – we are hopeful by midyear.

The next advancement we have been working on is our totally new website, www.westiefoundation.org. The new site is user friendly and includes all the research projects for which the WFA has granted funds since 2009, including our own projects as well as those in partnership with AKC/Canine Health Foundation.. As on the previous site, the Westie Health Book is also included for download or to order a hardcopy. We are planning to develop several new chapters within the next year or two. The "Donation" page offers more options and addresses the need for messages when donating "Memorials" and "Honorariums." If you are considering a thank you or sympathy card for someone, why not give the gift that keeps on giving using the Donations page? Your donation though our 501 (C) 3 not only honors the situation, but also benefits the mission of the WFA and is an IRS possible tax deduction!

WFA is a progressive breed foundation to which has had effects worldwide. We are excited about our support of Dr. Brendon Corcoran's work at the University of Edinburgh, Scotland on Pulmonary Fibrosis. Our current grant is supporting the research assistant in his research project "Evaluating the efficacy of immuno-suppressive therapy in canine idiopathic pulmonary fibrosis in the West Highland white terrier."

As always, we are available to you for questions on Westie health. If your dog is diagnosed with a condition that is unusual for our breed, please share. We keep all health information confidential, and by including the WFA in topics of interest, it benefits the entire breed. Frequency of disease determines how the WFA selects future research topics. We are here to work for your Westie and you!

# Food Allergy in Dogs and Cats: What We Know and What We Don't!

*By Valerie A. Fadok, DVM, PhD; Diplomate, ACVD; Senior Veterinary Dermatologist; Zoetis*

## Food allergy in dogs and cats is one of the most difficult allergies.

We don't have a rapid diagnostic test, and it is so hard to tell the difference between a real allergy to a food, and a food intolerance. For that reason, many dermatologists prefer to call food reactions cutaneous adverse reactions to food (CAFR). Some dogs have sensitive gastrointestinal tracts and they need easily digestible diets; this is not an actual allergy. A real food allergy is an immune reaction to a food protein. Often in veterinary medicine, we look to human medicine to help us with allergies, but with regard to food allergy, there seems to be some distinct differences. Human food allergies are most often mediated by the allergic antibody IgE, the same antibody that reacts to environmental allergens, e.g., pollens, molds, dusts, and danders. One of the most common IgE-mediated food allergies is to peanut, and exposure to peanut can be deadly. We believe that dogs and cats have IgE reactions to foods too, but often there are other immune reactions that mediate food allergy.

So let's answer some frequently asked questions and provide some new information recently published that can help us make a better diagnosis. There have been a series of 9 papers, called critical appraisals, that have reviewed all the veterinary literature on food allergies in dogs and cats. These are open access papers and the references are listed at the end.

### Why do dogs and cats get food allergy?

It seems crazy that any mammal would develop an allergic reaction to food. We all have to eat to survive. So why would any of us, whether human, canine, or feline, become allergic to what sustains us? We have to start with the immune system. Like allergies to environmental allergens (e.g. pollens, molds, dusts, danders), dogs and cats have an immune system that is able to respond to food allergen proteins. But as we know for atopic dermatitis, it is much more complex than just a genetic predisposition. The immune system of the gastrointestinal tract is specifically designed to be tolerant to food. The gut has a physical, chemical, and immune barrier to prevent an inflammatory reaction to foods. We also know that the gut microbiota (the friendly bacteria, fungi, and viruses that normally live in the GI tract) are very important in this barrier

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function. But just as we see in atopic dermatitis and the skin, there are barrier defects in the gut that could allow penetration of allergenic proteins and stimulation of the immune response. It is interesting to note that when cats have roundworms and they are fed bovine serum albumen, they develop allergic antibodies to that protein. We also have anecdotal reports that food allergy and environmental allergies can develop in dogs that have had severe GI parasitic infestations. Most immunologists believe that the arm of the immune system responsible for allergies was originally meant to control parasites. It is interesting to note that more environmental and food allergies occur in people and pets in developed countries, where parasitic infestations in the gut are less common than in undeveloped countries. Developed countries also have good nutrition, clean water, and vaccines for our pets and ourselves. What other factors contribute? There is always interest in looking at the influence of diet. Certainly in developed countries, our diets are more processed. There is some suggestion that highly processed diets are more inflammatory. We lack hard evidence for animals, but it seems worth considering and requires more study. One question I have asked is why dogs with food allergy get skin symptoms instead of, or in addition to, gastrointestinal signs? New data in human atopic dermatitis suggests that food allergens can be absorbed directly through the skin! Think of babies with food all over their faces, and puppies standing in their first solid food, with food on their feet and their faces! We also know that the skin communicates with the gut, so information can be transmitted between the two organs.

## How common is food allergy in dogs?

This is an important question, but so difficult to answer. It depends on what population of dogs you are studying. And the data we have are problematic, because documenting food allergy can be very difficult. The gold standard is to feed a strict diet for a set period of time, and then challenge to discover what foods exacerbate the problem. This is easier said than done! Many people whose pets get better on a diet are reluctant to do the challenges, as we are looking for the itch and inflammation to come back. For people, the food challenges are done in the medical clinic; the potentially incriminating foods are in capsules so the patient doesn't know whether they are taking the actual food or a placebo. We have not done this in veterinary medicine. Based on the critical appraisal papers, anywhere from 10-60% of dogs with allergic skin disease could have food allergy. Keep in mind, however, there were only 5 papers! And if we look at dogs with atopic dermatitis, anywhere from 10-50% could have food triggers, again based on only 5 papers. We definitely need more work in this area, and better ways to test for food allergy. What has become clear though is that pure food allergy, where all of the clinical signs are controlled with diet alone, is uncommon (2% of dogs or less). It is more likely that dogs with food allergy also have environmental allergies as well. The value of a diet trial is to see if we can control the itch and inflammation most of the year with diet control, and

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then use our allergy medications to control disease associated with pollens that occur during specific times of the year. Dogs with food allergy have nonseasonal itch and inflammation. If a dog can have even a couple of weeks a year where they are not itchy without medication, they are not food allergic.

## How does food allergy manifest in dogs?

There are no specific signs that prove a dog has a food allergy. With regard to the skin, we can see itchy inflamed skin that looks just like atopic dermatitis. We can also see itch and inflammation on the back half of the body that can resemble flea allergy. Some dogs can develop hives and even anaphylaxis (severe allergic reaction that is life-threatening). Fortunately in dogs this is rare. We also see recurrent skin and ear infections. Veterinarians increase their level of suspicion for food allergy when gastrointestinal signs accompany the skin disease. We see intermittent vomiting, loose stools, frequent bowel movements (more than 2 or 3 per day), and/or frequent burping or flatulence. It seems that about 25% of dogs could have both skin and GI signs.

## What are the most common food allergens for dogs?

Robust marketing to the contrary, grains are not a common cause of food allergy. The 3 most common food allergens in dogs are beef, milk products, and chicken. Animal proteins are more likely to cause food allergy than grain proteins or carbohydrates. Keep in mind, though, that dogs become allergic to what they eat regularly. A dog that eats pork regularly can become allergic to pork; a dog that eats fish regularly can become allergic to fish. There is no naturally hypoallergenic food.

## How do we test dogs for food allergy?

We would all like an easy test, but the reality is that serum testing, saliva testing, and hair testing is simply not accurate enough. There are false positives and false negatives for each of these. In fact, a recent study showed that fur clipped from a stuffed toy showed positive reactions to foods, and that saline tested positive for foods when submitted for saliva or serum testing. The only way to prove a food allergy is to do a diet trial and then confirm with food challenges. The data in the critical appraisal papers suggest that we can diagnose food allergy in 96% dogs if we feed the diet for 8 weeks. We also have new evidence that this time could be shortened if dogs are treated with glucocorticoids or oclactinib (Apoquel®) as we start the diet trial. By reducing itch and inflammation quickly with medications, some dogs can do much better after 4 weeks on the diet. Then we can challenge with the old diet to see if the itch and inflammation comes back. By doing food challenges, we can discover what foods to avoid in future. The next question is what prescription diet is best for a food trial, and why does it have to be a prescription diet? These prescription diets are prepared very stringently and tested for contaminants before they are released; over-the-counter diets are not prepared to be free of contaminating proteins that are not listed on the label. As veterinarians, we can help you choose the right diet based on what your dog has been eating in the past. A diet history that contains the type of food fed, any treats, and any flavored medications is extremely helpful. We have some choices between hydrolyzed diets and novel protein diets, but most dermatologists now advocate for a highly hydrolyzed diet like Royal Canin's Ultamino®. The reason for this recommendation is that most of the novel proteins we have used in the past are now present in over-the-counter diets, and we recognize now that there is cross-reactivity among proteins. Dogs allergic to beef could be reactive to venison or lamb, and dogs allergic to chicken could be reactive to turkey or duck. There is even evidence of cross-reactivity between fish and chicken. A new diet has been released recently by Purina,

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called Elemental®. This diet contains purified amino acids instead of intact or hydrolyzed protein. It is highly palatable and approved for growing dogs. Early information suggests that it can be very effective. Other options are to consider the novel protein diets available at Rayne Clinical Nutrition (https://raynenutrition.com/). For those who wish to cook for their dogs, there are services offered by veterinary nutritionists who can help create a balanced diet for you. Here are some websites with their information.

1. Veterinary Nutritional Consultations, Inc. https://www.vetnutrition.com/
2. Petdiets.com https://www.petdiets.com/Consultation/Owner
3. Balance it https://secure.balanceit.com/ez/index.php?rotator=NewEz

## What about treats when a dog is on a diet trial?

We need to stop all the treats the dog was having before, but there are some acceptable ones! Many dogs will eat a few pieces of kibble from their diet if we call it a treat! Some dogs are more discriminating. I like to use the Potato Pleasers® from Serenegy (https://www.serenegy.com/products/potato-pleasers) as treats. Many dogs, including my own, love them. Purina also makes Gentle Snackers®, which contain the ingredients of their diet HA®. Also available are kangaroo meatballs available from Rayne Clinical Nutrition. What about giving pills? We can't use Pill Pockets, but you can use vegan marshmallows!

## My dog is taking an oral chew to control fleas and ticks. What do I use during the food trial?

This question often comes up and it is a good one. The best flea and tick medications now are isoxazolines, which will kill any parasite that crawls on a dog. They have revolutionized our ability to control parasites on the skin. Because they work better than the older topical medications, and because we don't want the dogs to get fleas while on the diet trial, I recommend that they stay on their parasite control. Most of the products are given once monthly and contain ingredients that rarely cause a food allergy. You can start the diet on the day you give the medication and give the next dose in a month and watch for a flare. If you want to avoid a monthly, oral Bravecto® (fluralaner by Merck) can be given at the beginning of the food trial, as it doesn't have to be repeated for 8 – 12 weeks. The monthly products include Nexgard® (afoxolaner now through BI), Simparica® or Simparica Trio® (sarolaner by Zoetis), and Credelio® (lotilaner through Elanco). Keep in mind that Credelio and Bravecto must be given with a full meal to be effective.

## My dog got better on the diet! How do I do a food challenge?

It is wonderful when a dog's allergy gets better on a diet trial. The prescription diets we use for food trials are complete and balanced and you can choose to feed them permanently; however, I think the food challenges help you understand exactly what to avoid and what treats you can come back to using. Because we use small amounts of food for the challenges the disease does not come back in full force. As soon as we see a return of itch and inflammation, we stop the offending food and use allergy medication to quickly control the flare. To do the initial challenge, we mix the old diet in with the prescription diet, ¼ old to ¾ prescription, and feed that daily until we see a flare or 7 days. An excellent recent paper from Japan suggests that 83% of dogs with food allergy will flare within 24 hrs, and 94% in 72 hrs. If there is no flare, then reintroduce the treats one at a time to see if those induce a flare. For example, some dogs can react to beef rawhide chews, so substitutes can be found. Once the

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flare is established, how do we know what to feed in future? Here is where the real investigative work comes in. We can do individual food challenges. I usually start with chicken and feed a little chicken breast every day until a flare occurs or for 7 days. Most of my patients have eaten chicken-based diets, so many of them are reactive to chicken. If no response to chicken you can do individual challenges with proteins you are interested in feeding, such as beef, fish, lamb, or pork, each one at a time, until you find what the dog can tolerate. Then those are proteins within dog foods that your dog can tolerate. We may do single challenges with wheat germ, corn, potato too, if indicated. This is a lot of work. My own atopic dog ate Purina HA for 8 weeks, then we fed him a test meal of a diet with chicken, which caused the flare. I bought a small bag of a lamb-based OTC diet which he tolerated. As long as he avoided chicken he did well. Each dog is an individual. There are some dogs that are so sensitive, they do better by staying on the prescription diets.

## Summary

Food allergy can be frustrating because we don't have a rapid test. Keep in mind that food allergy causes nonseasonal signs. The value of the food trial is to control the signs by diet and reduce the need for constant medication. If you are interested in reading more, some references are listed below. Also, listen to the wonderful podcast on food allergy by Dr. Brittany Lancelotti. She is a veterinary dermatologist who has started a free podcast called "Your Vet Wants You To Know." Here is the website link. https://yourvetwantsyoutoknow.com/episodeposts/page/4/ There are many topics of interest to Westie owners, including good discussions on the medications we use to control allergic diseases.

## Food allergy-critical appraisals


1. Duration of elimination diets
   http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4551374/
2. Common food allergy sources in dogs and cats (spoiler alert: it's not grains)
   http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4710035/
3. Prevalence of cutaneous adverse food reactions in dogs and cats.
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5311844/
4. Can we diagnose adverse food reactions in dogs and cats with in vivo or in vitro tests?
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5577833/
5. Discrepances between ingredients and labeling in commercial pet foods.
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5778722/
6. Prevalence of noncutaneous manifestations of adverse food reactions in dogs and cats.
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6233561/
7. Signalment and cutaneous manifestations of dogs and cats with adverse food reactions.
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6507158/
8. Storage mites in commercial pet foods
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6822402/pdf/12917_2019_Article_2102.pdf
9. Time to flare of cutaneous signs after a dietary challenge in dogs and cats with food allergy
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7247231/pdf/12917_2020_Article_2379.pdf


# The Impact of One Passionate Dog Advocate

By Teresa Barnes

When a canine owner put her heart, soul, time and money into efforts to help not just her dog, but all dogs, especially the West Highland White Terrier breed, thousands of canine owners took notice. They joined her Facebook page and sought not only her advice but her friendship. They even helped her raise funds for much-needed research into a deadly lung disease called Pulmonary Fibrosis (PF) that ultimately claimed both of her Westies.

When PJ Kessler passed away suddenly weeks ago, we at the Westie Foundation of America and the entire Westie PF community were shocked and deeply saddened. We got to know PJ as not just a friend to Westies suffering from PF as her dogs had, but also a friend to all dog owners from around the world.

PF is deadly, and there are no current approved therapies for canines suffering from it. There are just two drugs approved in humans and though both drugs slow progression of the deadly scarring, neither Ofev or Esbriet halts or reverses the life-threatening damage in the lungs caused by the disease. They are currently unavailable for canine PF.

PJ made a positive impact on the lives of so many in the canine space. A growing group of dog owners reached out to her over the last few years since she set up a Facebook page for Westie Lung Disease (WLD/PF). Even after their dogs crossed the rainbow bridge, many remained on the closed group page to engage with PJ and other dog owners.

In early 2019, the WFA was working to set up the first canine drug study in PF with an existing drug called sobetirome used for thyroid disease in humans. WFA put together researchers from Yale and Tufts to design the protocol and worked to fund the study. The protocol came together quickly, but the funding didn't. Perhaps it was too big of a stretch for funders unfamiliar with the One Health concept in which science and research can move forward faster when veterinarians and human medical experts work together on confounding medical problems.

PJ and Tyler

When PJ caught wind of the study WFA, Yale and Tufts designed, she jumped in to help find the funds to get the study underway as soon as possible. She set up a GoFundMe and within months, she and her Facebook page dog owners had raised most of the money needed when the WFA joined them to fully fund the program. It launched in fall 2019 and stalled in early 2020 due to the pandemic. Sadly, PJ's dog, Kenny, died months after the study stopped. She still remained optimistic that the study could soon be started again and could help save the lives of so many Westies whom she had gotten to know in her Facebook group.

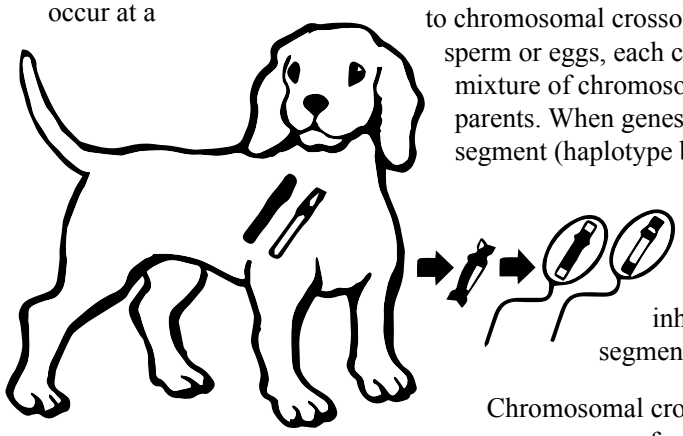
In PJ's memory, WFA set up a fund in PJ's name. Sorely missed, she was such an example of what one dog owner can do to improve the lives of dogs and their owners, alike, and to help move science forward faster.

# Understanding Breeds As Populations

*By Jerold S Bell DVM, jerold.bell@tufts.edu, Cummings School of Veterinary Medicine at Tufts University*

*This article was presented at the 2019 AKC Canine Health Foundation National Parent Club Canine Health Conference. It can be reprinted with the written permission of the author.*

Dog breeds are like different ethnic populations of people. All people on earth are humans (Homo sapiens), but we are not all closely related. Ethnic populations originally arose due to geographic isolation. There are some mutated genes (and hereditary diseases) that are shared by different ethnic populations. These mutations occurred a long time ago in distant ancestors that preceded population migrations and the separation of ethnic populations. In some ethnic populations certain common genetic diseases occur at a higher frequency (like high blood pressure and diabetes). Some ethnic populations are prone to certain genetic diseases that are seen very rarely in other populations.



The same thing occurs in purebred dog populations. Dog breed populations are like early isolated human populations. The most common genetic diseases that are seen by veterinarians every day in practice are due to ancient liability genes that originated in ancestors that preceded the separation of breeds. They occur in both purebred and mixed breed dogs. These include allergies, hip dysplasia, heart disease, cruciate ligament disease, slipping kneecaps, cataracts, hereditary cancers and others. Breedspecific genetic disorders are due to more recent mutations. For many genetic disorders, validated genetic tests are available to identify carriers. For others, genetic screening and medical history differentiate normal from affected dogs.

## Breed Formation & Chromosomal Inheritance

Breeds were formed by selecting for a working, behavioral and/or conformational standard. Dogs that did not adhere to a standard or were unhealthy were discarded. Those that did adhere were used for breeding. As only a small number of dogs are used to produce the next generation, rapid change can occur in the breed's genetic background. Dogs that embody and produce health and quality were considered superior to the standard and their offspring were used more frequently. Their genes were retained and propagated in the breed gene pool. Dogs that produced offspring that were unhealthy or inferior to a standard were not used. Their influence and that of their ancestors was diminished.

Dogs have 39 pairs of chromosomes — one in each pair from its sire and one from its dam. Dogs used for breeding supply one chromosome from each pair to every offspring. Due to chromosomal crossovers during meiosis producing sperm or eggs, each chromosome can include a mixture of chromosomal segments from its two parents. When genes are selected, the chromosomal segment (haplotype block) containing the gene is inherited along with many other "linked" genes in the segment. Selection for positive traits will cause the inheritance of a chromosomal segment

Chromosomal crossover during meiosis forming sperm or eggs can from the parent(s) containing causative genes. Mix maternal and patemal segments on each chromosome. Selection against deleterious traits or diseases will cause the loss of a chromosomal segment containing causative genes. As meiotic crossovers occur producing sperm and eggs through the generations, the size of the chromosomal segment containing genes under positive and negative selection can get smaller.

As ancestors and dogs who pass on positive traits to the breed are linebred on (appearing in both the sire and dam's sides of the pedigree) this can cause haplotype blocks to pair up - causing runs of homozygosity (ROH). Even without close linebreeding, selection for positive traits will increase their homozygosity having originated from distant ancestors. Breed-defining genes would be expected to be collected in runs of homozygosity due to selection over time.

Deleterious (primarily recessive) mutated genes can accumulate in the background of the breed gene pool. These accumulate primarily because they are not expressed in the heterozygous (carrier) state. Deleterious genes can increase

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# UNDERSTANDING BREEDS AS POPULATIONS

in frequency if linked to positively selected genes, or through genetic drift. An increasing frequency of breed-related disease will be due to homozygosity of deleterious recessive or additive liability genes. Individual liability genes can cause embryonic death (thus resulting in smaller litter size or infertility), increased neonatal death, or breed-specific genetic disease. This is due to the expression of specific deleterious genes and not a general result of increased homozygosity.

If disease liability genes are linked in haplotype blocks to positively selected genes, then dogs that demonstrate the positive traits and do not carry the disease-liability genes should be selected for breeding. These dogs can occur due to phenocopies (selected traits due to other genetic causes), or due to meiotic chromosomal crossovers that break the linkage between the positive and disease-liability genes. If the positive and deleterious genes cannot be separated due to tight linkage (adjacent genes or even multiple effects of the same gene) then this is not a healthy breed standard. The standard may need to be changed, achieved through other selected genes or possibly through crossbreeding.

As breeds develop and reproduce to a standard, their genetic difference from other breeds increases. Runs of homozygosity for breed-defining traits and quality genes is a positive development, even though it results in a loss of genetic diversity from genes that do not reproduce a standard or maintain health. The genetic diversity between breeds is large. This is why pure breeds can be separated by their DNA signatures. Breed subgroups (conformation versus working or breed populations on different continents) can also be differentiated based on their DNA. This can provide an important source of breed genetic variation if needed. The genetic diversity within the breed should be small, so that the breed reproduces itself to a healthy standard. This is the "big picture" of genetic diversity in dog breeds.

The fine detail of genetic diversity within a breed concerns maintaining a healthy phenotype and reproductive ability. Dogs from the breadth of the gene pool should be used for breeding as long as they represent health and quality. Restricted genetic diversity is not an issue in pure breeds, unless there is no altemative direction to go for health and quality.

## Differences Between Breeds And Species

The force of species evolution is natural selection - the ability to thrive and reproduce within the species' environment. Artificial selection that could be detrimental to species survival is not an issue in the wild. Genetic isolation can create subspecies (often with multiple isolation events) and can cause random genetic changes due to genetic drift.

Endangered species can share several population parameters with breeds. Their population size is usually small, and they have a closed population. In many instances, there is a limited foundation base (founder genome equivalent). Endangered species can experience decreased fertility and ability to thrive due to both genetic and environmental variation.

Genetic disease in endangered species occurs primarily through genetic drift. This is the random accumulation of disease liability genes in the absence of selection. As carriers of recessive and additive disease liability genes are healthy, they are not selected against and their genes are propagated in the offspring. Who reproduces in the population is random, and if carriers reproduce, the liability genes are passed on. When recessive disease liability genes pair up, or when additive genes combine to cross a threshold, clinical disease results.

(Continued on page 12)



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(Continued from page 11)

# UNDERSTANDING BREEDS AS POPULATIONS

Species survival plans (SSPs) were developed by population geneticists working with rare and endangered species who have a limited number of available breedable individuals. With the assumption that avoidance of homozygosity of deleterious recessive genes provides for the healthiest and robust offspring, SSPs are designed to mate the most unrelated individuals together (through pedigree or molecular genetic markers). This hopefully limits the expression of recessive disease-causing genes. SSPs also work to maintain the breadth of genetic diversity (evaluating the rareness or commonness of genetic background) in the species population. The only individual selection in SSP systems is to not breed unhealthy animals. However, if an unhealthy animal represents a unique genetic background it could still be used in matings to maintain genetic diversity. The goal of an SSP is successful reproduction with the production of healthy, live offspring representing the diverse background of the species.

Purebred breeding requires constant (artificial) selection for positive traits including health, and against negative traits and disorders. Without constant selection for specific breeding goals and their associated genes, the health and quality of the offspring will decline. The ability of selective pressure to create change in the population is limited by the amount of variation that is present for the selected trait in the breed. Selecting for heterozygosity as a goal and mating the least related parents together, erases the differences between dogs in the breed that are required for selection. This limits the ability to apply selective pressure for improvement. As a breeder selects for more goals in any mating, the amount of selective pressure for each individual goal diminishes. I.e., it is easier and more productive to select for one to three goals at one time than for eight or nine goals. Any selective pressure (selection goal) that is not specifically directed toward health and quality will diminish the selective pressure for both.

SSP breeding systems are not appropriate for pure breeds. Only outbreeding for the most heterozygous dogs randomizes the positive and deleterious genes in the gene pool. Breed-specific genetic disorders are caused by liability genes that are already dispersed in the breed's gene pool. Outbreeding will not decrease the frequency of these genes in the population. The clinical occurrence and frequency of such disorders will not diminish based on outbreeding versus linebreeding. The disorder will just appear randomly in offspring from different matings. Outbreeding and linebreeding are tools, not goals. There are specific reasons for using either in planned matings.

## Improving Breed Population Health Through Health Conscious Breeding

Purebred dog breeds were developed through artificial selection when dedicated breeders judiciously purged dogs and their genes from the breed gene pools if they were unhealthy or did not perform to a standard. Somewhere along the way, the responsibility to select for health and produce healthy offspring disappeared from dog breeding. Today, people just breed dogs and expect healthy offspring.

People decide which dogs get bred, and which get bred to each other. This is the difference between natural selection and artificial selection. If artificial selection does not select for health, then there can be no expectation of genetic health. If artificial selection selects for breed characteristics that impair health, then breed-related disease is the natural outcome. Dog breeding is all about selection.

In the planning of any proposed mating, the selection of healthy parents is paramount to the health of the offspring. A pre-breeding health examination includes phenotypic examination of the major organ systems for; musculoskeletal, cardiac, ophthalmologic, gastrointestinal, pulmonary, dermatologic and behavioral abnormalities. Medical history

(Continued on page 13)



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(Continued from page 12)

# UNDERSTANDING BREEDS AS POPULATIONS

should be examined for episodic inherited disease that cannot be identified on examination; i.e., allergies, seizures, bloat, bladder stones, cruciate ligament disease, etc. Dogs demonstrating hereditary disease should be selected against for breeding.

Pure breeds can also have breed-specific genetic disease due to more recent mutations. For many of these there are breed-validated genetic tests that can identify causative or disease liability genes, or genetic screening to identify affected dogs. The OFA Canine Health Information Center (www.ofa.org) and the AKC Bred With H.E.A.R.T. program (http://www.akc.org/breeder-programs/akc-bred-withheart-program/) both have breed-specific genetic testing requirements that have been determined by the parent breed club. All prospective breeding dogs should undergo a veterinary pre-breeding health assessment that covers screening and medical history evaluation for all common and breed-related genetic disorders. If all breeders include pre-breeding genetic screening in mate selection, then America's dogs will be healthier.

The advent of multiplex genetic panel testing (Mars Wisdom Health, Embark, etc.) provides genetic test results for over 180 canine traits and disorders. Unfortunately, most of the disease liability genes tested for in these panels are breed specific. Unless the gene(s) have been validated to cause clinical disease in other breeds or mixed breeds, the test result may not have any significance in your dog. In addition, the panel tests utilize SNPs (single nucleotide changes) instead of testing for a mutation, so false positive and negative results can occur. Breeding decisions regarding breed-validated liability genes should be based on direct mutation and not SNP testing.

Typical genetic counseling recommendations utilize the breeding of quality carriers to non-carrier dogs and replacing the carrier parent with a quality non-carrier offspring. In this way breeding lines (and breed genetic diversity) are not abandoned and testable disease liability genes can be lost in one generation. If a valid genetic test is not available then selection should be based on genetic screening and open health databases that identify relative risk of carrying disease liability genes.

Health conscious breeders are fulfilling their ethical responsibilities to produce healthier dogs. If a breeder is not willing or able to provide official health screening results for the parents of litters, then BUYER BEWARE! There will be no expectation of genetic health in the puppies. Without evidence of pre breeding genetic screening, health guarantees that provide for a replacement of a family member once the emotional bonds have been made are worthless. It is only a piece of paper written to excuse a breeder from performing their ethical responsibility of pre-breeding health screening.

There are many conversations concerning issues with dog breeding in America. Many people prefer the predictable characteristics of purebred dogs. The "Adopt, Don't Shop" movement promotes rescuing a dog from a shelter instead of buying from a breeder. The fact is that there isn't even a fraction of rescue dogs available to provide canine companionship to America's families. This has created the "bred for rescue" industry. Dogs will continue to be bred so that they can be our faithful companions. If any purebred or mixed-breed mating is being planned, health-conscious breeding through pre-breeding health examination, genetic screening and genetic testing should be performed. If the public demands health-conscious breeding then the issue of genetic disease in dogs will change.

***"All dogs deserve to live healthy lives."*** William J. Feeney, Chairman of the AKC Board of Directors.

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# PET FIRST AID

By Kay McGuire, DVM, MS

As summer approaches we will see more people out with their pets. The outdoor exposure adds to the possibility of your dog acquiring an injury. I am providing a list of items you might consider including as a first aid kit for your dog. The most frequent calls our Veterinary Hospital receives are in regard to vomiting, diarrhea, and lameness or trauma.

Vomiting and diarrhea may be due to ingestion of a foreign object, toxin, parasites, or a metabolic illness.

Lameness can include fractured bones, tendon rupture, swelling due to bites or envenomation from snakes or spiders.

The items listed below are **NOT** an alternative to seeking veterinary care but something you can do to aid your dog on your way to the doctor. If you have a good working relationship with your veterinarian, most will be happy to fill a small prescription for these items for you to keep at home or take when you travel with your pet.

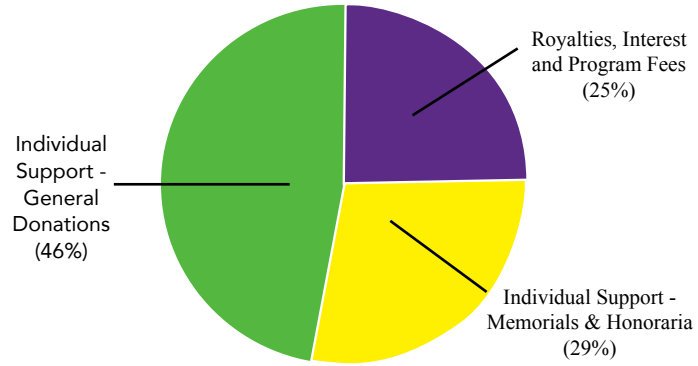
1. Antihistamine, Benadryl 25 mg. Dose is typically 1mg per pound body weight, can be repeated at 4-6 hours for snakebites, etc.
2. Endosorb or Lomotil for diarrhea
3. A non-steroidal anti-inflammatory such as Rimadyl, Meloxidyl, or Gallaprant can be used for discomfort of musculoskeletal soreness.
4. Cerenia tablets for nausea. This drug helps nausea for 24 hours.
5. Bandaging material, i.e. stretch gauze, coflex, tape
6. Muzzle or nylon hose to act as muzzle
7. A lead (can also act as muzzle)
8. Thermometer
9. A broad-spectrum antibiotic such as Amoxicillin
10. An anti-bacterial agent such as chlorohexidine as a cleaner and flush
11. An ear wash, whether homemade or prepared product
12. An eye wash
13. A ophthalmic triple antibiotic ointment or solution for eyes
14. Foil packet of microwave rice (good for gastroenteritis)

If you have the above items you can handle vomiting, diarrhea, muscle pain, and start an antibiotic for puncture, bites, etc. These agents again are not a substitute for seeing your veterinarian but may help keep you out of an emergency room until you can see your doctor during regular hours.

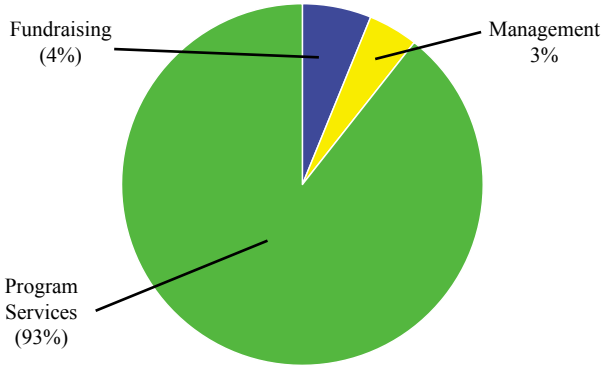
# Financial Report – Fiscal Year 2020

By Gary C. Sackett, Treasurer

## Revenue = $109,249




## Expenses = $90,912




## REVENUE

**Individual Support** 2020 was a tough year for everyone. Thanks to a legacy donation from a long-time Westie Foundation of America, INC (WFA) donor, revenue from individuals supporting the WFA's mission in 2020 totaled $82,300 (75.3%). An additional $26,930 (24.7%) in royalties from Affiliate programs, Dividends, Interest and Westie Healthbook sales ensured that we had sufficient funds to continue the mission of the WFA.

## ASSETS

**Temporarily Restricted Funds** All memorials and honoraria are added to the Temporarily Restricted Fund which now totals $531,169. Through the legacies of Nancy Schoch and Daphne Gentry, we have significant funds dedicated to Pulmonary Fibrosis research and a veterinary scholarship. Our Temporarily Restricted Funds totals 41% of our assets. The income from these funds may be used to fund projects, but the principal is restricted by the Board of Directors and invested carefully to maintain principal while bringing a reasonable return. These are tracked monthly to ensure conformance with WFA investment policy.

**Unrestricted Funds** WFA has unrestricted funds balance of $753,357 (59% of our assets) including cash, CDs and Mutual Fund investments. This is used to fund program services, management operations and fundraising. In 2021, we have increased our expected grant expenditure from $65,000 in 2020 to over $86,000 in 2021.

## LIABILITIES

**Future Projects** WFA retains liabilities of $37,471 to fund the remainder of the Tufts University IPF study, the Winter edition of *Westie Wellness* and other ongoing activities.

## EXPENSES

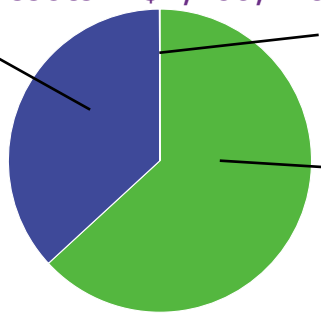
**Program Services** In 2020, despite the slowdown in university related research projects due to COVID-19 related shutdowns, the WFA continued support of research and education related to diseases affecting the West Highland White Terrier.

**Research** $30,000 of the funds spent on research were matched by funds from the AKC Canine Health Foundation, compounding the benefits our Westies will receive. These grants addressed further Investigation into the study of Methicillin-resistant Staphylococcus Pseudintermedius, Biomarkers of Canine Atopic Dermatitis and Bladder Cancer in Pet Dogs ($10,000 each). We also provided a grant to the University of Florida to study the effects of ***resveratrol*** on Atopic Westies ($35,000). In addition, the WFA awarded its 3rd veterinary scholarship in the amount of $5000 through the Canine Health Foundation to a researcher at the University of Florida who happens to be working on the ***resveratrol*** study.

**Education** Expenses included funding a major update to our website ($4,520), the outstanding ***Westie Wellness*** ($7,000), and printing additional copies of the popular Healthbook ($1,698).

**Management and Fundraising** These expenses were kept to a minimum (7.4 % in 2020 vs 10.6% in 2019) by careful allocation of resources and the fact that all officers, directors, and committee members are volunteers.

## Assets = $1,285,126




**% of Temporarily Restricted Funds**

Unspecified (61.8%)
Pulmonary Fibrosis (28.3%)
Daphne Gentry (8.0%)
Addison's Disease (1.7%)
Inflammatory Bowel (0.3%)

# Westie Foundation of America Scholarship 2018 Winner Chie Tamamoto-Mochizuki, An Update

After receiving the WFA scholarship, I passed the board exam and became a veterinary dermatologist in 2018 *(I have included this information in the previous follow-up report)*.

I also completed the Ph.D. program this summer. My dissertation is "***Investigating the Role of IL-31 in an Experimental Model of Acute Canine Atopic Dermatitis***" (available at: https://repository.lib.ncsu.edu/handle/1840.20/39074?fbclid=IwAR0QKO7hLStWAithyD2X7kiWEXJYITqk954Pd9aDdKtk25ySThlY7dEe6dI). A part of my dissertation was just published this month (available at: https://onlinelibrary.wiley.com/doi/full/10.1111/vde.13034).

I investigated a new therapeutic target in canine atopic dermatitis in this study. Since atopic dermatitis is common in Westies, I hope that my study results will help atopic Westies in the near future.

I also actively engaged in veterinary education by giving presentations at international and regional conferences (9th World Congress of Veterinary Dermatology in 2020, 24th Japanese Society of Veterinary Dermatology Conference in 2021, North America Veterinary Dermatology Forum in 2021, Vet Symposium in 2021, and International Society of Atopic Dermatitis Symposium in 2021).

*Dr. Tamamoto-Mochizuki*

Owing to all of these achievements, I recently became a member of the International Committee of Allergic Diseases of Animals (https://www.icada.org/).

I currently work as a Postdoctoral Research Associate at the Neuroscience lab at NC State University to study itch neuronal pathways in skin diseases, especially atopic dermatitis, in dogs and cats.

The WFA Scholarship supported me to obtain the diploma of veterinary dermatology, which was one of the most important achievements of my career. Also, I could have access to the writing assistant program thanks to the scholarship. It was very helpful in writing my dissertation and papers because English is not my first language.

I really appreciate the WFA foundation, and I hope my information will be helpful for you.

Thank you,

Chie Tamamoto-Mochizuki

# WILD WESTIE WORDS

H G S D Q U C K D R S D W W Z Q Y P O I T Y
Q A Z W S E T I H W D C V F R T T G B N H J
Z X C V T B A N N H U N T E R E I R R E T G
F D S V U B I N E M S F Q W E N G H J N E I
W R Y U B A L T S G F D G J H A D D S E R R
B V C X B Z A A R Q I W S F X C C A F R R D
O F G T O P C O A T H L J R K I L M M G I N
P B I U R Y O C T R E O L I W O Q A E E T S
Z X E V N M N R M Q W Y E E R U T Y E T O U
G H J D I L Z E X C V A B N T S N M T I R Z
Q W E N I T Y D U T O L P D A N S D S C I F
F G G H J E L N N W R T Y L P E I A E O A U
D X C V B N N U S S H O W Y P L A Y F U L D
N W R T Y P H C N M R S D W W Z Q Y L T S A
A S F A R N D A E A F T A S F D E S E H T T
L E G V R L T O T R Y Q E X P R E S S I V E
T G H A S T A E R T N E M E V O M S E R U G
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C R S D W W Z L Y P A I Q Y P I I T Y O G S
S G S D Q U I K H E E L W W A Q S P O I M Y
R S D W W G Q Y P O I T L G G S D Q U I C K
Q U C K A R S D W W Z Q Y Y O I T Y H G S D

WHITE
LOYAL
RAT
HEEL
SIRE
DAM
GET
MOUSE
GAIT
TAIL
SMART
RALLY
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*Puzzle solution will be in next newsletter.*

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Irene Fountas

In Honor of Daphne Gentry and Brice Verdier
Geof & Cynthia Reynolds

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York County Dog Training Club

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WHWTC of New England

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Maureen and Robert Valenza

In Memory of Kiloran Lea's Next A Kin "Kinsey"
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In Memory of Wee-Hy-Lynn Seymour Ribbon
Robert Kalal

In Memory of Randy Pinter
Kay McGuire

In Memory of Finishline's Kick It Up A Notch "Cayenne" BN, TD, CA, AXP, AJP, OFP, SE, RN, RATO (2007-2020)
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Irene Kenny

In Memory of Randy Pinter
Judith White

In Memory of Buddy Shedloski, a Westie with a great heart and loved by the Sheloski family. May you rest in peace.
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Irene Fountas

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WESTIE FOUNDATION OF AMERICA, INC
*Leading the Way to Westie Health*

# Save The Date

*for the*

# WFA FUNDRAISING AUCTION

**Starts Saturday, August 20, 2022 at 8 am EST and**

**Closes Sunday August 21, 2022 at 6:59:59 PM EST**

# RESEARCH PROGRESS REPORT SUMMARY

**Grant 02597:**
*Molecular Epidemiology of Methicillin-resistant Staphylococcus pseudintermedius in the United States*

**Principal Investigator:**
*Stephen Kania, PhD*

**Research Institution:**
University of Tennessee

**Grant Amount:**
$47,082

**Start Date:** 05/1/2019
**End Date:** 10/31/2021

**Progress Report:**
End-Year 2

**Report Due:**
04/30/2021
**Report Received:**
04/29/2021

*(The content of this report is not confidential and may be used in communications with your organization.)*

**Original Project Description:**
The bacterium Staphylococcus pseudintermedius is the most common cause of canine skin infections as well as other important canine diseases. Disfigurement caused by skin infections and treatment failures is an important problem. Resistance to antibiotics is becoming increasingly widespread with few or no antibiotic options left for some cases. Alternative therapeutic approaches being investigated include vaccines, small molecule virulence factor inhibitors and bacteriophage lytic enzymes. In order for new products to be effective against the broadest spectrum of wildtype bacterial strains as possible, it is important to determine which strains of S. pseudintermedius clinically predominate in the United States today. A genetic typing method for S. pseudintermedius was previously developed by the research team along with a survey of bacterial strains in the United States in which they sequenced the genomes of the most common strains. This analysis provided a snapshot of predominant strains and suggested a potential for emergence of new, highly antibiotic resistant organisms. Identifying the current strains in the US and sequencing their genomes will provide a basis for developing the next generation of treatments as well as important information about changes that occur in the bacterial population in response to selective pressures.

**Publications:** Ashley Tuttle, Mohamed Abouelkhair, Rebekah Jones, Stephen Kania. Temporal transition of Methicillin Resistant Staphylococcus pseudintermedius clonal populations in the United States. (In preparation).

**Presentations:** None at this time.

**Report to Grant Sponsor from Investigator:**
This project is designed to study the molecular epidemiology and characteristics of Staphylococcus pseudintermedius in the United States. This bacterium is the major cause of skin infections in dogs and has become widely resistant to antibiotics over the past 15 years. With data from about 90% of the samples we plan to collect, we have found widespread antibiotic resistance and emergence of new strains previously only associated with canine disease in other parts of the world. This information is important to understand the spread of antibiotic resistance and for the development of new strategies to treat and prevent this important disease.

The Westie Foundation of America, Inc is a nonprofit corporation, recognized by the IRS as a 501 (C) (3) organization.

The mission of the foundation:

Lead, innovate and advance medical research to benefit the health and quality of life of West Highland White Terriers.

Lead, guide and advocate on behalf of Westies.

Develop and communicate to Westie owners, Westie breeders, veterinarians and others who share our challenges.

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# RESEARCH PROGRESS REPORT SUMMARY

**Grant 02651:**
*Discovery of Novel Biomarkers of Canine Atopic Dermatitis through Lipid Profiling*

**Principal Investigator:**
*Harm HogenEsch, DVM, PhD*

**Research Institution:**
Purdue University

**Grant Amount:**
$99,105

**Start Date:** 05/1/2019
**End Date:** 04/30/2021

**Progress Report:**
FINAL

**Report Due:**
04/30/2021
**Report Received:**
04/30/2021

*(The content of this report is not confidential and may be used in communications with your organization.)*

**Original Project Description:**
Canine atopic dermatitis (CAD) is a common allergic skin disease of dogs with a strong genetic basis. CAD can severely affect the health and well-being of dogs and current diagnosis of CAD requires timeconsuming and expensive procedures for the owner. Furthermore, the molecular mechanisms underlying this condition are not well understood. Evidence from human studies suggests that several variants of atopic dermatitis (AD) exist with different mechanisms and responses to treatment. Therefore, new approaches to identify molecular markers that can help with better diagnosis and management are warranted. CAD and human AD are associated with changes in the composition of lipids in the epidermis which may precede the inflammation or result from the inflammation. The investigators will analyze the lipid composition of the epidermis and blood of healthy dogs in comparison to dogs with CAD using a novel analytical method developed by their interdisciplinary team. The results of this work could lead to new, minimally-invasive tests for the diagnosis of CAD and for the prediction and monitoring of the response of CAD patients to treatment.

**Publications:** Franco J, Rajwa B, Gomes P, Ferreira C, HogenEsch H (2021) Changes in the lipid composition of the epidermis and blood in dogs with atopic dermatitis identified by nontargeted lipidomics. *In preparation*.

**Presentations:** None at this time.

**Report to Grant Sponsor from Investigator:**
We enrolled 30 dogs with mild to moderate atopic dermatitis and 30 healthy control animals in the study. The dogs with atopic dermatitis were treated with either Apoquel® (n=17) or Cytopoint® (n=10), whereas one dog was switched from Apoquel® to Cytopoint®, one dog was treated with prednisone followed by Apoquel®, and one dog was treated with a topical shampoo. Both Apoquel® and Cytopoint® reduced the clinical severity of the skin lesions during 8 weeks of treatment. Skin swabs and blood samples were collected from the atopic and control dogs at Day 0, and from the atopic dogs at 4 and 8 weeks after initiation of treatment. Analysis of the lipid composition of the skin and blood samples by mass spectrometry showed significant differences between atopic and control dogs. In addition, nonlesional skin of atopic dogs had a different skin lipid profile from that of control dogs. Treatment reversed the changes in lipid composition both in the skin and the blood; however, there was marked variation in the direction and extent of the changes between individual dogs. This research suggests that atopic dermatitis is associated not only with changes in lipids in the skin but also systemic changes. These lipid changes can potentially help in the diagnosis and evaluation of treatment responses in canine atopic dermatitis.

# RESEARCH PROGRESS REPORT SUMMARY

**Grant 02864-A:**
*Luteinizing Hormone Receptor Activation in Canine Hemangiosarcoma Cells*

**Principal Investigator:**
*Michelle Kutzler, DVM, PhD*

**Research Institution:**
Oregon State University

**Grant Amount:**
$11,718

**Start Date:** 02/1/2021
**End Date:** 01/31/2022

**Progress Report:**
Mid-Year 1

**Report Due:**
07/31/2021
**Report Received:**
07/29/2021

*(The content of this report is not confidential and may be used in communications with your organization.)*

**Original Project Description:**
Hemangiosarcoma is an aggressive, silent cancer that sometimes snares its victims without any sign of illness. In the U.S., hemangiosarcoma is believed to be responsible for the deaths of tens of thousands of dogs each year. German Shepherd Dogs, Golden Retrievers, and Labrador Retrievers are most commonly affected but this cancer affects all dogs. While there is no cure, early surgical intervention and chemotherapy treatment may prolong the lives of dogs afflicted with hemangiosarcoma. Additional treatment options are needed to increase life expectancy and possibly even prevent the development of this deadly disease. Several studies have shown that spayed female dogs have a two- to ten-fold increase for developing hemangiosarcoma compared to intact female dogs. This may be due to overproduction of luteinizing hormone (LH) following spay or neuter. Investigators have previously demonstrated that hemangiosarcoma tissues collected from dogs have binding sites for LH. The proposed research will determine if LH binding to these sites increases cancer cell growth. The results of this research may allow for a better understanding of the relationship between spaying or neutering and the development of hemangiosarcoma. In addition, future development of a method to reduce LH secretion in spayed or neutered dogs may lower the risk for some breeds to develop hemangiosarcoma.

**Publications:** There are no publications from this research yet.

**Presentations:** The results from the LHR immunocytochemistry will be presented as a virtual poster at the 2021 Oregon State University Celebrating Undergraduate Excellence conference in September 2021. There are no other presentations from this research yet.

**Report to Grant Sponsor from Investigator:**
In the United States, spaying and neutering of dogs and cats is commonly performed to prevent the birth of unwanted pets. However, surgically removing the ovaries or testes may have unexpected consequences. Dogs that have been spayed or neutered have an increased risk for developing obesity, urinary incontinence, hypothyroidism, hyperadrenocorticism, diabetes, cruciate ligament tears, hip dysplasia, and cancer. Hemangiosarcoma is a rapidly growing, highly invasive cancer arising from the lining of blood vessels of any tissue. More than half of all canine hemangiosarcoma tumors are in the spleen. Spayed female dogs are reported to have two to ten times the risk for developing splenic hemangiosarcoma compared to intact female dogs. This funded study is investigating the hormonal and cellular relationships between spaying/neutering and the development of splenic hemangiosarcoma so that new treatments may be available in the future to extend life expectancies of dogs with cancer.

# RESEARCH PROGRESS REPORT SUMMARY

**Grant 02890:**
*Characterizing the LINE-1 Transcriptome in Canine High-grade Peripheral T-cell Lymphoma by RNAseq to Gain Insight into Mechanisms of Drug and Immune Resistance*

**Principal Investigator:**
*Paul Hess, DVM, PhD*

**Research Institution:**
North Carolina State University

**Grant Amount:**
$33,234

**Start Date:** 03/01/2021
**End Date:** 02/28/2022

**Progress Report:**
Mid-Year 1

**Report Due:**
08/31/2021
**Report Received:**
08/31/2021

*(The content of this report is not confidential and may be used in communications with your organization.)*

**Original Project Description:**
High-grade lymphomas are common cancers of white blood cells in dogs. T-cell lymphoma is a particularly aggressive form associated with poor outcomes. Chemotherapy ultimately fails in T-cell lymphoma patients because of a tiny subpopulation of cancer cells – so-called minimal residual disease (MRD) – that resists most drugs, and eventually takes over, leading to short survivals. Researchers will investigate the role of "jumping genes," a set of genes able to copy and paste themselves into new places in DNA, in T-cell lymphoma. Genes jumping to new spots is disruptive to the integrity of the genetic code, and is permitted only under certain circumstances but can occur when cells become cancerous. Investigators found that jumping genes are unusually active in canine T-cell lymphoma. When cancer cells can suppress jumping gene activity, they can better tolerate chemotherapy drugs and evade immune detection. Researchers hypothesize that MRD emerges during chemotherapy because that subset of cells hijacks a system normally used by reproductive cells to inhibit jumping genes. Investigators plan to use next-generation genetic techniques to define the currently unknown world of active jumping genes in T-cell lymphoma and investigate the molecular causes and consequences of their activity. A successful study will begin characterizing an unexplored pathway used by lymphoma cells, which could be an important new treatment target in a canine cancer that desperately needs novel therapies.

**Publications:** None to date.

**Presentations:** None to date.

**Report to Grant Sponsor from Investigator:**
Lymphoma, a group of cancers of white blood cells, is the most common malignancy of dogs. At diagnosis, the typical dog has that fast-growing-type lymphoma that is already widely spread. Chemotherapy is remarkably effective short-term, but the cancer invariably becomes resistant during treatment. Consequentially, very few patients are cured. The T-cell type of lymphoma, which we study, develops resistance to treatment much more quickly than other types. Survivals average just 7 months. In profiling the T-cell type, we've found that newly-diagnosed lymphomas have unusually high activity of "jumping genes", so named because they are able to cut and paste themselves into new places in the genetic code. Because this activity is dangerous – inadvertent pasting into a normal gene could stop its function – healthy cells suppress jumping genes, but they are turned back on in some fast-growing cancer cells. Interestingly, when cancer cells re-gain the ability to suppress jumping genes, they more easily resist chemotherapy and evade immune detection. We've found that T-cell lymphomas hijack a suppression system used by spermatozoa, fast-growing cells that have special mechanisms for controlling jumping genes. We believe that a small percentage of cancerous T cells quickly become resistant to chemotherapy and immunity by this mechanism, and that's why treatments only work for a short time. Learning exactly how they exploit this mechanism could yield smarter, better treatments. Jumping genes are extremely numerous and spread throughout the chromosomes. Most are quiet and irrelevant. Simply cataloging their presence in cancerous T cells won't be helpful.

*(Continued on page 26)*

# RESEARCH PROGRESS REPORT SUMMARY

**Grant 02829:**
*Investigating the Potential of Phage Therapy to Tackle Staphylococcus pseudintermedius Infections in Dogs*

**Principal Investigator:**
*Gavin Paterson, PhD*

**Research Institution:**
R(D)SVS and Roslin Institute, University of Edinburgh

**Grant Amount:**
$99,830

**Start Date:** 01/1/2021
**End Date:** 02/28/2022

**Progress Report:**
Mid-Year 1

**Report Due:**
07/31/2021
**Report Received:**
07/26/2021

*(The content of this report is not confidential and may be used in communications with your organization.)*

**Original Project Description:**
The spread of antimicrobial resistance is a major threat to modern medicine, for both humans and animals. In the case of dogs, Staphylococcus pseudintermedius is an important cause of infections, especially pyoderma. Antimicrobial resistance in S. pseudintermedius is making infections more difficult to treat which is affecting dog welfare and might pose a threat to humans too. There is a need to explore alternative treatments to antibiotics with one approach being to use phage therapy. This therapy uses naturally-occurring viruses, called bacteriophages (phages) which infect and kill bacteria to treat bacterial infections. Phage therapy has a long history of safe and effective use in humans and has the advantages that it can target drug resistance bacteria with few side effects. This project has a team of veterinarians and scientists working together to isolate and characterize phages that kill S. pseudintermedius which may contribute to the development of new, exciting treatments to benefit dog health and wellbeing.

**Publications:** None at this time.

**Presentations:** None at this time.

**Report to Grant Sponsor from Investigator:**
Antimicrobials are widely used in canine medicine and bring significant benefits to animal health and well-being. However, similarly to human medicine, the spread of antimicrobial resistance (AMR) is a growing challenge to the continued success of these medicines in dogs. The spread of AMR and the prospect of restrictions in veterinary antimicrobial use would have a devastating impact on canine welfare. Morbidity and mortality to infections would increase hugely; even routine infections that are currently tractable could become life threatening. Without effective antibiotics much of modern veterinary healthcare (including critical care, orthopedic and complex surgeries, implants and oncology) would be rendered near impossible. Concomitant increases in veterinary costs could also deter owners from seeking treatment, leading to increased suffering, euthanasia and abandonment. It is therefore critical for dog welfare to tackle the problem of AMR. One strategy is to identify alternative or adjuvant therapies that could be used instead of antibiotics, either to help preserve them by limiting their use or to replace them entirely where they are no longer effective or available for use in dogs. In this AKC CHF-supported project we are investigating the potential of bacteriophages to treat canine bacterial infections, an approach called phage therapy. This work is targeting S. pseudintermedius (formerly designated Staphylococcus intermedius), the predominant organism associated with pyoderma, a common chronic debilitating illness which contributes significantly to the use of large amounts of antimicrobials in dogs. Amid the growing problem of AMR among S. pseudintermedius isolates, the development of new therapeutic options is an urgent need.

Bacteriophages (or phages) are viruses that specifically infect and kill bacteria. Phage therapy exploits these naturally-occurring viruses and has a number of attractive features such as the ability to kill multi-drug resistant bacteria, to have minimal effects on the microflora and an excellent safety profile.

*(Continued on page 26)*

*(Grant 02890 continued from page 24)*

What's needed is to find the very few that are the actual active troublemakers, and learn whether they are the same or unique players in each canine T-cell lymphoma. This is the objective of our study. To accomplish this task, we have to wade through enormous amounts of genetic information. That process can only be done by new, next-generation sequencing methods. In the first half of the study, we extracted and processed the appropriate genetic material (messenger RNA) from canine T-cell lymphoma biopsies, which is currently being sequenced in two different ways at the NCSU high-throughput sequencing core facility. In the second half of the project, which will begin when sequencing data is returned, we will decode this information to provide a completely new picture of jumping gene activity and active suppression mechanisms in T-cell lymphomas of dogs.

*(Grant 02829 continued from page 25)*

The support of the AKC Canine Health Foundation has allowed us to undertake a large screen of canine samples to find phages that can kill S. pseudintermedius. Four phages of interest have been found and these are being taken forward for further study while the search for other phages continues.

If successful, this project will be highly novel and open the possibility of a new approach to treating veterinary infections in the face of antimicrobial resistance. This is clearly significant given the huge threat that antimicrobial resistance poses, and the impact is applicable not just to canine atopic dermatitis and S. pseudintermedius infections but across all of canine and small animal veterinary medicine

Tacking this challenge would not be possible without the kind support provided by the AKC CHF and we look forward to updating you further in due course on the success of our work.

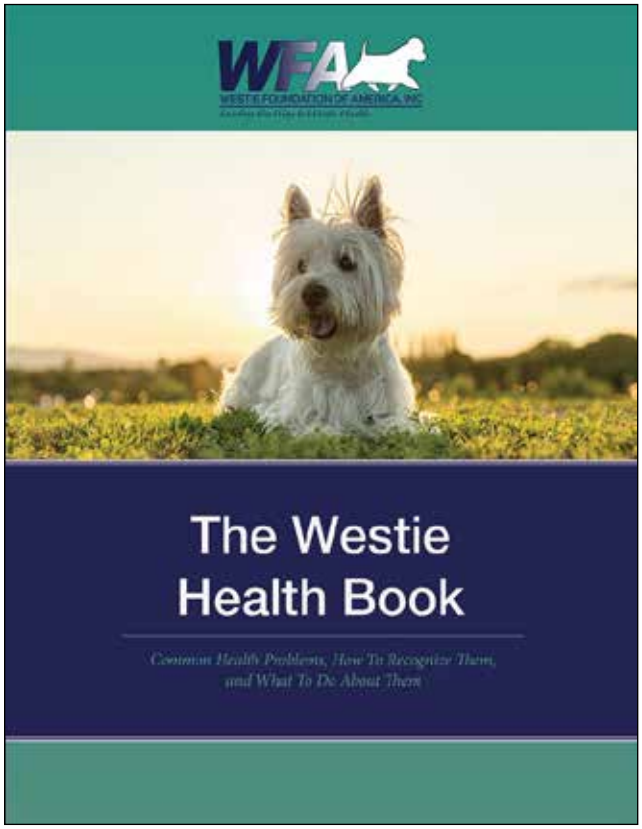
# Westie Lung Disease Project

*By Professor Brendan Corcoran MVB, PhD, DipPharm, MRCVS,*
*Chair of Veterinary Cardiopulmonary Medicine, University of Edinburgh*

At the University of Edinburgh Veterinary School, we are particularly interested in Westie Lung Disease (WLD) and in identifying new treatment options, and are currently running an exciting project funded by the Westie Foundation of America, Inc. The project is in its first year and will finish in September 2023. We are actively encouraging owners of dogs with WLD and their veterinarians to become involved with this project and the details can be found through this link https://blogs.ed.ac.uk/westielungdisease/publications/.

The Westie Lung Disease Project aims to validate a new treatment approach that will markedly improve patient quality of life and survival. It also aims to examine how engagement with owners and veterinarians world-wide can help us better understand the disease, how it impacts on canine welfare and on owner emotional and financial stress. Recent work by ourselves have identified novel findings that has allowed us to re-appraise what type of disease WLD actually is. Knowing about these findings greatly enhances our approach to the diagnosis, treatment and management of the disease. Previously, it has been presumed that WLD is a condition known as Idiopathic Pulmonary Fibrosis (IPF), but newer discoveries, in particular using High Resolution Computed Tomography (also commonly known as a Cat Scan), suggest otherwise and that WLD is more similar to a much rarer disease in people called Non-Specific Interstitial Pneumonitis (NSIP).

The benefit of this newer view of WLD is NSIP is treatable (but not curable) while IPF is not. Any benefit WLD cases have had so far with treatment also suggests the condition is not IPF. If your dog is affected by WLD, we would be delighted to hear from you, and liaising with your veterinarian we would offer to help with diagnosis, treatment and management. You could also help this project by spreading the message to other Westie owners.

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Create the winning caption for this Westie cartoon. Please send your caption to bjpinter@msn.com before June 15, 2022. The winner will be announced in the next newsletter with their caption.

## Create a Caption for this Cartoon

*Copy of original watercolour by Ruth Sutcliffe, England*


## Winning Caption of Last Cartoon!

**April Sullivan**

**"A HORSE! A HORSE! MY KINGDOM FOR A HORSE!"**


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