From the President, Gerrie Oliver  
60 Columbus Ave, Closter, NJ 07624-2455  
Phone: 201-768-1282/Email: gerrieoliver@hotmail.com

The CCA National in Springfield, MA was spectacular. Sincere thanks to Specialty Chairperson Laura LaBounty and the entire team for a job well done. CHF also did a great job with the traditional silent auction table, promos table, membership table and the Thursday night auction & dinner. Thanks to the many generous auction donors and to all the many CHF workers who gave up their time to help. Thanks, too, to everyone who supports CHF at these events!

CHF welcomed Dr. Leigh Anne Clark, Professor and Researcher, Department of Genetics and Biochemistry, Clemson University and her research assistant, Jacquelyn Evans who shared their findings on the Collie Whole-Genome Sequence in a special presentation on Thursday afternoon. Dr. Clark also provided interesting new information on gray collie syndrome. Be sure to check out CHF Member Kathy Moll’s excellent account beginning on page 9.

With gratitude and appreciation, the 2013 President’s Award was presented to Michele Brane. Michele has never refused a request to help CHF and has served in a myriad of jobs as far back as 2005 by handling Juniors’ Certificates, advertising, creating the list of grants and the overview of tests and studies for the new website--not to mention writing an article on navigating the website for the Bulletin which became part of the Breed Ed Seminar in 2013. Michele also helps the CHF by sharing her artistic talents with us and donating beautiful hand painted items for the night auction each year.

August will be here soon and while searching to find something new to tell you about The Gathering, I went backwards in time to the 1998 article Nancy McDonald wrote for the Cornucopia (remember that?). Nancy’s account of the second Gathering at Sunnybank reminded me of the wonder, mystery and romance that is still “The Place”. Among all the wonderful weekend happenings that year, Nancy delighted in having Claire Leishman, who unselfishly dedicated a lifetime to collecting and preserving Terhune’s treasures, as key speaker. How amazing is it that 15 years later we can still celebrate those treasures and Claire, too? In tribute to the “FABULOUS FEMALES” of Sunnybank, the story of this Quarter Century Collie Group Right Stuff Award Winner will be featured in a repeat of the original presentation. Come celebrate Claire and all the Fabulous Females of Sunnybank this August 16th & 17th and discover the wonder, mystery and romance for yourself!
In speaking of Right Stuff Award Winners, I last had the sad duty to report the passing of a great lady, the mistress of Deep South Collies, Helen Denton. Helen served in many capacities but most notably as President of the Collie Health Foundation, Chairman of the Grants Committee, worker at the early Gatherings and a fixture at every CHF Auction. Recently CHF was notified of a very generous $20,000 bequest from Helen’s estate. I think her dear friend, Pati Merrill, said it best in Helen’s Right Stuff Award tribute “The Foundation – she was there when it started and she continues to be there…” In recognition of her generous contributions to CHF, the Board voted to donate $25k of the $50k epilepsy initiative funding in honor of Helen Denton in order for her to be recognized the AKC/CHF "Millenium Founder" level donor.

Thanks for everything you do to help us grow!  

- Gerrie

Treasurer’s Report
Nancy McDonald, Treasurer

Collie Health Foundation
Balance Sheet as of March 31, 2014

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Grrrrrl Power!

Fabulous Females of Sunnybank

August 16-17, 2014
The 18th Annual Gathering at Sunnybank
381 Terhune Drive, Wayne, NJ 07470

SATURDAY, AUGUST 16th

9:00 am & 9:30 am
Sunnybank Walking Tours
Guides: Marilyn Horowitz & Kathy George
Judy Leathers & Donna McKoy

11:00 am - The Gathering’s Own Fabulous Females!
Kristina Marshall on Sunnybank Jean and her Kennelmates
Kathy George on Sunnybank in the Words of its Fabulous Females
Noralee Smiley on Marion Harland
Donna McKoy on Anice Terhune
Judy Leathers on Claire Leishman
& QCCG’s Tribute to Claire

10:00 am to 2:00 pm - Microchip Clinic @ Gazebo - $25
AKC CAR Including lifetime enrollment; no annual fees
24/7 support by dedicated recovery experts - Collar ID tags

1:00 pm - CGC & CGCA Testing - $15

1:00 pm - Rally Demonstration

Portobello’s, 155 Ramapo Valley Road, Oakland
$40 - Advance Reservations or $45 at door
Send Your Check to Gerrie - Payable “CHF”

SUNDAY, AUGUST 17th

9:00 am
Collie Memorial & Bagpiper at Sunnybank
Complete order form below and mail together
with your check for $4 payable to “CHF” before August 1st
FMI: Sue at 201-391-9826 or susiezo@aol.com

10:00 am - Virtues Match
* PROFILE * SKULL* MUZZLE* EXPRESSION*
* OUTLINE * FRONT* REAR** SIDE GAIT**
Moderated by Royal Rock’s Leslie Canavan
Judges: Joan Kirkland, Kirkhaven
Lee Runnels, Kimberee
Marianne Sullivan, Millknock

10:00 am - CGC, Lad of Sunnybank Memorial Match
“Lad of Sunnybank” Trophy Best in Match
Judges: dogs:
Erin Blaisure, Tirnanog
Bitches: Robette (Johns) Ehrbar, Rowbar

Event Prices: $5/Virtue or $12/3
Juniors, Lad Match Entry & Rally Fun Run: $5
Microchip $25
CGC $15  TDI $25

BREAKFAST & LUNCH AVAILABLE
SATURDAY & SUNDAY
Courtesy of Boles’ Bistro & CCNJ

T-SHIRTS, PREMIUMS, AUCTIONS
PAYMENTS WITH “SUNNY MONEY”
*SORRY, NO VENDORS ALLOWED*

HOLIDAY INN EXPRESS, 303 Union Ave., Haskell, NJ 07420 - Call DIRECT 973-839-4405
LA QUINTA INN & SUITES, 1850 Rte. 23 & Ratzer Rd., Wayne, NJ, CALL DIRECT 1-973-696-8050
FMI: Gerrie Oliver, 60 Columbus Avenue, Claster, NJ 07624 - (201) 768-1282 - gerrieoliver@hotmail.com
or Nancy McDonald, 2934 Cotten Road, Sanford, NC 27330 - (919) 718-9347 - nancy@collieexpressions.com

VISIT THE VAN RIPER-HOPPER HOUSE
533 Berdan Avenue, Wayne, NJ 07470
973-694-7192
Collie Memorial Celebration at Sunnybank
Memorial Card Order Form

Name for (memorial) (celebration)____________________________________________________________________________________________

Any additional information (title, year of birth, etc.) (8-10 words only please)______________________________________________________________________________

Your Name:_____________________________________________________________________________
Street Address:_____________________________________________________________________________
City State Zip:__________________________________________________

Total number of cards ordered at $4.00 each __________
Total amount enclosed: $ __________

Please make your check payable to CHF.  
FMI: Sue at 201-391-9826 or susiezo@aol.com

To:  Ms. Susan DeLorenzo
     22 West Park Avenue
     Park Ridge, NJ  07656

If you wish to have your card(s) mailed after the Memorial, enclose a No. 10 SASE for every 2 cards ordered, or a SAS priority mailer if you are ordering a large quantity and send by August 10, 2014.

Collie Memorial Celebration at Sunnybank
Memorial Card Order Form

Name for (memorial) (celebration)____________________________________________________________________________________________

Any additional information (title, year of birth, etc.) (8-10 words only please)______________________________________________________________________________

Your Name:_____________________________________________________________________________
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The Collie Health Foundation Joins the AKC Canine Health Foundation’s Epilepsy Research Initiative as a Champion Sponsor

The Winter 2013 Newsletter included an announcement that the Collie Health Foundation had joined the AKC Canine Health Foundation’s Bloat Initiative as a Champion Sponsor. In late May 2014, the CHF Board voted to again join with the AKC Canine Health Foundation and support their Epilepsy Research Initiative as Champion Sponsor pledging $50,000 toward the initiative. The following information came from the AKCCHF and has been edited and reformatted for our newsletter.

AKC Canine Health Foundation Launches Epilepsy Research Initiative

WHAT IS EPILEPSY?

Epilepsy is a general term for neurological conditions that cause seizures.

**Epilepsy is among the most common neurological disorders in dogs.** Any breed of dog and mixed-breeds can be affected by epilepsy. Epilepsy can be heritable and some breeds are believed to be predisposed to the condition. More information on seizures in dogs is available from the American College of Veterinary Internal Medicine.

WHY FOCUS ON EPILEPSY IN 2014?

Epilepsy research is an unmet need articulated by dog clubs, owners and veterinarians. Much more must be done to understand the causes of epilepsy and to develop additional treatment options. Approximately 30% of all dogs diagnosed with epilepsy are not able to achieve relief from seizures with the current drug therapies available. The current drug treatment options also carry possible negative side-effects. Epilepsy is often a devastating diagnosis for a dog and his owner.

**We must make a significant investment to make real progress in the fight against epilepsy.**

Because little is understood about the causes of idiopathic epilepsy, more work must be done to define the underlying molecular mechanisms that cause the disease. The life-altering nature of epilepsy is of foremost concern to the AKC Canine Health Foundation and will require a major research effort. We need significant sponsorship from dog clubs as well as donations from individuals and corporations.

The Request for Proposals is written as a two phase effort. The recipient(s) of the Phase I grant(s) will be expected to deliver something demonstrable so that research on epilepsy moves forward in a substantial way. Collaboration among researchers is required to translate results from bench to bedside as rapidly as possible. The request for proposals released to the research community follows.

**Epilepsy Initiative**
**Request for Proposals**
Released to Researchers on February 20, 2014

The seizure-related syndromes collectively known as epilepsy represent one of the most common neurological disorders in dogs, and as such are a significant concern to the AKC Canine Health Foundation and our donors. In response to donor concern, CHF is launching a major, two phase research effort to better classify disease, understand the underlying mechanisms that predispose dogs to epilepsy, and finally, to introduce new drugs into the canine epilepsy treatment pipeline.
To insure success, the Epilepsy Research Initiative requires the formation of collaborative pre-clinical/clinical research groups who will work together to define the molecular basis of epilepsy and develop disease modification or prevention strategies. It is expected that formation of collaborative pre-clinical/clinical research teams will accelerate the discovery phase and thus the translation of research from laboratory bench to patient. Successful applications must demonstrate both a strong understanding of the clinical syndromes themselves and a rigorous preclinical research base.

Phase I: Discovery

As epilepsy has a wide range of severities, precipitating causes, comorbidities, and treatment outcomes, any major prevention/therapeutic target identification effort must include the goal of accurate disease diagnosis and phenotyping. In Phase I researchers are expected to focus on defining the underlying molecular mechanisms of disease within clearly stratified patient populations. While genomic studies can be a component of pre-clinical research, GWAS in the absence of complementary proteomic, epigenomic, metabolomic, transcriptomic or pathophysiology studies will not be considered responsive to this RFP.

Overarching ‘Special Topics of Interest’ include, but are not limited to:

- Discovery approach to define the pathophysiology of canine epilepsy. The focus of discovery research should be epilepsy prevention and/or identification of novel therapeutic targets.
- Overcoming the blood brain barrier to delivering potentially novel anti-seizure agents such as RNA therapies, genes, antibodies, or cell therapies to treat epilepsy.
- Identify and validate biomarkers that define a beneficial response to treatment.
- Define novel ways to image brain chemistry and function during seizures to better phenotype disease.
- Develop systems that anticipate epileptic seizures and deliver a therapy to halt them.

Milestones that will trigger submission of Phase II applications must be clearly defined in Phase I grant applications. Funding in phase I is expected to be up to $100,000 per award.

Phase II: Implementation

Using data from Phase I studies, researchers will design and conduct patient-centered studies that will lead to tangible outcomes in disease prevention and/or treatment. Funding in phase II is expected to be up to $250,000.

Research Deliverable: At the conclusion of Phase I and II of the Epilepsy Research Initiative dog owners and the veterinary community will have improved methods for preventing and treating Epilepsy in dogs.

Samantha Wright, AKC Canine Health Foundation Program Manager notified the Board that the AKC Canine Health Foundation received six applications in response for the RFP from the following investigators:

Hannes Lohi, PhD; University of Helsinki
Sam Long, PhD; University of Melbourne
Charles Lee, PhD; Louisiana State University
Ned Patterson, DVM, PhD; University of Minnesota
Jennifer Gambino, PhD; Mississippi State University
Holger Volk, DVM, PhD; Royal Veterinary College

The next step is to assemble their scientific review group; made up of experts in the field of neurology and epilepsy who declare that they do not have a Conflict of Interest (COI) with any of the applicants.
Donations in Honor/Celebration/Memory
General Donations
February 1, 2014 – June 30, 2014

Donor

Patricia Schroder
Mary Ellen & Roger Splinter
Joani & Sami Berg

Jean Coffey
James S. & Irene C. Lackman

Erin Matthews & Rich Bellows
Joan Scheulen
Carol Brim

Lloyd Broggini
Broggini Family
Helga Kane
Wendy Bush Lyons, Esq.
Andrea Moss
Kathleen N. Peters
Jack & Lorraine Santi
Lawrence S. & Theresa M. Uzelac
Jean A. Wasiak
Mary & Rose Robischon
Gerald & James Ardine & Danielle Fuller
Central New York Kennel Club, Inc.
Collie Club of Georgia

Jean P. DeGruchy
Nancy Jan Holbrook
Judith D. Kirkeby
Earl & Linda Rogers
Shirley Schaffer
The Hurricane Ridge Kennel Club
Jane Gunnit
Suzanne Walsh
S. James & Janice Coppersmith
Orville & Becky Crowley
Orville & Becky Crowley
Orville & Becky Crowley
Helen K. Denton
Joseph & Michele DiCarlo
Karing K9's Therapy Dogs

In honor/celebration/memory of....

In memory of Ed Bechtel
In memory of Sampson, beloved pet of David & Karen Steen
In memory of GCH Highcroft Lode-Arks Roulette & Sashay Enchanter's Strut'n My Stuff (Belle)
In memory of Ed Bechtel
In memory of "Teddy" 9/6/01 - 1/10/14, Crispin Lord of the Dance CDX, RE, CGC, HIC, TDI
General Fund
In memory of Ed Bechtel
In memory of beautiful "Apache" loved and cherished by Johanna Lance of Cleveland

In memory of Martha Hoffman
In memory of Martha Hoffman
In memory of Janet "Jidge" Holbrook
In memory of Lynne Dorsey
In memory of Cathy Toft
In memory of Lynne Dorsey
In memory of Janet Holbrook
In memory of Peter Kane
In memory of ALL the collies I've had since I was a child!
In memory of Lynne Dorsey
In memory of Judith Ardine
In memory of Brady, beloved collie of Deanne Balutis
In memory of Gail & Millie Meyer & their many contributions to the Collie Community

In memory of Lynn Dorsey
In memory of Janet "Jidge" Holbrook
In memory of Rita Stanczik
In memory of Judith Ardine
In memory of Judith Ardine
In Memory of Janet "Jidge" Holbrook
In memory of Evelyn Honig
In memory of Maestro, owned and loved by Noreen Bennett
In memory of the lovely Evelyn Honig
In memory of Linden Lane Tough Tactics (Tad)
In memory of Rita Stanczik
In memory of Evelyn Honig
Bequest
In memory of Evelyn Honig
In memory of V-CH U-GRACH5 U-ALCH BIMRS/BIS U-CDX FAITHFUL PROMISE KEEPER, CD, HSAsd, AX, AXJ, OAP, OJP, NFP, RAE, NAC, RS-N, THD, CC, BPDX, CGC, AWCA AOM I, II, III and Oklahoma Veterinary Medical Assoc. 2012 Hall of Fame Inductee - "Jackson"
In memory of Evelyn Honig

Mary Lenertz
Donations in Honor/Celebration/Memory
General Donations
February 1, 2014 – June 30, 2014
continued

Donor
Kathleen N. Peters
Mary H. Wells
Mary H. Wells
Mary H. Wells
Nancy Van Note
Sean Devlin
Judith D. Kirkeby
Kathleen N. Peters
Maria Elwan Theriault

In honor/celebration/memory of....
In memory of Evelyn Honig
In memory of Malcolm, the Proulx family collie
In celebration of Audrey Proulx's Graduation from Stanford
In celebration of Anna Diaz's Graduation from Loyola Marymount University
In memory of Linden Lane Tough Tactics (Tad) and Linden Lane Butterfly (Kitty) beloved collies of Orville & Becky Crowley
In loving memory of Lynne Dorsey
In memory of Albemarles Lady (Allie) 2001-2014
In memory of Dennis Day, Abbehurst
In memory of Evelyn Honig

Study Assistance Request!

Editors note: We received the following study assistance request from Animal Cell Therapies, Inc. This is not part of the work of the Collie Health Foundation.

Animal Cell Therapies is beginning clinical trials for using stem cell therapy to treat dogs who have osteoarthritis, laryngeal paralysis, ligament/tendon issues, Rheumatoid arthritis, liver disease, and burns. Our pilot studies have shown significant improvement with no adverse side effects. We are seeking funding to continue our studies, as well as volunteers who would like to participate in these studies. In addition, we are recruiting vets to administer our stem cells, as well as collect and donate umbilical cords from caesarian sections for the harvesting of stem cells.

Our primary clinical trial is taking place at the University of Florida, and we are recruiting further pilot studies across the country.

If your organization knows of any dogs who could benefit from treatment for arthritis (or any of the above-mentioned medical issues), please let us know, as we would love to assist in providing this ground-breaking treatment. As we are still in the clinical trial phase, we would be providing stem cell therapy at no cost.

Further information can be found on our website: www.actcells.com, as well as our YouTube channel: http://bit.ly/actvideos.

Kat Rheinbold
Executive Assistant
Animal Cell Therapies, Inc.
10054 Mesa Ridge Ct, #106
San Diego, CA 92121
ACTcells.com
Kat.Rheinbold@ACTcells.com
P: 858-678-8843
F: 858-678-0621
**RESEARCH UPDATE FROM CLEMSON UNIVERSITY CANINE GENETICS LAB**

**THE SEARCH FOR THE ALLELES FOR DERMATOMYOSITIS IN THE COLLIE & SHETLAND SHEEPDOG AND THE MAPPING OF THE COLLIE GENOME**

*Presented by Dr. Leigh Anne Clark, Jacquelyn Evans & Dr. Allison Starr-Moss*

*Written by Kathy V. Moll*

Reprinted with permission from the Collie Club of America Bulletin and reformatted for this newsletter. Because of space restrictions, four pie charts and one picture that were in the original article are not included here.

**Introduction:** It is my sincere wish that those who were not fortunate enough to attend the presentations sponsored by the Collie Health Foundation at the 2014 National study this article. The first presentation was Thursday afternoon and then was repeated at the CHF dinner and auction. Dr. Clark has provided me with suggestions and edits along with a few of the slides she and her colleagues used. Science isn’t always spell-binding, but in this case, *the presentation was excellent and contained information that is crucial for the future of our Collies!*

CHF President Gerrie Oliver introduced the speakers from Clemson University Canine Genetics, Dr. Leigh Anne Clark, Jacquelyn Evans – graduate student - and Dr. Allison Starr-Moss. All have been working on research projects concerning the Collie genome and specifically on the auto-immune disease, dermatomyositis (DM or DMS), occurring mainly in Collies and in Shetland Sheepdogs. The reason for the addition of the “S” in the abbreviation identifying dermatomyositis is to distinguish it from another canine disease called degenerative myelopathy, also abbreviated DM. These two diseases are not related to each other. To avoid confusion, we will use DMS to identify the Collie/Sheltie disease in this article.

Dr. Allison Starr-Moss introduced the new Clemson Genetics Counseling Service for Dog Breeders, a course for students of genetics with an interest in genetics counseling. She also handed out the pamphlet, *Breed Healthy Dogs Through Understanding Basic Genetics,* created by these students. Email Dr. Clark lclark4@clemson.edu or Dr. Starr-Moss astarr@clemson.edu to receive copies for use at club meetings and functions. Dr. Starr-Moss asked for suggestions that breeders would like to see included to improve the pamphlet, currently a work in progress. Please send your suggestions to her.

**Background:** Jacquelyn Evans spoke next about chromosome 12 where immune system genes are located, including auto immune disease genes such as diabetes, hypothyroidism, lupus and dermatomyositis (DMS). Identification of the chromosome is a giant step toward finding the DMS alleles. The team made this important chromosome discovery.

Each puppy in a litter gets one copy of each chromosome and one copy of each gene on each chromosome from its sire and its dam. The pairs of each gene in the puppy are called alleles. If these pairs are identical, they are called homzygous for the trait the genes control. If they are different, they are called heterozygous for the trait. Taken together alleles (pairs) form the puppy’s genotype (genetic makeup); the traits that are visible to the breeder in the puppy are called its phenotype (physical appearance).

**Immune System Alleles:** When working properly, immune system genes produce proteins that allow the body to distinguish its own proteins from those proteins that come from outside sources such as bacteria. Thus, the dog’s healthy immune system can mount a response to outside proteins that attack its body and overcome them. Heterozygosity for immune system alleles allows for maximum protection and a healthy immune system.
In recent GSD studies, the Clemson team discovered that 70% of the population was heterozygous for 11 immune system alleles. In Pembroke Welsh Corgis the percentage was even higher. So it appears that there are healthy genetic immune system choices in these two breeds.

Unfortunately, modern American Collies are not as fortunate; over time we have reduced our heterozygous immune system population. In the population studied, 100% of the Collies were homozygous for immune system alleles. Subjects varied widely in background and included rescues, pets and show Collies. Available pedigrees helped eliminate Collies that were closely related in the first two generations.

International Collies studied were slightly better off for heterozygous in 2 alleles identified in the breed. The same pedigree criteria were applied to European, Australian and a few South American Collies. None with American ancestry were included. Still, 87% of these Collies were homozygous, leaving only 13% heterozygous for the 11 immune system alleles. The team is still collecting genetic data to help widen the samples.

Driver/Passenger Effect & Bottlenecks: While the exact reasons for the loss of diversity are unclear, there are a couple of possible explanations. One may be that the selection for particular behavioral and physical traits, such as herding in past generations, have created driver and passenger genes. Unrelated genes exist together on DNA strands. In the past, breeders have systematically selected for particular traits. If most breeders are doing so for generations, then the driver/passenger effect takes over among genes in close proximity to each other on a strand. For example, the genes for a Collie physical trait may become the driver, carrying along the neighboring immune system genes that have now become passengers. Selecting for homozygous alleles for the physical trait might cause a reduction in the alleles of the surrounding genes.

Another possibility is that only a small number of imported Collies became the foundation for all early American Collie kennels at the turn of the 20th century, causing a bottleneck at that period in our breed’s development. Bottlenecks vastly reduced the number of different genes in modern dogs. The first species-wide canine bottleneck happened when dogs were domesticated thousands of years ago, because only a small population of grey wolves contributed to the creation of modern dogs. The second overall bottleneck occurred when people began selecting for characteristics in temperament and appearance, creating different breeds for specific work. Individual breeds often have their own bottlenecks.

Genetic Mapping Process: Dr. Clark explained how the team narrowed the search for the location of the alleles causing DMS among the 40 canine chromosomes containing hundreds of thousands of genes that make up the Collie’s genotype. Of the over 600 genetic diseases in dogs, 65% are autosomal recessives. For example, in Collies progressive retinal atrophy (PRA) is a simple recessive. This disease occurs when the dog has two recessive alleles for the disease which causes blindness. Collies that are heterozygous (only one recessive gene) are carriers of the disease, but have a normal allele that prevents them from having the disease. The genes that cause dermatomyositis are among the 35% that are not autosomal recessives, so finding the location and determining inheritance and then eliminating the disease is more complicated.

DMS Definition & History: Dr. Clark showed slides of Collies affected with DMS. The disease presents with skin lesions, usually on the face, ears and bony prominences and may also include muscle atrophy, especially in the temporal and masseter muscles of the head. Severity varies widely from barely noticeable to severe. The affected dog can live a normal life span with few outbreaks or can die very prematurely. DMS auto-immune disease
should not be confused with demodectic mange, which is not an auto-immune disease. The latter is likely a temporary T-cell disruption in puppies, is usually localized and typically goes away for good once the puppy’s immune system is fully functional. The confusion of the two is understandable because both have a puppy onset. Unless mange is generalized and resistant to treatment, it is much less serious than DMS.

A study conducted in the 1980s test bred DMS affected Collies to Labrador Retrievers, a breed that does not have any recorded cases of DMS. When the two affected Collies were bred to each other, the resulting litter produced 6 puppies; all of which were affected. When the same affected Collie sire was bred to a Lab, four puppies resulted; three of whom were affected. This tells us that DMS is not caused by a simple recessive. Instead it is dominant; only one copy from one parent is needed to produce the disease. Factors controlling the severity of DMS may include incomplete penetrance. If a mutation in the gene responsible for DMS has 80% penetrance, then 80% of those with the mutation will develop the disease, while 20% will not. Another possible factor is variable expression, which occurs when a phenotype is expressed to a different degree among individuals with the same genotype. It is possible that some dogs with DMS have such a mild case that it goes undetected. Environmental triggers such as bacteria and viruses may also be involved. Once the DMS alleles are identified, the exact factors that control inheritance may also become clear.

Specific Criteria & the Mapping Process: The team used SNP’s and a technique called association mapping to start tracking down the culprit alleles. One group of DMS affected Collies and one control group of Collies with no DMS family history were used. The object was to compare regions in the DMS group that were different from regions in the control group. The selection criteria for these groups were as stringent as possible.

All affected Collies had been diagnosed by pathologists as probable DMS. Probable is the closest to definitive as anyone can get since other auto-immune diseases, such as lupus, read very much like DMS, so other criteria are used by pathologists to determine which disease is most likely. The controls were Collies 8 years or older that had no history of any type of skin disease and no closely related familial ties to skin disease.

In addition, checks for population balance were utilized. For example, Collies in the DMS group and control group varied in coat color, creating balance. Collies in both groups were all American bred, also creating balance. The team used principle component analysis to plot for balance and eliminated individuals that created imbalance.

The team genotyped thousands of SNPs to discover whether there is an allele of a SNP that occurs more frequently in DMS affected Collies than in non-affected. The goal was to sort through the SNPs to determine those with no association to DMS from those with a possible association. A tool called a bead chip was used to obtain individual Collie genotypes; it has the capability of identifying 173,000 SNPs.

In the next research stage, the team began preliminary mapping for dermatomyositis with surprising results. The region in which DMS occurs was narrowed down more quickly than expected, so research began on the genotypes in that region. Of the Collies that had 2 copies (homozygous) of the suspect DMS region, 92% exhibited the disease. Of the collies that had one copy (heterozygous) of the suspect DMS genes, only 18% exhibited the disease. It may be that the small percentage (8%) of homozygous Collies without signs of DMS never encountered a trigger that activated the auto-immune response, or that the disease signs in these Collies were too mild to be noticed by the owner or that symptoms were not going to appear until well into old age.

The team has narrowed thousands of genes to just over 100 suspect genes in a specific region of the genome. The goal now is to identify the DMS genes that are the driver genes from the many passenger genes along for the genetic ride.

Additional Funding, Research & Breeding: Because DMS also occurs in humans, the team applied to The National Institute of Health and received $300,000 to continue working. Their research in Collies benefits DMS research in human medicine. The next step in narrowing the number of genes further is to do a parallel study in
Shetland Sheepdogs that also have DMS. The aim is to use this study to locate DMS in the same region in affected Shelties and narrow further the region identified in Collies. In both breeds the genes are very likely to be the same. The team has already done much of the preliminary work on both the affected Sheltie group and the control group.

Dr. Clark’s suggestion to breeders is that once a reliable test for DMS genes is created, breeders carefully attempt to breed first for Collies that are heterozygous for DMS. Any attempt to eliminate all Collies from the gene pool with only one copy of the gene would likely result in destructive bottleneck. Collies have had bottlenecks in the past, and our breed cannot afford another one. Very slowly eliminating heterozygous Collies is the only prudent approach since they have an 18% or less probability of having the disease. Further reducing genetic diversity in the Collie is far more dangerous.

The Collie Genome & Selective Sweeps: In addition to all the research that has been done to identify DMS, the team has also mapped the entire genome of 5 Collies in the study. This was a tremendous undertaking because the dog genome contains 2.5 billion base pairs. Of these Collies, two had no common ancestors for 4 generations, and 3 had none for at least 7 generations. The resulting gene chart from such mapping revealed selective sweeps in all 5 Collies. Remember, as breeders select over generations for a trait, the allele of the gene that causes that trait becomes more common in the breed. Alleles of other genes that are close by become more common, too. A "sweep" is a region with little genetic variation due to selection.

Dr. Clark showed slides of those results. What they reveal are sweeps in which breeders have consistently selected for a trait, for example, length of head. This multi-generational selection process becomes a driver/passenger effect in the genome. The gene for the selected for trait becomes the driver, and other genes on the same chromosome come along as passengers. These selective sweeps were evident on some Collie chromosomes, including chromosome 12 where the immune system genes reside. The driver genes in our breed have not yet been identified.

Normal Grey Coat Genetics in Collies: As a side product of the Collie Genome research, Dr. Clark was able to sort out the mystery of normal grey Collie coat color (no relationship to lethal greys). In testing the DNA from several different normal grays, she discovered that these Collies are actually blue merles with an additional mutation that eliminates the visible spots and produces a nearly solid grey coat. Normal blue merle littermates to a normal grey have no more chance of producing normal greys than any other blue merle. Also, no health related problems are associated with the mutated merle gene that produces solid greys than with any other Collies. Dr. Clark cautioned breeders against euthanizing these normal greys because they will be the same as any other Collie without the mutation, except for their coat color. However, these normal greys when bred reproduce their grey color. If breeders do not want to propagate this color, they should not breed greys.

Harlequin Pattern Coat Genetics in Collies: The subject of harlequin coat pattern came up. Dr. Clark believes harlequin in Collies results from a change in DNA within or close to the merle gene. It is not the same gene that produces harlequin coats in Great Danes. Dr. Clark and her colleagues found the harlequin gene in Danes a number of years ago. This separate allele does not exist in Collies. Most harlequin merles in breeds other than Danes reproduce a preponderance of harlequin blue merles, but can occasionally produce non-harlequin blue merles. Contrary to what some mistakenly believe, harlequin patterned Collies are not defective, and no additional health problems have been associated with the pattern.

Conclusion: All of us who love the Collie owe Dr. Clark and her colleagues a huge debt for the massive amount of work they have done on our behalf. How we use the knowledge they provide will literally determine the inheritance we leave to our beloved Collies. Much more vital information is already in the Clemson Genetics’ pipeline and will be available as soon as it has been verified by this dedicated team. It’s our job to learn as much as we can about how to use genetic information wisely. It’s a crucial part of what we create for future generations!
MEMBERSHIP BENEFITS!

You know the Collie benefits when you join the Collie Health Foundation as your dues help fund health research. Indirectly you benefit when the dog you love is able to live a longer and healthier life because of genetic testing available to breeders or increased knowledge on how to prevent/treat disease or other health issues. This is just a reminder that YOUR MEMBERSHIP OFFERS YOU A DIRECT BENEFIT in the form of rebates for select DNA tests.

Rebates are offered to CHF members only for Optigen’s PRA test, Optigen’s CEA test, Washington State University’s MDR1 test, and Canine Cyclic Neutropenia (Gray Collie Syndrome) testing through either Health Gene or VetGen. These rebates for testing are only available through the end of 2014 so do your testing soon! See the Winter 2014 newsletter or visit the Collie Health Foundation’s website at www.colliehealth.org/announcements.asp for more details.

Grant Approved for a Pilot Trial of Stem Cell Treatment of Dermatomyositis

In March, the Board approved a grant of $18,000 for a 12 month pilot trial of stem cell treatment of dermatomyositis. This amount will be only to cover the evaluation and follow-up of the patients. The Tufts University Laboratory of Regenerative Medicine will supply the stem cells. The following information was provided by the researchers in their letter of intent.

Project Description (Background):
1. Dermatomyositis is a prevalent and severe disease that specifically targets Collie dogs. Some of them have a poor life quality.

2. There is not a good, effective treatment for this condition. Some treatments are effective but have severe side effects (especially on the long term: steroids). Management is very difficult.

3. The disease is only partially understood. According to the most accepted pathomechanism an immune mediated reaction is the main pathogenic mechanism. Stem cells have proved to have immune-modulatory properties.

4. The equivalent condition in humans has been treated successfully with stem cells.

Project Description (Design):
Prospective, open pilot trial. Six dogs affected by dermatomyositis would be treated with canine embryonic cultured and well-characterized stem cells (IV, 1 M stem cells/kg). The severity of the lesions will be assessed with an objective scoring system. If good results are obtained in this pilot trial, a larger study could be developed to establish the best treatment, dose scaling, selection of the most adequate patients and concomitant therapy.

Researchers:
Lluis Ferrer, DVM, PhD, Dip ECVD. Professor of Dermatology. Dermatologist and dermatopathologist. Experience in stem cell therapy in canine skin diseases.

Andrew Hoffman, DVM, DVSc, DACVIM. Director of the Laboratory of Regenerative Medicine. This is the leading laboratory in veterinary regenerative, stem cell and nanomedicine. The Laboratory is funded by the NIH and several Foundations and private companies.

Research Institution/Affiliation:
Department of Clinical Sciences / Laboratory of Regenerative Medicine / FosterHospital for Small Animals. Cummings School of Veterinary Medicine. TUFTSUNIVERSITY (MA, US).
Welcome

The Collie Health Foundation
Welcomes the Following New Members

Debra & Shawn Amszi**
Austin, TX

Dennis Burke
Covington, LA

Joanne Cowulich**
Berkshire, NY

Alexzandra Erb
Ethel, WA

Karen & Gary Gordon
Bridgewater, CT

Amy Hauser
Coupeville, WA

Elaine Kennedy** & Robert Holley
Pine Grove, PA

Ray Lavelle
Minneapolis, MN

Thomas Montero**
Sanford, FL

George Robert Rohde**
Tinley Park, IL

Darlene Santistevan
Fowler, CO

Michelle Struble
Bondurant, IA

Sharon Vanderlip, D.V.M.
Lakeside, CA

Kim Wellington
Issaquah, WA

Beverly A. Bain**
Circleville, OH

Jacquelyn Cary
Cedar, MN

Mary Eades
Sunnyvale, CA

Katie Finley
Concordia, MO

Jeanne Gregory**
Seattle, WA

Nancy Jan Holbrook
Clinton, WA

Holly L. Kossuth, D.V.M.**
Follansbee, WV

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Stroudsburg, PA

Jim O’Connor & Hank Odum**
Manassas, VA

Timothy Roneker
Tamarac, FL

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Eva Taylor
Overland Park, KS

Richella Veatch**
Crossville, TN

Rebecca Wentworth**
Eastford, CT

Kathie Bangs
Belgrade Lakes, ME

Heidi Connolly
Hampton, VA

Cheryl Ellis
Kelowna, BC, Canada

Michelle S. Frank
Covington, GA

Mary C. Harper**
Norway, Canada

Daniel Hopkins
Delphos, OH

Daria Lacy**
Skamokawa, WA

Marga Megens
Liesel, Netherlands

Mary Lee Oliphant**
Bush, LA

John Sharp Sampaga
Lemmon Valley, NV

Gigi Smith
West Milford, NJ

Louise Torkelson
Appleton, WI

Gary Webster
Monroe, WA

Kerstin Widmark
Harnosand, Sweden

Note:  **indicates previous member…Welcome Back!

New Members – February 1, 2014 through June 30, 2014
Membership 2014

Life
Helga Kane
Harold W. Sundstrom

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Collie Club of America, Inc.
Christine K. Dungan
Indiana Collie Club
Kenneth Williams

Patron
Elizabeth James

Sustaining
Mary M. Allen
Carole Andrews
Dr. William K. & Doris M. Brokken
En Harriet Chang
Collie Club of Western PA
Roz Durham
Kathryn & Louis George
David Hansen, DVM
Nancy Jan Holbrook
Doreen A. Ingrassia
Nancy Kelso, DVM
Jacki & David Linstad
Shirley & Jon McAlear
Robert A. Mondillo
Ann O’Connor
Piedmont Collie Club, Inc.
Sally Richardson
Bevery Ann Schwab
Debbie E. Taylor
Harold & Patricia Warren
Ann T. Zimmerman

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Barbara Aschenbrenner
Joani & Sami Berg
Ann & Jim Boles
Leslie & Tom Butler
Thomas & Jane H. Clymer
Neal & Frances Current
Sharon & Scott Dowell
Marilyn & Carter Eggers
Fred F. & Rita A. Figg
Chandra & Michael Flaim
Dr. Robert & Mrs. Janice Geller
Denice & Lonnie Gray
Josh & Alisha Harbin

Life
Nancy McDonald
Pati Merrill
A. David Russell

Benefactor
Collie Club of America, Inc.

Patron
Elizabeth Miller & Richard Maniqlia

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Tyrone & Kaelene R. Artz
Dennis Burke
Collie Club of New England, Inc.
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Douglas Gobeski
Donald G. & Suzanne E. Hardy
William Holbrook
Svend E. Jensen
Chris, Sheila & Marilyn Kolb
Nancy J. Marks
Heidi M. Mendez
Hildegarde S. Morgan
Panhandle Collie Club of W. Va.
Cdr. Thomas & Jeanette Poling
Mary & Rose Robischon
Randy Sheets
Terhune Sunnybank Memorial
Tokuko Watanabe
Karen & Jeff Anderson
Mary Benedict
Barbara Burns & Carol Erends
Collie Club of Northern New Jersey
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Marie & Jay Hooper
Dwight Kayto & Brenda Caswell
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Carol Martin
Todd & Brenda Merchant
June E. Morris
Joe & Terry Pegram
Nikon Pongprueksa
A. David & Patricia A. Russell
Sylvia G. Sippel
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Collie Club of Washington
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Sharon Vanderlip, D.V.M.
Saskia Whallon

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Dennis R. & Carol F. Elliott
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Virginia A. & John E. White

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Joan Armitage
Phyllis A. Autrey
Beverly A. Bain
Dena Barcellona
Peggy E. Beattie
Carol Belo
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Karen Bishop
Jeanine Blaner
Betsy Bradshaw
Pamela Brown
Wendy Bryant
Judy Byrd
Leslie Canavan
Mary Carrizalez
Merry Cearley
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Sue Cobler
Collie Club of Alabama
Nancy Comparato

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Connie Armitage
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Tasha Byerly
Helen L. Campbell
Mary Lou Carlson
Mary Catoir
Louise Christopherson
Ruth Coates
Linda Colelli
Ann M. Comfort
Hannah H. Cook
# Membership 2014

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<td>Richard F. Greathouse, M.D.</td>
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<td>Katherine Harker</td>
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<td>Daniel Hopkins</td>
<td>Marilyn R. Horowitz</td>
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<td>Phyllis Howard</td>
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<td>Gloria Markos-Krakow</td>
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<td>Ray Lavelle</td>
<td>Kathy Lawliss</td>
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Membership 2014

Linda A. Lee  Vicky A. Lee  Gordon Lee  Kathryn H. Leenhouts
Claire K. Leishman  Mary Lenertz  Barbara K. Lennie  Sandra Leon
Lisa Ann Lepera  Libby Lewitt  Carol A. Lieberman  Elizabeth Lilly
Barbara A. Linder  Barbara K. Lindner  Vicki Loucks  Heather & Ron Luster
Lisa A. Mahoney  Carol Mallicoat  Cheryl A. Mantel  Debra L. Marki
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Faith A. Martin  Blaine A. Mason  Eileen Mason  Sharon L. Mayes
Barbara P. McCampbell  Barbara Lynne McCauley  Charlene F. McCauley  Melissa McClain
Lynn McDermott  Sheryl McDonald  Juanita McGhee  Maureen E. McGrath
Faith McKown  Kristy McTaggart  Marga Megens  Regina Mehr
Eileen P. Middleton  Steve Miller  Diana Miller  Annette Miller
Renee Millison  Marsha Milroy  Sally Mobraaten  Kathy V. Moll
Lori Montero  Thomas Montero  Melissa Moses  Andrea Moss
Sherry Moss  Marilyn Mothersell  William N. Moyers, Sr.  Mary Mulhem
Sharon L. Mullaney  Kyle Musselman  Sharon L. J. Myers  Kelly Neeley
Beth Nemoff  Jill Nickerson-Smith  Sherri Nicoletti  Nancy J. Noble
Stephanie Noelle  Northern Wisconsin Collie Club  Karen O’Brien  Mary Lee Oliphant
Gerrie D. Oliver  Patricia Ortiz  Frank R. Ortolani  Aytena Oztas
Christine Pan James  Diane Parness  Susanna Pathak  Leonore Patten
Barbara A. Peck  Elizabeth Peplin  MorningStarre Perdue  Kathleen N. Peters
Ann Petersen  Mandi Peterson  Linda Peterson-Goldfarb  Phillip A. Pilgram
Judith A. Porter  Frances L. Preston  Dorothea Preus  Robert J. Primiano
Brenda Pulkrabek  Donald F. Queen  Mona Ragan  Naomi Ragan
Janice Read  Wendy Reekie  Joe Reno  Sandra Reuter
Donna Jean S. Rewt  Joyce K. Reynolds  Joyce Richter  Laura Rinard
Judy Ritner  Melanie Robbins  Helene G. Robbins  Grace Robelen
Anne Robinson  Barbara E. Robinson  Nikki Rock  Dana Rodman
Deborah R. Rogstad  George Robert Rohde  Susanna Roland  Judi M. Roller
Laura JN Romano  Joann Romero  Timothy Roneker  Carol Roodhouse
Shelley C. Roos  Lisa Root  Sue E. Rosensteel  Amy Ross
Marguerite Roth  Joan Rothfuss  Alison Rubendall  Loralee Runnels
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Deborah Rymer  Sandra Sadley  Theoni V. Salcedo  John Sharp Sampaga
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Lily A. Sayre  Catherine Sayre  Helmut P. Schleith  Patricia Schroder
Sylvia M. Schultz  Sandy Schwedler  Virginia Shafer  Michelle Shoemaker
Noralee Smiley  Susan K. Smith  David Smith  Margaret R. Smith
Elizabeth M. Smith  Gigi Smith  Juanita Smith  Mary A. Snook
Karen Soeder  Mitzi Soldner  Southern CA District Collie Tourn Group  Diane P. Steele
Carol Stone  Barbara Stott  Cindy Stratton  Elizabeth (Tracy) Strother
Michelle Struble  Ellen M. Stuart  Robin Borck Sturgis  Joy Surkand
Sandra Swartz  Mary E. Swierkos  Sandra K. Symmes  Trudy Taphorn
Eva Taylor  Linda Tefelski  Becky Tehon  Cathy Telario
Linda Thompson  John H. Thompson  Audrey A. Tilden  Susan J. Torkelson
Louise Torkelson  Bonnie Tovell  Arlene & Everett Towell  Linda F. Trujillo
Cindi Turner  Marlene M. Vachon  Deborah Valenti  Mary B. Valentine
### Membership 2014

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<td>Dragana Vulic</td>
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<td>Ericka A. Wojack</td>
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<td>Dr. Cathy J. Wolf, DVM</td>
<td>Sandra L. Wrenn</td>
<td>Yvonne Evans-Wynn</td>
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<td>Joan M. Young</td>
<td>Lily Young</td>
<td>Louann Young</td>
<td>Jennifer Zappone</td>
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<td>Mrs. Linda Zeswitz</td>
<td>Maureen Zwirble</td>
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### OFFICERS

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**VICE PRESIDENT** — Cindi Bossart, V.M.D.

**VICE PRESIDENT** — Robette Johns

**SECRETARY** — Mary Hunter

**TREASURER** — Nancy McDonald

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### CLASS OF 2018


Many thanks to those who served the Collie Health Foundation the last several years from the Corporators Class of 2014, to past Board members and Officers and to those in the Class of 2016 who agreed to continue to serve. The Collie Health Foundation is moving ahead and making great strides in the areas of Collie research because of you!
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PLEASE INDICATE: ___new member OR ___renewal membership

Please check level of membership desired: I’m interested in volunteering:

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___ Patron - $ 500     ___ Other: ____________________________
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Nancy Van Note – CHF Membership
827 Bowman Road
Jackson, NJ  08527-3553

PAYPAL: membership@colliehealth.org

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