



# Sheltie Showdown



A publication of the Central Indiana Shetland Sheepdog Club

September 2017

## Club Meetings

Our membership meetings are held at 7:30 p.m. at Camp Bow Wow, 10830 Pendleton Pike, Indianapolis, IN 46236. Camp Bow Wow is just past North German Church Rd. **Next Membership Meeting: September 8th. Program is pending at this time.**



## 2017 Officers

President: Carole Creech  
Vice President: Linda Lee  
Treasurer: Doug McKee  
Recording Secretary: Cheryl Sharp  
Corresponding Secretary: Kathy McKee

## Board of Directors

Elizabeth "Babs" Beck  
Marianna Keohane  
Kathleen Morphew

## Standing Committees

Agility Trial: Babs Beck  
Education: Linda Lee  
Equipment: Doug McKee  
Judges Selection: Carole Creech  
Legislative: Carole Creech  
Librarian: Karen Burton  
Membership: Kathy McKee  
Policies & Constitution: Cheryl Sharp  
Sheltie Info Line: Becky Hamm  
Showdown: Carole Creech  
Specialty Show: Cheryl Sharp  
Website: Carole Creech



## CISSC Upcoming Events

### Agility Trial

November 18-19, 2017

Pawsitive Partners Dog

Training Center

Beech Grove, IN

### Specialty Shows -

#### Back-to-Back

May 12, 2018

Boone County Fairgrounds

Lebanon, IN

Sweeps: Ellen Ball

A.M. Judge: Brian Reid

P.M. Judge: Liz Bianchi



## Bragging Rights

From Karen Adams: Cooper, Road's End Reflected Bi Moonlight (Ch Aynsworth No Moon Tonight x O'Sure Roadsend Echoes of Love) and I have been on a great journey together. April 30, Cooper was Reserve Winners Dog (his littermate "Buzzy" was Winners Dog) under Judge Muriel Purkhiser. On May 20, he went WD, BOW, BOS and Best Owner-Handled under Judge Gloria Kerr and then on to a Group 2 in Owner-Handled under breeder judge Mark Lucas. The next day, he was WD, BOW, BOB (over a lovely top ranked Special), Best Owner-Handled under Judge Lydia Coleman Hutchinson. He was awarded a Group 1 in the Owner Handled Group under Judge Alfred Ferruggiaro. The next weekend at the Warren County Kennel Club of Ohio, he

was RWD under Judge Carolyn Herbel. On Sunday, he was WD, BOS and Best Owner Handled under Judge Allen Odom ("Buzzy" was RWD). He went on to receive a Group 4 in the Owner Handled Group under Judge Sue Richey.

The Iced Tea Cluster was great for us! On Wed., Cooper was WD, BOS, BOH for 1 point under Judge Evie Sullivan and received a Group 4 in the NOHS under Judge Edy Dykstra-Blum. Thurs., he was RWD under Judge Dykstra-Blum. Friday was another good day, he was WD, BOW, BOS, BOH under Judge Sei-Ichiro Ishimaru for 2 points and went on to a Group 3 in the NOHS under Judge Valerie Dombrowski. Sat., he was RWD again for a major reserve under Judge Jon Cole. Sunday, Cooper was WD, BOW, BOS, BOH under Judge Sun Shu for another 2 points! In the NOHS Group, we got to congratulate the other 4 dogs who placed. We are now searching for majors and closing in on my goal for the NOHS ranking. Cooper was bred by and is co-owned with Christina Schmidt.

**From Babs Beck:** The new little Kizzie earned both of her Novice Agility titles (NAJ, NA) at the Brittany Club trial August 25.

**From Liz Carroll:** Lenny got his first novice JWW LEG at the Sheltie Club Trial on August 5th and his second Novice JWW Leg at the Brittany Club Trial on August 13<sup>th</sup>.

**From Marianna Keohane:** Lenox, PaRodise Divine Fortitude, in his first agility trial (CPE), got Q's in both standards and jumpers, along with 1st place in standards and 3rd place in jumpers.



**Below is an informative article about Drs. Clark and Evans work on dermatomyositis and a bit of the history of their work.**

[https://clemsun.world/dogs-best-friend/#after\\_full\\_slider\\_0](https://clemsun.world/dogs-best-friend/#after_full_slider_0)

"Lassie, come home!"

But first, Clemson genetics researcher Leigh Anne Clark, would like to get a cheek swab to study your genes.

Anyone who has had a 5-pound Yorkie or 90-pound Lab nudge her hand, requesting a scratch under the chin or a rub of the ears, or a rescue mutt who's been more faithful than friends or family, would be pleased knowing geneticists like Clark are working tirelessly to understand the underpinnings of diseases that affect dogs.

Clark has a simple explanation for her team's work: "We like dogs."

Over the past decade and a half, Clark, with her colleagues and students, has discovered genes in collies like Lassie and Shetland sheepdogs (aka shelties) that explain a variety of traits in the two breeds. In February 2017 the scientific journal, *PLoS Genetics*, published the results of her most recent research: the identification of two new genes associated with a painful and disfiguring disorder called dermatomyositis.

There are ramifications for humans, too, in Clark's research. Pigment disorders affecting dogs and humans are often accompanied by hearing and vision difficulties. Understanding the genetic underpinnings of pigmentation in dogs could help scientists understand diseases in humans such as vitiligo. Dermatomyositis, an autoimmune disorder, affects collies and shelties almost exclusively, making them the only animal model for the human form of the disease.

Juvenile dermatomyositis occurs in several thousand children a year in the United States, creating a skin rash and inflammation that weakens muscles and makes joints sore. In adults, dermatomyositis strikes between ages 40 and 60. In addition to a rash and progressively weakening muscles, adults with the

disease have a higher risk of cancer, lung disease and heart disease.

Studying human dermatomyositis is difficult; studying the disease in dogs is much simpler. There's a lot of genetic diversity among people, which is healthy for the long-term resilience of the human race, but confusing when trying to pin down genes associated with a specific disease. In humans, the disease presents differently from person to person, and there's a lack of biological data to study. With collies and shelties, the genetic pool is much smaller, making it easier to isolate genes specifically associated with the disease.

### **Breeding genetics**

Clark became a fan of the TV show "Lassie" when she was a little girl growing up in Austin, Texas. "I thought that was the greatest dog," she says. Who could argue? Well, Clark's mother did. After years of Leigh Anne's begging for a collie, her mother finally acquiesced — sort of. The family adopted a Shetland sheepdog, which looks like a miniature collie.

But that one sheltie wasn't enough for Clark. She continued to go back to the breeder where she'd gotten the sheltie to visit new puppies.

"During one visit, the breeder asked if I'd like to help on the weekends," Clark says. "Basically, he needed another set of hands to help with the puppies. I eagerly said yes!"

Being around the breeding practice introduced her to genetics. At Texas A&M (where, coincidentally, the mascot is a collie named Reveille), Clark worked with Keith Murphy, who served as her doctoral adviser and her boss during her postdoctoral fellowship. Murphy would later become chair of the department of genetics at Clemson and recruit Clark to the Clemson faculty.

Clark was fascinated by the work of a veterinary dermatologist on the faculty, Christine Rees, who was leading a clinical trial of improved therapies for dogs with dermatomyositis.

"Every month, this group of affected collies and shelties would come in, and she would try these new therapies," Clark says. "We got together and decided this was a good opportunity to understand the genetics of the disease. If we can understand the genetics of the disease, then rather than treating the disease we could eliminate it altogether."

### **A misplaced war**

Dermatomyositis is basically a misguided inflammatory response, like friendly fire. The body is defending itself against an enemy that is no longer there. Previous research by others had suggested that the major histocompatibility complex (MHC), which acts like a forward operating base for the immune system, was associated with dermatomyositis. But the disease is complex, meaning it has genetic and environmental causes. Many dog owners report that symptoms of dermatomyositis appear after some kind of traumatic event, like being shipped on a plane, driven across country or having a viral infection. The fact is that dogs often share our human environment — living in our homes, riding in our cars, eating our food, playing in our yards. "So dogs are more likely to be exposed to the same environmental triggers as humans," Clark says. In many diseases, like cancer or diabetes, "there are lots of things at play that cause a person to develop that disease. The same is true in dogs."

Clark knew there were environmental triggers; she had to find the genetic guns. While there are some cases of similar diseases in other breeds, full-blown dermatomyositis in dogs is limited to the collie and Shetland sheepdog gene pools. The range of characteristics of the disease also points to several genetic components, as opposed to a simple dominant or recessive genetic disorder. "We knew this was going to be a really hard project from Day One," Clark says.

Clark started her work on dermatomyositis during a postdoc at Texas A&M in 2004, but the project fizzled, and she turned her attention to the genetic cause of coat patterns. In 2010, after Clark joined the faculty at Clemson, a program officer at the National Institutes of Health told her the NIH didn't receive many proposals for dermatomyositis research. In other words, this was a proposal that they would be excited to receive.

"We stopped everything and wrote a proposal for dermatomyositis." In 2010, her team received a grant from the Collie Health Foundation, and she got samples for analysis from the dogs treated at A&M. In 2013, Clark got a grant from the NIH.

## Lassie to the rescue!

Clark needed DNA from a lot of dogs for the study because of the complexity of the disease. Fortunately, she says, there are 84 million pet dogs in the United States. Cheek swabs and small blood samples came in from around the world from 160 collies and shelties, dogs who were affected with dermatomyositis and dogs with no history of the disease. Clark and then-doctoral candidate Jacquelyn Evans, who was the lead author of the PLoS paper, compared all 39 pairs of chromosomes in each dog, looking for the smoking gun. (Evans received her PhD in August; she's now a fellow at the NIH working in a genetics lab.)

"I remember when we saw [the results]. We were speechless. We started looking at the genotypes (the combinations of variations) and writing them down, and it was exciting," Clark says.

In a graphic illustration of the dogs' genomes, there's a large spike on the collie's at chromosome 10, and two large spikes on the Shetland sheepdog's, on chromosomes 10 and 31.

The spikes represent genetic mutations in two genes, PAN2 and MAP3K7CL, which are involved in coding proteins — making enzymes and proteins or giving other genes instructions for making proteins.

Together with the MHC, the three genes interact to create the disease. They're the smoking guns.

Now that they know where the mutations are, "we can genotype a dog and know that dog's individual risk for developing the disease," Clark says. "We can also take a sire and a dam and look at their genotypes and determine what combinations of alleles, or mutations, the puppies might receive. And so breeders can select mates that will not produce a high-risk puppy." It's information breeders have been hoping for, says Rooksie Noorai, a co-author of the PLoS paper who did her research as a Ph.D. candidate in Clark's lab. Breeders don't always know if their dogs have dermatomyositis because the symptoms sometimes don't develop until after the dogs are bred.

In 2011, Noorai adopted a sheltie, Jessie, with dermatomyositis from a breeder who had contacted Clark. Jessie had symptoms — lesions on her face and tail — and Noorai, now a geneticist in Clemson's Genomics Institute, was also able to let Jessie contribute to the dermatomyositis study.

Clark's team has developed a genetic test for collies and shelties that is helping breeders identify dogs who are at high, moderate and low risk of having puppies with the dermatomyositis mutations.

Although this study is a breakthrough in understanding the genetic basis of dermatomyositis, Clark believes there is a lot more to learn about the disease. Future research will focus on dogs with moderate risk genotypes, specifically asking why some moderate-risk dogs develop the disease and others don't.

## Working toward an end

In the TV show, Lassie always came to the rescue. In Clark's lab, you could say she's coming to Lassie's rescue.

"She's making a difference," Noorai says. Not only for dogs, but for people. "Dogs make humans' lives better. Helping dogs helps people," she says. The research findings with dogs will enable researchers of dermatomyositis in humans to make greater progress as well in determining causes and treatments.

Clark, who has owned two collies — Dr. Watson, her current dog, is a handsome devil with a merle coat resulting from a gene Clark has studied for years — would just as soon not have to do genetic studies for dermatomyositis.

"The end goal," she says, "is that slowly breeders start eliminating these mutations. Then there won't be a need to genotype the dog because the disease won't exist."

