



PURINA
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GREAT DANE Update

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CHAGAS DISEASE

Kissing Bug Parasite Found in
Great Dane Puppies

GREAT DANE PUPPIES CONTRIBUTE TO CHAGAS DISEASE AWARENESS



As Memore Great Dane breeders Lori Masse and her husband, Tom, of Spring Branch, Texas, began planning to have a litter of puppies, their fourth litter in 20 years, they diligently researched stud dogs to find the right one to breed to their 3-year-old fawn bitch, "Summer" (GCH Memore's Sweet Little Texas Heat).

Their good friend, Aslynn Rose, of Bastrop, Texas, a professional handler and the co-owner of Summer, joined them as they studied pedigrees, temperament, conformation, movement, health histories, and health clearances to find the right stud dog. Summer already had cleared the breed's health tests. A handsome 7-year-old brindle male named "Maverick" (Multi-BISS GCH Paxton's Tsun of Tsunami AOM), owned by Allison Paxton of Napa, California, was their pick.

Summer delivered a healthy litter of seven puppies — three males, two



Unbeknownst to breeders Tom and Lorie Masse of Spring Branch, Texas, and Aslynn Rose of Bastrop, Texas, their bitch, "Summer" (GCH Memore's Sweet Little Texas Heat), was already infected with the T. cruzi parasite that causes Chagas disease when she was bred. All seven puppies in her litter contracted the infection in utero. At right: "Cassie," the first puppy to show signs of being infected, died at age 12 weeks after suffering for a short time with advanced heart failure, an effect of Chagas disease.

fawn and one brindle, and four females, three fawn and one brindle — in April 2017. The Maverick X Summer litter was a dream, but things would soon turn dramatically.

“At 12 weeks, 4 days old, ‘Cassie,’ the brindle female puppy, couldn’t keep anything down, and she was lethargic,” Masse says. “I thought it was just an upset stomach when I found some throw up beside her. I waited about an hour and gave her a biscuit, but she vomited it. Then, I gave her some water, and she couldn’t keep it down either. I was concerned she may have eaten something that caused a blockage.”

A trip to the veterinarian began with a radiograph to check for a blockage, which showed nothing unusual. The puppy’s temperature and bloodwork were normal, but the heart rate was concerning. “The veterinarian asked the technician to bring her ‘the other stethoscope,’ and I became worried something wasn’t right,” says Masse.

Cassie’s heart was beating 250 beats per minute, considerably higher than a normal resting heart rate of 65 to 80 beats per minute. Cassie was given medications to lower her fast-beating heart, and Masse and the puppy were sent to a nearby emergency veterinary hospital for urgent care.

At the emergency clinic, Cassie was given oxygen and intravenous fluids. As Cassie’s heart raced to 300 beats per minute, the technicians began two more doses of heart medications to try to lower the heartbeat and stabilize her heart.

“They told me Cassie was in advanced heart failure,” Masse says. “We were hoping she would make it through the night.”

She left the puppy at the emergency clinic for the night. Early the next morning, at 3 a.m., when they took the puppy out to go bathroom, the fast heartbeats returned, again going up to 300 beats per minute.



“Reign,” a male, died suddenly from Chagas disease at 12 weeks of age with no prior signs of illness.

After two more rounds of medications, Cassie’s heart stabilized. Around 7 a.m., Cassie was moved to the critical care area of the veterinary clinic.

“The critical care specialist thought the heart problem was likely secondary to something else, maybe anaphylactic shock caused from being bitten or stung or from eating something poisonous or maybe Addison’s disease,” Masse says.

About when Addison’s disease was ruled out, Cassie’s heart rate again climbed to 300 beats per minute. Her bloodwork showed extremely elevated liver enzymes. The puppy went into cardiac arrest and was euthanized as Masse held her in her arms. The date, Friday, July 14, 2017, was etched in Masse’s memory.

Then, a littermate brother, “Reign,” died the next day, on Saturday, July 15, 2017, when he awoke from a nap while snuggling on the chest of his new owner. It came suddenly, with no prior signs of being ill.

Necropsies were ordered for both puppies to learn the cause of their

SIGNS OF CHAGAS DISEASE IN DOGS*

- Diarrhea
- Vomiting
- Lethargy or Depression
- Seizures
- Enlarged Lymph Nodes and/or Spleen
- Fever
- Fainting
- Cardiac signs including increased heart rate, abnormal heart rhythm and fluid buildup in the abdomen & lungs

*If you suspect your dog may be infected with *T. cruzi*, see your veterinarian as soon as possible. Early treatment for an infection has the greatest chance of success.

deaths. It would take a few days to get the results.

CHAGAS CAN BE FATAL

Trying to figure out what was going on was challenging. “Aslynn asked me to check with the veterinarians for Chagas disease, which is carried by kissing bugs,” Masse says. “She remembered seeing kissing bugs during one of the visits to see the puppies at our house and recalled from breeding Doberman Pinschers (Whiskey Mac Dobermans) that Chagas can mimic the heart disease dilated cardiomyopathy.”

Bingo!

Chagas disease, also called American trypanosomiasis, is a potentially deadly disease that is spread to animals and people by the feces of insects called triatomines, or kissing bugs. Unborn

puppies can contract the disease from an infected dam. When this happens, puppies may even die in utero or as neonates. Dogs also can become infected if they eat the bug or its feces on the ground or from licking their paws or coat.

On Monday, July 17, after Cassie and Reign died, Masse took Summer and the four surviving puppies, “Zoe,” “Rhythm,” “Storm,” and “Aspen,” who lived at her house to the veterinarian to have an indirect fluorescent antibody (IFA) blood test for Chagas disease. A few days later, the results came back showing that Summer, Zoe and Rhythm tested positive for infection with the *Trypanosoma cruzi* parasite that causes Chagas disease. Storm and Aspen were clear of the infection.

When testing the dogs for Chagas, the veterinarian detected an irregular heartbeat, or arrhythmia, in Zoe, and an accelerated heart rate of around 250 beats per minute in Rhythm. “We thought we would probably lose Rhythm quickly,” Masse says. “I took her and the others home. We hoped that Rhythm would live through the night.”

However, it was Zoe, a beautiful fawn female, who died next, on Wednesday, July 19, 2017, at 13 weeks, 3 days old. “Zoe was treated for the irregular heartbeat for a couple of days, and then the heart became accelerated like Cassie’s had done,” Masse says. “She died in my arms.”

Meanwhile, the necropsy reports on Cassie and Reign came back, tagging them as having had Chagas disease.

Mostly found in the poor rural areas of Latin American, where Chagas is endemic, kissing bugs also are in the U.S., particularly the Southern states. It is estimated that as many as five to 13 million dogs in the U.S. are infected with *T. cruzi*, though it is challenging to pinpoint the number because many cases are likely undiagnosed



“Zoe” experienced arrhythmia, or irregular heartbeats, for a short period before dying of Chagas disease at 13 weeks old.

or misdiagnosed. Not all kissing bugs are infected with *T. cruzi*, though it is believed that 60 percent of the seven species found in Texas carry the infection.

Chagas disease in dogs can cause severe heart disease, including cardiac rhythm abnormalities, congestive heart failure and sudden death. The cardiac signs often resemble dilated cardiomyopathy and even look similar on an echocardiogram. Bloat may occur due to reduced cardiac function resulting in an inability to properly pump blood through the body. Other conditions that can result from Chagas include megaesophagus, an enlarged esophagus reducing the movement of food and liquid to the stomach, and megacolon, a dilated colon making it difficult to pass feces normally.

Many infected dogs don't show clinical signs; however, asymptomatic carriers can pass on the disease to their offspring. "This explains why Summer had a completely normal echocardiogram not even six months before whelping the litter," Masse says.

Dogs may show signs within weeks of an infection, the acute form of the disease, or months to years later, a chronic infection. Dogs under 1 year old typically develop acute disease; older dogs are more likely to have chronic disease.

"I cannot begin to explain the devastation and hopelessness we were feeling," Masse says.

As good fortune would have it, the Masses' veterinarian learned about a local veterinarian who had been working with Chagas disease patients for 10 years. Their veterinarian reached out to Roy Madigan, DVM, of The Animal Hospital of Smithson Valley in Spring Branch, Texas, for advice.

Dr. Madigan offered a silver lining to losing three puppies in five days: an experimental treatment pro-

ocol that had successfully cured other dogs with Chagas disease. Even before the blood test results came back, he suggested to begin Summer and Rhythm on the treatment due to their clinical signs.

Working with a Venezuelan research scientist, Alberto E. Paniz-Mondolfi, MD, PhD, of the Institute for Scientific Research in Caracas, Dr. Madigan formulated the treatment for dogs after a drug therapy Dr. Paniz-Mondolfi had used to cure a Venezuelan man with Chagas disease. The therapy combines a daily dose of itraconazole, an anti-fungal medicine that is given according to a dog's weight, and amiodarone, an antiarrhythmic heart drug. Due to potential ill effects from the medications, a dog's liver enzymes and heartrate must be monitored every few weeks to be sure the drugs are being safely absorbed and metabolized.

In 2007, Dr. Madigan treated a 1 1/2-year-old male Pointer mix from the local humane society with severe arrhythmia and a heart rate of more than 220 beats per minute. The dog eventually died, which troubled Dr. Madigan. He ordered a necropsy, which indicated the dog had severe heart disease.

"I was so frustrated," Dr. Madigan recalls. "I didn't know why we were not able to help this dog."

Dr. Madigan sent tissue samples to Texas A&M University. After several rounds of testing, they found the *T. cruzi* parasite in the dog's heart tissue, indicating Chagas disease.

Four months later, Dr. Madigan had a second patient with Chagas, a 180-pound Irish Wolfhound. He discovered Dr. Paniz-Mondolfi while researching treatments for Chagas disease and wanted to see if the treatment he used on the Venezuelan man could be adapted to help the dog.

The Irish Wolfhound survived and became the first dog to be cured of

KISSING BUG CITIZEN SCIENCE PROGRAM

At Texas A&M University, researchers want to learn more about the distribution and behavior of kissing bugs (triatomine bugs). Since the study began in 2013, more than 5,000 bugs have been submitted for the research that aims to characterize the transmission of Chagas disease and determine the risk factors for exposure in animals and humans. For information about how to safely collect and submit a kissing bug for the study, [click here](#).



PHOTO: GABRIEL HAMER

TIPS ON REDUCING KISSING BUGS

- Limit outdoor lighting, particularly around a dog kennel, as kissing bugs are attracted to outdoor lights
 - Bring dogs indoors at night or move them to a secure, well-sealed environment. If you have outdoor kennels, consider protective screens
 - Examine pet bedding for signs of the bugs
 - Keep your yard free of woodpiles and brushy areas, as these are a breeding ground for the insects
 - Seal cracks and crevices around windows, walls, doors, roofs, and attics
 - Begin a pest control plan to combat kissing bugs, though the effectiveness of spraying is limited due to the large migration pattern of kissing bugs
-

Chagas disease. The collaboration led to testing the treatment on many affected dogs. Among their findings, the amount of itraconazole needed to be higher than the dosage used to treat fungal infections, and treatment needed to continue for 12 months in dogs with chronic cases.

“The success rate was almost 100 percent,” Dr. Madigan says. “We had a sample size of 105 dogs, of which 100 percent of those that completed the 12-month protocol were cleared of the infection. Not only were they cured, much of the heart damage due to inflammation repaired itself and cardiac function improved.”

However, scar tissue caused by the disease cannot be repaired. “This is why starting treatment as soon as possible is important, especially in dogs showing cardiac signs,” Dr. Madigan says. “This also is why we first treat patients with a nonsteroidal anti-inflammatory medication

to help reduce the inflammation and secondary scar tissue formation caused by the parasite.”

A scientific paper, titled “Successful Treatment of Canine Chagas’ Disease Using Combination Treatment of Amiodarone and Itraconazole,” describing the treatment in dogs with Chagas disease will be published in 2019 in the *Journal of the American Veterinary Medical Association*. The drug combination that Dr. Madigan and Dr. Paniz-Mondolfi have adapted for dogs will be sold as *Vidarone* once it is approved by the Food and Drug Administration.

“We hope that *Vidarone* will provide a more affordable alternative to current options,” says Dr. Madigan.

Meanwhile, Summer and Rhythm, the fourth Great Dane puppy with Chagas, continued on the treatment protocol. “They both did pretty well on the medications,” Masse says. “Occasionally, they were lethargic and didn’t have much appetite or would vomit. Rhythm was putting up a good fight.”

Rhythm hung on for three months before dying on Sept. 21, 2017, at age 5 months and 6 days. When she passed away, her liver weighed 14 pounds, taking up her entire abdominal cavity, an effect of fluid accumulation due to congestive heart failure caused by Chagas disease. She left behind her dam and three littermates: Storm, Aspen and “Cairo,” who lived with his family in Arizona.

Although Storm and Aspen originally tested clear for Chagas, one month later they tested positive. Cairo was tested, and he, too, was positive for *T. cruzi* infection.

By now, the Masses and Rose had spent several thousand dollars treating their Great Dane dam Summer and her puppies. Originally, they thought Storm and Aspen would need the 60-day drug therapy for



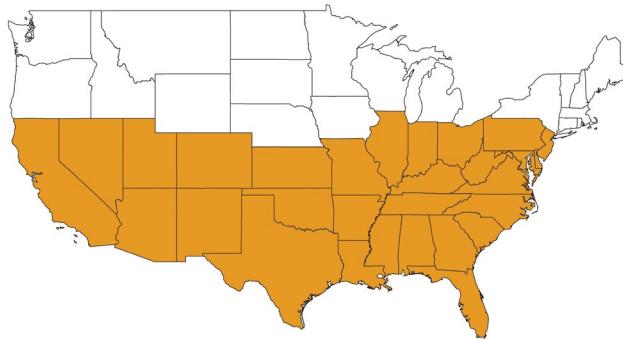
“Rhythm,” a female, was treated with an experimental drug therapy and fought hard before dying of Chagas disease at age 5 months. When she died, her liver weighed 14 pounds, the effect of fluid accumulation due to congestive heart failure caused by *T. cruzi* infection.

WHERE TO FIND KISSING BUGS IN THE U.S.

Triatomine insects, more commonly known as kissing bugs, are found worldwide, but those that carry the parasite *T. cruzi* that causes Chagas disease are only found in the Americas, particularly in poor, rural areas of Latin America. Thus, Chagas disease is sometimes referred to as American trypanosomiasis.

Named for their habit of biting humans around the mouth or eyes, kissing bugs have been recognized in the U.S. since the mid-1800s. Eleven species of the nocturnal, blood-sucking insects have been identified in the U.S., with Southern states, notably Texas, New Mexico and Arizona, having a higher prevalence.

Carlos Chagas, a Brazilian physician and bacteriologist, discovered the *T. cruzi* pathogen in 1909. The zoonotic infectious disease named for him is



MAP COURTESY OF RACHEL CURTIS-ROBLES

Triatomine insects, or kissing bugs, can be found throughout the United States in a broad geographical area that runs from south of Oregon to south of Pennsylvania. The insects also are in Hawaii.

transmitted to animals and people via the feces of an infected kissing bug. The ancestor of *T. cruzi* is believed to have been introduced to South America from bats 7 to 10 million years ago.

acute cases, but they had the chronic form and would need one year of medications. Cairo, too, needed one year of medications, and they paid for his treatment. They worried that soon they would not be able to afford the medications or the blood and heart tests monitoring their condition.

“They were all doing well and were happy,” Masse says. “They were active and playful and had a good chance of being cured.”

They shared information about their ordeal with Chagas disease with the local Great Dane club. A good friend organized a fundraiser auction on their behalf despite Masse’s protests. An educational component helped to teach others about Chagas disease and the importance of testing dogs.

“More than 200 items were donated plus cash gifts came in,” Masse says. “Our dog community pulled together to support us in a way I had never seen. We can never repay the generosity of everyone. We are so blessed to be part of such a wonderful community.”

Now, a year later, over \$20,000 has been spent caring for the dogs, Masse says. She not only continues

to have their blood checked for liver toxicity and their hearts monitored for cardiac disease, but also PCR (polymerase-chain reaction) blood tests are used to detect the parasite’s DNA. PCR testing is more effective than antibody blood tests to check the effectiveness of treatment because antibodies stay in a dog’s system long after the parasite is cleared.

Reflecting on the experience, Masse says, “This has forever changed our lives. We have added testing for Chagas disease to our pre-breeding checks, and we plan to periodically test all our dogs. It was an unbelievable heartache to have perfectly healthy, thriving, beautiful puppies from birth to 13 weeks of age die suddenly with no clinical signs. We hope our experience will help educate others about Chagas disease.” ■

Purina appreciates the support of the Great Dane Club of America, particularly Neil O’Sullivan, PhD, chair of the GDCA Health and Research Committee, in helping to identify this topic for the *Purina Pro Plan Great Dane Update*.

PURINA PUPPY CHOW ENHANCES NUTRITION FOR PUPPIES

During the first year of life, puppies need more protein than adult dogs and essential nutrients to support their growth and development. *Purina Puppy Chow* is launching three newly formulated formulas in October that provide 30 percent more protein than *Purina Dog Chow Complete Adult* dog food. The new formulas have added vitamin C, an antioxidant, and contain DHA, an essential omega-3 fatty acid, for brain and vision development. They also contain antioxidants to support a healthy immune system. Look for new packaging featuring children and puppies on these *Puppy Chow* formulas: Complete, Tender & Crunchy, and Natural. *Purina Puppy Chow* is sold at grocery stores, major pet food retailers and online.



LEARN MORE

PURINA DOG CHOW SALUTES VETERANS WITH SERVICE DOG SALUTE CAMPAIGN

Purina Dog Chow is donating up to \$500,000 to support Tony La Russa's Animal Rescue Foundation's (ARF) veteran's program. The campaign, called *Dog Chow Service Dog Salute*, will benefit ARF's expanding veterans program that matches veterans with rescue dogs whom they train to become their own service dogs. Here's how it works: Through Veteran's Day, Nov. 11, *Dog Chow* will donate \$1 for each unique share on Facebook of the BuzzFeed video featuring the powerful stories of veterans and rescue



dogs brought together by ARF (up to \$250,000). In addition, the brand will donate 5 cents from the sale of each specially marked bag of *Purina Dog Chow Complete Adult With Chicken* dog food (up to \$250,000) through Nov. 11. Located in Walnut Creek, California, ARF has rescued more than 38,000 dogs and cats since it began in 1991.

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PURINA PRO CLUB *Purina Pro Club* members can redeem their Purina Points for orders of Purina logo apparel and merchandise as well as gift certificates for retail, restaurants and travel through the Purina Points Rewards program. Members also can use Purina Points for checks toward future purchases of *Purina* brand dog food. Click on the link below to log in to your account, and then go to the Rewards program to place an order.

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