Scientists Study Genetic Basis for Inflammatory Bowel Disease

T

venty-seven years later, Sandy Jessop still remembers her Siberian Husky “Dax” battling inflammatory bowel disease. At 18 months of age, Dax, who was Jessop’s first Siberian Husky, began having chronic soft stools and losing weight, classic signs of the gastrointestinal disease.

The veterinarian suspected inflammatory bowel disease (IBD), a disorder first recognized in dogs around the time Dax was diagnosed. Resolving the diarrhea and finding an appropriate diet that Dax could tolerate was a long, difficult process.

Inflammatory bowel disease consists of a group of poorly defined gastrointestinal disorders that cause chronic intestinal inflammation. The cause is unknown but is likely multifactorial. The disease can affect the small intestine, large intestine or both. It also can involve the stomach.

“It was a process of elimination,” says Jessop who formerly bred under the Jax Siberians prefix in Long Island, N.Y., and now breeds in Lenoir City, Tenn. “We tried different foods and different amounts. Since Dax was unable to absorb the nutrients from his food due to intestinal inflammation, he lost quite a bit of weight in the beginning.”

Thus began lifelong management of the condition. “Dax stayed on medications for the rest of his life,” Jessop says. “Fortunately, Dax led a fairly normal life despite having IBD.”

Diarrhea and weight loss are common signs of IBD, but other signs are vomiting and anorexia. The condition affects dogs of all ages but is most commonly seen in dogs older than 2 years of age. The disease can be challenging to diagnose since diarrhea and vomiting can occur with other gastrointestinal diseases.

Though IBD is not highly prevalent in Siberian Huskies, it may be more common than previously thought. A 2006 Siberian Husky Health Foundation survey indicated that 1.2 percent of 3,725 dogs had IBD, of which 1.7 percent were males and 0.7 percent were females. The average age of onset was 2 years.

Among breeds considered at increased risk for IBD are Basenji, Boxer, Chinese Shar-Pei, French Bulldog, German Shepherd Dog, Labrador Retriever and Soft Coated Wheaten Terrier. The higher incidence in particular breeds suggests that IBD may have a genetic predisposition.

“Definitely, there is a genetic component,” says Kathleen Stryeski, D.V.M., a trustee of the Siberian Husky Health Foundation. “But other factors, such as diet, parasites and bacterial infections, may be involved as well.”

Karin Allenspach, Dr.med.vet., Ph.D., DECVM-CA, a scientist studying IBD at the University of London Royal Veterinary College, agrees. “It is likely that IBD has genetic and environmental causes,” she says.

The latest research shows that some genetic mutations in German Shepherd Dogs and Boxers predispose them to greater susceptibility for development of IBD. Other factors, such as diet and possibly exposure to infectious agents, could exacerbate disease.”

Researchers at Iowa State University College of Veterinary Medicine are investigating the genetic profile of the disease to determine whether they can identify a hereditary component. Meanwhile, breeders and owners must learn to cope with caring for dogs with IBD.

Seeking a Genetic Basis

Investigators at Iowa State University are delving into the genetics of inflammatory bowel disease, trying to determine which genes may be involved in the initiation and progression of chronic intestinal inflammation.

“There’s emerging scientific data that suggest that perhaps some of the breeds at risk have fundamental genetic alterations that make them more susceptible to intestinal inflammation,” says Albert Jergens, D.V.M., Ph.D., professor of veterinary clinical sciences. Jergens and his research team are focusing on intestinal gene profiles associated with intestinal inflammation and altered bacterial composition in dogs with IBD. Their study aims to identify key genetic factors that contribute to IBD and to characterize progression of the disease to help predict a dog’s response to specific treatments.

“My group is investigating the gene expression patterns in diseased intestinal tissues to unravel the cause and progression of intestinal inflammation,” Jergens says. “We hope to provide a framework for identifying genes that make some breeds more susceptible to IBD.”

The study involves looking at differences in gene expression that may help pinpoint potential triggers for disease, as well as the pathways that mediate the inflammatory process.

“The value in taking a look at gene profiles is that it will help us hopefully identify pathways of inflammation, maybe distinct gene signatures that are reflective of IBD versus other causes for intestinal inflammation,” he says.

Additionally, the research team is analyzing the compositional changes in the intestinal bacteria of dogs with IBD in an effort to better define the

Recognizing Signs of IBD

Inflammatory bowel disease (IBD) can be challenging to diagnose partly because signs of the disease can occur in other gastrointestinal disorders. Among the common signs are:

- Vomiting
- Diarrhea
- Weight loss
- Anorexia
- Lack of or increased appetite
- Blood or mucus in the stool
- Loose and/or dark stools
- Frequent defecation with smaller volume
- Straining to defecate
- Gas and other loud digestive sounds

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complex bacterial populations in a dog’s intestines. “We are using a molecular technique called bacterial pyrosequencing that allows us to take DNA isolated from an intestinal biopsy or from feces to decipher which bacteria are present among the numerous and complex species found within the intestinal tract,” Jergens says.

Abnormal Immune Response

Inflammatory bowel disease is believed to occur in dogs with an abnormal immune response that affects the gastrointestinal tract, causing intestinal hypersensitivity and poorly regulated immune responses. In normal dogs, mucosa lines the intestines and serves two functions: helping the body absorb nutrients and forming the intestinal mucosal barrier, which prevents bacteria, viruses and toxic substances from passing through the lining to the walls of the intestine.

That protective function creates mucosal immunity against infections and moderates immune function. Dogs diagnosed with IBD may be abnormally sensitive to an ingredient found in food or to normal intestinal bacteria, resulting in the production of harmful host responses. This sensitivity causes an increased number of white blood cells to accumulate within the intestinal wall, which perpetuates the inflammation.

Though inflammation is a normal immune response to infection or injury, in dogs with IBD, the response is exaggerated. IBD can cause damage to the stomach and intestines, which leads to chronic intestinal inflammation that interferes with digestion and food absorption.

Since signs of IBD are similar to other gastrointestinal conditions, it can be difficult to diagnose. “A diagnosis of IBD is reached after all other causes have been eliminated,” Allenspach says. “The signs are vague and un-specific, and it is a common disease. We see approximately five cases per week at the Royal Veterinary College, about 10 percent of our total caseload in the Royal Veterinary College, about approximately five cases per week at and it is a common disease. We see the signs are vague and un-specific, and it is a common disease. We see approximately five cases per week at the Royal Veterinary College, about 10 percent of our total caseload in the Royal Veterinary College, about approximately five cases per week at

Managing Signs of Disease

Once inflammatory bowel disease is diagnosed in dogs, the condition is managed, not cured. Medications and diet modification are used to help treat gastrointestinal inflammation.

“Most of my IBD patients are on a special elimination diet and also need long-term immunosuppressive drugs,” Stryske says. Medications used to treat IBD include immunosuppressive steroids, which decrease inflammation and inhibit the immune system from producing new inflammatory cells. Antibiotics also may be prescribed to reduce bacteria in the dog’s intestines, which may reduce inflammation as well. Diet is one of the most important factors in managing IBD. “Usually, veterinarians will prescribe an elimination diet—a diet containing a protein that the dog has never eaten before,” Allenspach says. Elimination diets can determine if signs are due to an allergic reaction or sensitivity to something the dog is eating. Finding the right protein is key because the immune system is believed to be most responsive to proteins in the diet.

“Food sensitivities, such as reactions to meat protein, food additives, food preservatives, wheat gluten or milk products, are common,” Stryske says. “Veterinarians usually recommend trying a hypoallergenic dog food to see if a dog responds positively to a novel or hydrolyzed protein. It is important to follow the veterinarian’s recommendation to ensure dogs are fed a complete and balanced diet that offers proper caloric intake for an individual animal.”

Food trials begin by feeding a single protein and single carbohydrate source that the dog has not been exposed to in the past. The protein source may be duck, rabbit or venison, and the carbohydrate may come from potato if the dog has never eaten these foods in the past. Omega-3 fatty acids from fish oil can be included to control intestinal inflammation. Alternatively, the veterinarian may prescribe a hydrolyzed protein in which the protein is enzymatically broken down to minimize the likelihood of the immune system responding adversely. Fat and gluten intake may be reduced, and additives and preservatives may be eliminated. Fiber may be increased or decreased depending on the dog’s sites of intestinal inflammation. For example, a higher fiber diet may be fed when inflammation of the colon is suspected.

Dogs generally are fed several meals daily. All other food sources, including treats, snacks, table scraps and flavored medications, should be eliminated. Food trials can be time-consuming and require strict adherence and careful monitoring. Often, several diets must be tried before finding the best one.

“Patience is important when you have a dog with this disease,” Stryske says. “Some dogs respond well to a hypoallergenic diet, but most dogs need the diet change plus medications long term to control the problem.”

Dax was fortunate. Through Jessop’s diligence with his diet and prescribed medications, his signs eventually resolved. “It was relatively easy to adjust to,” Jessop says.

Though Dax spent six years on the supplement and special diet before dying of osteosarcoma at age 7, IBD did not negatively impact his quality of life.

“He had a very good life,” Jessop says. Purina appreciates the support of the Siberian Husky Club of America and particularly Sheila E. (Blanket) Morrissey, D.V.M., SHCA genetics chairwoman, in helping to identify topics for the Purina Pro Club Siberian Husky Update newsletter.

Want to Reach the Editor?

Have comments about Purina Pro Club Update? Send them to us at: Purina Pro Club Update, c/o Editor, Nestlé Purina PetCare, 2T Checkerboard Square, St. Louis, MO 63164 or via e-mail at today@breeder@purina.com.

Send Us Your Questions

Have questions about your Purina Points or how to redeem weight circles for rewards and rebate checks? Contact Purina Pro Club at (877) PRO-CLUB, or (877) 776-2582, between 7 a.m. and 5 p.m. CST Monday through Friday. You also may visit www.purina proclub.com to review and redeem Purina Points.
Purina Pro Club offers many perks for members. Here are tips to help you tap into valuable member services and get the most of your membership.

Submitting Weight Circles
Weight circles are the colored circles on packages of Purina brand dog food that can be redeemed for Purina Points and used to order items from the Pro Club Rewards Brochure and dog food checks. When submitting weight circles, you should:

- Use a Weight Circle Claim Form. You may download a form at www.purinaproclub.com by signing into your account and clicking on “Pro Club Tools” on the red bar at the top of the screen. Then under Pro Club Forms, click on “Download Weight Circle Claim Form.” You may also call Pro Club member services toll free at 877-PRO-CLUB or 877-776-2582.
- Fill out the Weight Circle Claim Form completely. A completed form expedites the processing.
- Always put your return address on the weight circle submission envelope.
- Submit a minimum of 200 pounds’ worth of weight circles.
- Submit only weight circles, not UPC codes. Only weight circles are valid for credit to your account.
- Effective Dec. 31, 2009, Purina Hi-Pro weight circles were no longer accepted.
- Weight circles and points from redeemed weight circles cannot be purchased or otherwise transferred.
- Do not submit torn and worn weight circles, and avoid taping multiple weight circles together.

Ordering Puppy Starter Kits
Pro Club members may order Puppy Starter Kits for new owners that contain important information on caring for new puppies. You should only order Puppy Starter Kits for the puppies you currently have on the ground. Starter Kit information and coupon expiration dates are continually updated, so make sure you have only the most current Starter Kit information.

Redeeming Purina Points
Weight circles turn into Purina Points that can be redeemed for items from the Pro Club Rewards Brochure or dog food checks. When redeeming points keep in mind:

- Purina Points expire three years from the date of last activity. You are responsible for any taxes that may be owed as a result of points earned and/or redeemed.
- Your Pro Club account address

Certify Weight Circles
Pro Club recommends that you mail your weight circles by certified first class mail or other traceable delivery method. This helps to ensure proof of delivery in the event Pro Club does not receive your weight circles. Pro Club is not responsible for weight circles not in its possession.

Flying Fast
A dog clears a jump at the United Flyball League (U-FL) International Tournament of Champions Nov. 13 at the Purina Event Center in Gray Summit, Mo. About 1,000 people and 70 flyball teams attended the tournament.

The event was the eighth held at the new dog facility since it opened in August. Nearly 3,000 people and 6,000 dogs have participated in National Specialties, all-breed dog shows, and obedience, agility and flyball competitions.

More than 100 events are scheduled at the Purina Event Center through 2013. Among the National Specialties that will take place over the next couple of years are the Golden Retriever, Australian Shepherd and Border Collie.

For information about reservations for dog shows and events, contact Purina Event Center Director Brock Fitzgerald at 888-688-PETS (888-688-7387) or by e-mail at brock.fitzgerald@purina.nestle.com. Visit www.purinaproclub.com/eventcenter for more information about the Purina Event Center.

Purina-Sponsored Sporting Events December 2010 to February 2011*

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<tr>
<td>English Springer Spaniel National Amateur Championship</td>
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<tr>
<td>UKC (United Kennel Club) Battle of the Breeds</td>
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*This table lists some, but not all, upcoming sporting events sponsored by Purina.
**Pro Plan Introduces Two New Dog Products**

Purina Pro Plan is introducing two new dog products in early February: an all life-stages dry dog food, featuring a small kibble and made with real lamb as the No. 1 ingredient, and a dog snack formerly marketed as Purina Carvers. *Pro Plan Lamb & Rice Small Bite Formula contains 26 percent protein and 16 percent fat. This nutrient-dense food offers complete and balanced nutrition appropriate for puppies, pregnant or nursing dams, adults and senior dogs.* *Pro Plan Roasted Slices is made with over 80 percent real chicken. Already a dog fancy favorite used ringside and for training, this dog snack is high in protein and highly palatable. Roasted Slices can be fed whole or torn into bite-sized portions.* Lightly seasoned and oven-cooked, this dog snack is made without corn, wheat, artificial colors or flavors. *Pro Plan is sold at pet specialty and farm supply stores. For information, visit www.proplan.com or to talk with a pet nutrition consultant, call 800-PRO-PLAN (800-776-7526) from 9 a.m. to 4 p.m. Central time Monday through Friday.*

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**Pro Club Member Benefits**

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should be current. *Pro Club is not responsible for items sent to wrong addresses.*

- *Purina dog food checks have a one-year expiration and cannot be re-issued if you allow them to expire.*
- *As stated on the dog food check, only one $7 check can be used with the purchase of one bag of a *Purina* product. The terms on the check state "limit one check per bag."
- *Rewards — dog food checks, veterinary checks, gift certificates and gift cards — are like cash and should be protected. Purina is not responsible for replacement in the event of loss, theft or destruction.*
- *Pro Club Terms and Conditions state that three to five weeks should be allowed for processing and delivery of checks, and six to eight weeks should be allowed for processing and delivery of merchandise, gift cards and gift certificates.*
- *Visit www.purinaproclub.com to see the complete Terms and Conditions or to view your Purina Point balance.*

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**Purina-Sponsored Dog Shows**

December 2010 to February 2011

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