



## PURINA Pro Club

# Dachshund Update

Vol. 1, No. 1 ■ July 2007

## Researchers Seek Cause of Intervertebral Disc Disease in Dachshunds

Linda Stowe learned about intervertebral disc disease, an inherited spinal condition that affects one in five Dachshunds, when two of her Miniature Wirehaired Dachshunds suffered heart-wrenching episodes of paralysis.

Fortunately, "Bojangles" and "Jolene" both had surgery that successfully corrected the paralysis. A third dog experienced a less severe form of the disease that was managed through steroids and reduced activity until he recovered.

The difficulties Stowe experienced with her own dogs that had intervertebral disc disease (IVDD) motivated her to help educate others about the condition. "I saw the suffering and pain of my two dogs, and for many years wanted to do something. I had heard of too many dogs being euthanized and when I read about 'Dodger' on one of my e-mail lists, I knew it was time to try to do something."

Stowe, who lives in Champaign, Ill., launched an Internet informational site called Dachshund Orthopedic Disease Group E-Mail Resource, or Dodger, named for a Smooth-Coated Dachshund who was euthanized prematurely when he developed IVDD.

The Web site, which can be found at [www.dodgerslist.com](http://www.dodgerslist.com), includes *Dodgers Digest*, a newsletter that is both mailed and available online. Via the Web site, updates and information about treatments for IVDD are sent automatically to veterinarians and Dachshund owners. Brochures also are sent to owners and veterinarians.

"Principally, the Web site was developed so owners of affected dogs could exchange information and learn about veterinary treatments for IVDD that offer alternatives to euthanasia," Stowe says. "We also wanted to offer preventive tips and provide a support network."

About the same time she launched the Web site, in 2002, Stowe began looking for researchers interested in studying the genetics behind IVDD. That's how she met Mark W. Neff, Ph.D., associate director of the Veterinary Genetics Laboratory at the University of California-Davis.

Neff credits Stowe's persistence and passion as the reason he began to study IVDD. In the three years he and his research team have agreed to help, they have collected DNA from more than 1,000 Dachshunds. Stowe was instrumental in urging owners and breeders of Dachshunds

to submit cheek swabs and blood samples containing DNA from siblings and extended family members.

Though the mode of inheritance still is not known, the researchers are

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focusing on finding the gene mutation that contributes to the more severe form of IVDD. Neff allows for the possibility that IVDD is a polygenic disease involving more than one gene. "Identifying the genes that contribute to IVDD is the first step toward developing a DNA test for eliminating risk factors from breed gene pools," he says. "Dachshunds with severe forms of IVDD will most likely share the same genetic causes."

### The 'Slipped Disc' Disease

Intervertebral disc disease is sometimes called the "slipped disc" disease. It occurs when a disc slips in the middle of the back, the thoracolumbar region, due to bulging or rupturing. Once the disc has ruptured, the neurons in the spinal cord begin to degenerate causing nerve damage and loss of function. The degree and duration of the force on the spinal cord determine

### Dachshund Owners Can Contribute to IVDD Research

To help advance research at the Veterinary Genetics Laboratory at the University of California-Davis to find the gene mutation(s) that causes intervertebral disc disease (IVDD), owners of Dachshunds are encouraged to submit blood samples from dogs with the early-onset severe form of IVDD. Samples from multiple affected dogs of a bloodline are especially valuable as they help ensure there is a strong genetic component.

Before submitting samples, please check with the researchers to be sure your dog qualifies as having early-onset severe IVDD, which is defined as:

- occurring at around 3 to 6 years of age;
- episodes of repeated disc ruptures;
- paralysis, especially in the hind legs; and
- having affected relatives, including parents or siblings.

For information, visit the Veterinary Genetics Laboratory Web site at [www.vgl.ucdavis.edu/research/canine/research.html](http://www.vgl.ucdavis.edu/research/canine/research.html). You also may contact Linda Stowe, who developed the [www.dodgerslist.com](http://www.dodgerslist.com) IVDD informational Web site, by calling (217) 359-7148.

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## Intervertebral Disc Disease

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the extent of nerve damage and loss of function.

The bulging or rupturing occurs due to hardening of the fibrous cartilage surrounding the discs. This tissue contains a shock-absorbing gel, but when it calcifies it increases the risk of disc bowing and rupture. Lack of coordination and weakness are the first signs of IVDD. Paralysis, especially in the hind legs, and inability to urinate normally can occur in severe cases.

A surgical procedure, called hemilaminectomy, is usually needed to remove the ruptured disc material, which compresses the spinal cord. Generally if a dog has sensation in the hind limbs prior to and following surgery, he has a 90 percent chance of regaining the ability to walk. After surgery, dogs require rehabilitative care including urinary bladder expression, periodical turning, and muscle massaging, flexing and stretching.

IVDD is a debilitating and costly spinal disease that affects multiple breeds, but none more so than Dachshunds, which account for 45 percent to 70 percent of all cases. Other affected breeds are Lhasa Apso, Pekingese, Basset Hound, French Bulldog, Pembroke Welsh Corgi, Cardigan Welsh Corgi, Papillon, Doberman Pinscher, German Pinscher, Miniature Pinscher, Beagle, and Cocker Spaniel.

Early-onset IVDD occurs between 3 and 6 years of age. Although wobbly gait and paralysis are the first noticeable signs, radiographs can show disc calcification by age 2. Late-onset cases occur from 7 to 12 years of age.

Stowe experienced both types with her dogs. Bojangles experienced early-onset IVDD at age 3 and required surgery, but then lived a normal life until he died at age 15. Jolene suffered late-onset disease at age 9 and required emergency surgery. At age 12, Jolene is doing well despite having a slightly wobbly gait.

### Developing a Genetic Test

In their efforts to identify the gene mutation(s) contributing to severe IVDD, Neff and his research team are expanding their research. They are seeking DNA samples from not only Dachshund owners with severely affected dogs but also from owners of affected dogs from other breeds, such as the Papillon.

Papillons are a breed in which IVDD occurs less commonly than in Dachshunds. "We are hoping that the Papillon may simplify the search for causative genes, and thus, help us map Dachshund risk factors faster," Neff says.

"Severely affected dogs are those with an early age of onset that expe-

rience repeated and severe ruptures and paralysis," he says. "Affected dogs with affected first-degree relatives, including parents or siblings, are particularly informative as they are more likely to share casual genes. We gain mapping power if we can collect DNA samples from multiple affected dogs from the same bloodline. It helps us compare their genetic makeup to that of dogs that do not have IVDD."

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The ultimate goal is to develop a genetic test so breeders can identify dogs at genetic risk. Once a test is available, breeders can potentially reduce the incidence and/or severity of IVDD through selective breeding. Identification of genes responsible for IVDD may also help to advance therapies for affected dogs.

"Although IVDD may prove complicated, now is a good time to tackle the disease," Neff says. "Advances in the field of canine genetics have been tremendous. The complete DNA code for dogs, all 2.4 billion letters, is now known. The code essentially brings to light the full compendium of dog genes.

"This is particularly important when only a few of the 20,000 genes may contribute to IVDD. The DNA sequence has also made possible new technological advances that allow decoding DNA samples faster, at lower cost, and at greater resolution. The so-called 'SNP Chip' is an advance that could prove crucial in elucidating the basis of IVDD."

The pervasiveness of IVDD in Dachshunds has made Neff wonder whether all Dachshunds are equally susceptible to the spinal disorder. "Perhaps environmental factors, such as whether a dog is overweight, determine or contribute to the severity of the disease," he says.

Stowe advocates owners to take steps to help reduce disease incidence. Through postings on the [www.dodgerslist.com](http://www.dodgerslist.com) Web site and working with the Health and Welfare Committee of the Dachshund Club of America (DCA), she emphasizes the importance of maintaining a dog in ideal body condition.

"Limiting aggravating factors such as obesity and jumping and twisting are important," Stowe says. "The most important thing is to be a responsible

breeder, which entails carefully choosing breeding partners. You do not want to breed a dog that has had IVDD until the mode of inheritance is understood. Doing so could perpetuate the disease."

Meanwhile, the researchers need DNA samples from Dachshunds affected with the severe form of IVDD. Both Neff and Stowe are grateful for the outpouring of support from owners. "I've been pleased with the response from breeders, and so many participated in the DNA testing we held at this year's DCA National Specialty," Stowe says.

Neff agrees. "The Dachshund community has been fantastic in supporting a possible research project on the genetics of IVDD. And, as with all of our research, confidentiality is strictly maintained," he says. "We understand completely the threat breeders feel when turning over information about dogs in their bloodlines. But without the help of owners and breeders, we would not be able to move closer to understanding the genetics of any of the inherited diseases in the dog, including IVDD."

Veterinarians also are willing to help and often forego charges related to drawing blood samples to send to Neff and researchers at the Veterinary Genetics Laboratory at the University of California-Davis.

As for Stowe's involvement, she continues to work with breeders and owners in collecting DNA for the research. The Dodger Web site now has 1,600 members and she notes proudly grows by two to three new members each day.

"A big part of my mission is to get people in touch with veterinarians familiar with the disease and how to manage it," Stowe says. "Unfortunately, I am afraid that many people still are not familiar with the options and dogs are euthanized unnecessarily. This is why we send mailings to veterinarians to let them know about IVDD treatment options and offer support to their clients.

"No Dachshund or Dachshund owner should go through the pain and suffering of IVDD," she says. "There are ways to manage this disease. The future is exciting. I am optimistic that one day a genetic test will help us to identify dogs at genetic risk so we can reduce this painful, debilitating condition." ■

Purina appreciates the support of the Dachshund Club of America and particularly Charlotte Borghardt, chairwoman of the DCA Health Committee, in helping to identify topics for the *Purina Pro Club Dachshund Update* newsletter.