# PIECING TOGETHER A SYNDROME'S PUZZLE

After seven years of trying to solve the puzzle of *exercise-induced collapse* (EIC) in Labrador Retrievers, WCVM's Dr. Susan Taylor and her research collaborators are close to identifying one of the syndrome's crucial pieces: the defect's genetic location.

The syndrome, which was first detected in the mid-1990s, primarily affects Labradors (black, chocolate and yellow) from field-trial breedings. Although dogs with EIC are typically extremely fit, five to 20 minutes of strenuous exercise will cause them to weaken and collapse. Affected dogs usually experience their first collapse between seven months and two years of age.

This summer, University of Minnesota researchers will perform a genome scan of DNA harvested from hundreds of blood samples that were collected from affected Labrador dogs and their relatives. They will also conduct a computer analysis of the dogs' pedigrees.

If scientists can specify a genetic marker for EIC, they will be closer to identifying the mutation that causes the condition. With this key piece of information, they can develop a genetic test for EIC that will enable veterinarians to accurately diagnose EIC in affected dogs. "A genetic test will also allow breeders to test their dogs so they can identify genetic carriers, and make preventive breeding decisions based on that information," explains Taylor, a professor of veterinary internal medicine at WCVM.

Since multiple litter mates and offspring from individual sires have been diagnosed with the disorder, EIC is believed to be a genetic condition. Preliminary pedigree analysis suggests that EIC follows an *autosomal recessive* hereditary pattern, meaning that each parent must possess a copy of the gene mutation to pass it on to their offspring.

**For more information, call Dr. Sue Taylor at 306-966-7093 (fax: 306-966-7174) or send an e-mail to sue.taylor@usask.ca.**

In the past few years, Taylor has gathered more than 350 questionnaires from owners of affected Labradors as well as many pedigrees and blood samples. She has also evaluated more than 50 collapse episodes on videotape.

"The first thing you notice is that their nice, smooth gait becomes more forced and 'rocking.' The rear legs become weak, and they're usually unable to support their weight," describes Taylor. Some dogs continue dragging their hind legs behind them while others lose all limb control and are forced to lay flat on their sides until they recover.

Depending on their severity, collapse episodes last from five to 25 minutes. "The episodes don't happen every time the dogs exercise, but they can occur when the dog is very excited or stressed," says Taylor, whose initial EIC research was supported by WCVM's Companion Animal Health Fund. The Morris Animal Foundation is funding additional clinical studies and the genetic component of the research team's work.

In the past three years, Taylor has conducted extensive testing on 15 dogs with EIC and determined that all of the dogs' vital signs were completely normal before and after collapse episodes. As well, no dog experienced any health problems — such as heart rhythm abnormalities or low blood sugar — that could explain the condition.

In May, Taylor and Dr. Diane Shelton, another member of the North American EIC research team, presented preliminary results of their ongoing investigations at the American College of Veterinary Internal Medicine's annual scientific forum in Dallas, Texas. Shelton, a scientist at the University of California's Comparative Neuromuscular Unit, conducted metabolic testing of muscle and blood from dogs with EIC before and after collapse episodes.

Her findings have established that there is a defect in energy production within the muscle and brain cells. Dogs with EIC may be deficient in a needed enzyme within these cells, affecting the function of their muscles and brain during exercise and excitement.

More research needs to focus on the exact biochemical defect and developing effective treatment for EIC. In the meantime, Taylor hopes more owners of affected Labradors and their veterinarians will assist researchers in their investigations.

"We're asking owners to fill in a questionnaire and to send us a copy of their dogs' pedigrees. To help with our genetic testing, we're also asking them to take their dogs in to their veterinarian for a simple blood sample. Our study pays for the cost of shipping the sample to the University of Minnesota."

The more blood samples and pedigrees that researchers can collect from affected dogs, the better their chances are for finding EIC's genetic marker, says Taylor.

## EIC FIRST RESPONSE

- Stop your dog from moving as soon as you notice any change in gait or limb weakness. ***Walking or running for even a few minutes after the onset of symptoms can result in death*** since the dog's condition often worsens in the first three to five minutes after exercise is stopped.
- If water is available, give your dog a drink and wet him down. Labradors, with or without EIC, develop very high body temperatures following intense exercise (up to 42˚Celsius or 107.6˚Fahrenheit), so cooling them down can be beneficial.
- Keep your dog from moving until symptoms subside. If you can carry your dog to a vehicle, take him to a veterinarian. The effects of the collapse may have subsided by the time you reach the clinic, but examination by a veterinarian can help to eliminate other medical reasons causing collapse.