

SUSAN LACROIX HAMIL SAYS CHIC PROVIDES LIGHT AT THE END OF THE GENETIC TUNNEL

It is the call no breeder wants to receive.

A beautiful much-titled dog, Sam'Son, from your favorite and best stud dog, Sam, has just been diagnosed with a life-threatening disease of probable genetic origin. Panic sets in as you sit down to try to sort out this new information and formulate a plan.

First, to find out all you can about this disease, its proper diagnosis and possibility of genetic origin and transmission. Next, you'll need to notify all owners of the bitches Sam was bred to and notify all puppy buyers. You'll need to check with Sam's breeder to see if any of Sam's siblings or half siblings have been affected or have produced affected offspring.

Soon you realize this is a problem of amazing geometric proportions. Since Sam has been a prolific sire and Sam'Son has also sired a number of litters as well, many dogs have the possibility of being affected or of unknowingly carrying this disease to pass on to future generations. It is probable not all puppy buyers will be located; some of those puppies may have died, and no diagnostic or health information will be forthcoming on those dogs. Your pedigree information will be incomplete, and some information you receive may be completely false.

In some breeds, the popular-sire syndrome can create a breeding bottleneck that can take generations to overcome. Throw in the possibility of life-altering or life-ending disease, and for some breeders this scenario will be end of the line both literally and figuratively. Pedigrees will be analyzed without complete accurate information. Frozen semen on suspected dogs will be destroyed, and some of the otherwise outstanding dogs with much to contribute will summarily be eliminated from the breeding pool.

And then there is the specter of the Internet where all of your "friends" will be waiting to push the "send" button on their computers to announce your misfortunes, both real and imagined, to literally the entire dog world.

If you are really motivated, you and a group of likeminded owners and club members may form a committee and find a researcher willing to investigate this health issue in your breed. Clinics will be held, samples submitted and time will go on. Dogs pass away, and the researcher moves on. Samples are abandoned and are either unsuitable or unknown to other researchers. With no results achieved, the disease continues to "pop up" on a seemingly random basis.

Affected dogs with early-onset diseases can easily be identified and removed from the breeding population, but many diseases have late onset of symptoms that result in dogs which are apparently healthy until disease symptoms appear later in life, well after puppies have been produced. Additionally, many diseases produce carrier states in which the dog appears normal, but when mated to another seemingly normal dog will produce affected offspring.

It has been the inability to identify late-onset disease and carrier states before dogs are bred that has severely hampered the ability of breeders to eliminate many heritable canine diseases.

Indeed, in the scenario as described above, a small breeding program can be completely eliminated or abandoned all together. The reputation of an outstanding sire or breeding program is ruined — a lifetime in dogs goes down the drain.

Fortunately, there is light at the end of the genetic tunnel for all dogs. The Orthopedic Foundation for Animals (OFA) and the American Kennel Club Canine Health Foundation, in conjunction with their already exiting Canine Health Information Center (CHIC) program, have formed a DNA repository open to all breeds currently participating in CHIC. The CHIC DNA Repository collects and stores canine DNA samples along with corresponding genealogic and phenotypic information to facilitate future research and testing aimed at reducing the incidence of inherited disease in dogs.

The objectives of the CHIC DNA Repository include:

- Expediting sample collection process;
- Providing researchers with optimized family groups needed for research;
- Allowing breeders to take advantage of future DNA-based diseased tests as they become available;
- Fostering a team environment among breeders and owners and the research community, improving the likelihood of genetic discovery.

Samples are submitted to the CHIC DNA Repository along with a pedigree, health information and owner contact information. The Repository recognizes that many diseases have a late onset and therefore will attempt to contact the owner every 24 to 36 months for updated health information, or individual information can be updated through CHIC by the dog's owner when appropriate.

SAMPLES CAN BE SUBMITTED TWO WAYS:

SWABS. Multiple buccal (cheek) swabs collected at the same are counted as one collection. Cheek swabs collection is not invasive and does not require a trip to the veterinarian. These samples are cataloged at the OFA office and stored indefinitely through an arrangement with the Veterinary Genetics Laboratory at University of California at Davis. The cost is \$5 to cover cataloging, data management and indefinite storage. Because the swabs remain stable for an indefinite period of time, extraction of DNA is not required until the sample is pulled for use in a project or through a test request from the dog's owner.

WHOLE BLOOD SAMPLES. Whole blood still yields the greatest concentration of pure DNA in a highly concentrated stable form. Still considered the gold standard, DNA from blood is suitable for all current and future technologies. Blood draws will require a visit to your veterinarian, and blood must be shipped, cataloged and processed immediately. The cost is \$20

per sample to cover immediate processing and indefinite storage period through an agreement with the Small Animal Molecular Genetics Lab at the University of Missouri.

THE BREEDER BENEFIT

CHIC DNA Repository benefits to breeders include:

- *Facilitating research progress by expediting the sample collection process for breeders and researchers?*
- *Including phenotypic as well as genetic data on clear and affected individuals*
- *Safe, secure sample storage, allowing breeders access to future DNA tests on live and deceased dogs*
- *Preventing "orphaned" samples and sample fatigue*
- *Assured access to all researchers with approved projects.*

LEARN MORE

For more information on participating in DNA sample collection and to Bank on the Future, contact the Orthopedic Foundation for Animals at www.OFFA.org or visit the CHIC web site at www.caninehealthinfo.org. For the latest information on genetic testing and research projects, contact the American Kennel Club Canine Health Foundation at www.AKCCHF.org.

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The major breakthrough in genetic testing has been in the development of genetic-marker tests, providing the ability to identify through specific gene mutation those dogs that appear phenotypically normal but carry the gene for a specific disease. Once the carrier can be reliably identified, the affected state of the disease can be virtually eliminated. If a dog is identified as a carrier, it can be bred to an identified noncarrier and the resulting puppies will all be phenotypically normal, but it is expected that 50 percent of these puppies will be carriers.

Although some carrier puppies may be produced, they can easily be identified with the test and again bred to noncarriers so that no dog is affected. Previously, many worthwhile dogs have been removed from the breeding

pool because of an obvious genetically based disease. With the ability to identify the carrier state, even affected dogs — depending on the genetic disease — can be used in a breeding program. Again, once the carrier can be reliably identified, the affected dog can be bred only to clear dogs; any carrier offspring will be easily identified and bred accordingly.

Since the advent and perfection of the freezing of canine semen, there are many dogs of all breeds currently stored for future use. Many are outstanding examples of their respective breeds; some are less so. Many were frozen before the advent of genetic testing, so can pass on genetic traits, both good and bad, that will influence subsequent generations.

If these dogs have been stored in the CHIC DNA Repository, the owner may request stored samples from these dogs be pulled and sent to a licensed lab for testing rather than sacrifice frozen semen, which may or may not yield results. The owner would, of course, be responsible for costs to prepare and ship the sample as well as testing fees. Additionally, tests can be performed on other deceased relatives if they are in the repository. What an amazing service for all dogs!

With the advent of the CHIC DNA Repository, participating breeders have the ability to store DNA from all breeding stock to assure samples will be available to qualified researchers when needed. As future genetic tests become available, important dogs in pedigrees, living or not, can be tested to provide the most accurate health and pedigree information possible to ensure the health of future generations.

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Susan LaCroix Hamil, Laguna Beach, Calif., is a longtime breeder of Bloodhounds under the Quiet Creek banner. She was the Hound Group recipient of the AKC 2006 Breeder of the Year Award, and is a member of the AKC Canine Health Foundation President's Council.