

Lens Luxation Study at University of Missouri

I was recently contacted by Dr. Johnson of the University of Missouri. They are requesting blood samples of Chinese Shar Pei affected with lens luxation. They would also like samples from close relatives of those dogs. A genetic mutation has been identified for lens luxation. Unfortunately, the test that is available and accurate for most breeds does not work for CSP. They would like samples from our affected dogs (and their relatives) so they can identify the gene and potentially develop a test for Chinese Shar-Pei.

MU will do the testing at no cost. Please cross post and encourage members with affected dogs to participate in this study. Contact information is listed below. Also listed is information on the study and the "how/when/where" to submit the samples. Please contact Dr. Johnson or Liz Hansen for more information.

Sample Submission Information: <http://www.caninegeneticdiseases.net/Docs/DNAhowto.pdf>

Lens Luxation: <http://www.caninegeneticdiseases.net/GLX/mainGLX.htm>

Individual Dog Information Form: <http://www.caninegeneticdiseases.net/Docs/DNAasampl.pdf>

Litter Information Form: <http://www.caninegeneticdiseases.net/Docs/litrinfo.pdf>

Litter List Form: <http://www.caninegeneticdiseases.net/Docs/litrlist.pdf>

Dr. Gary Johnson: johnsongs@missouri.edu

Liz Hansen: HansenL@missouri.edu

Grace Fritz, CSPCA President

A DNA Test for Primary Lens Luxation is Available NOW!!

October 15, 2009

University of Missouri, College of Veterinary Medicine

A mutation that causes development of Primary Lens Luxation (PLL) in many breeds of dogs has been identified by a team of researchers led by Drs Gary Johnson & Elizabeth Giuliano at the University of Missouri College of Veterinary Medicine. A DNA test for this mutation became available in mid-September 2009 through a partnership with OFA (Orthopedic Foundation for Animals).

Shortly after the announcement by the University of Missouri, researchers at the Animal Health Trust in England also announced that they had found a mutation for PLL. Dr Catherine Mellersh and Dr David Sargen from the AHT contacted Dr Johnson, and both research teams have agreed to share data and co-publish this discovery. PLL testing will also be available through the AHT in England at a price comparable to the fee at OFA.

Primary Lens Luxation is an eye problem well known in many Terrier breeds as well as Tibetan Terriers, Chinese Cresteds, Australian Cattle Dogs, and other breeds. The lens is held in place in the eye by fibers known as zonules. If these zonules stretch or break, the lens can fall out of place, or luxate. When this happens it often requires immediate veterinary attention to remove the displaced lens and prevent painful secondary glaucoma, and sometimes loss of vision.

Research at the University of Missouri led to identification of a DNA mutation that predicts which dogs are at risk for developing lens luxation as they age. Working independently and using other breeds, the researchers at the Animal Health Trust found the same mutation a few months later.

This independent confirmation of the finding makes both labs confident that the correct mutation has been identified, and that the test is valid for many breeds. A simple DNA test will reveal if a dog is NORMAL (has 2 normal copies of the gene), a CARRIER (has one normal copy and one mutated copy of the gene), or AFFECTED (has 2 mutated copies of the gene). Wise use of this test will allow breeders to avoid producing individuals destined to develop lens luxation, while still retaining many other desirable traits in their dogs.

Testing and Inheritance of PLL From pedigree studies done previously, there has been general agreement that PLL is inherited as a simple recessive trait. This means that a dog needs 2 mutated, or “bad” copies of the gene to show the disease. With the PLL mutation identified, and the research groups able to compare notes on the dogs used in the study, it has become apparent that there are some exceptions. While the vast majority of dogs with PLL have tested AFFECTED, a small percentage of the dogs that test CARRIER are also at risk of developing PLL. Owners and breeders should be aware of this and understand the implications of the test results so that they can make well-informed decisions for the future of individual dogs, and the breed as a whole.

Dogs that test AFFECTED have 2 mutated copies of the gene. The vast majority of these dogs will luxate at 4-8yrs of age, the typical age of onset for PLL. There were a few dogs in the study group that tested as AFFECTED but did not luxate until after 8 yrs of age, and some dogs testing AFFECTED have died from other causes without luxating. A search of published veterinary literature revealed that about 10% of the dogs reported to be clinically affected with PLL had onset of symptoms after 8 yrs of age. Because of this, the test results will say “AFFECTED/HIGH RISK”.

As stated earlier, dogs testing CARRIER are at a slight risk of developing PLL. Carriers have one normal and one mutated copy of the gene. They could pass either the normal copy or the mutated copy on to their offspring. Because there were a very few cases of dogs in the research groups testing CARRIER who did appear to have PLL, the test results will say “CARRIER/LOW RISK”.

A dog testing NORMAL has 2 normal copies of the gene, is not at risk for developing PLL, and can only pass a normal copy of the gene to any offspring.

Breeders and individual owners are now able to test any dog using the testing kit that can be ordered online through the [OFA website \(www.OFFA.org\)](http://www.OFFA.org). DNA is collected using a cheek swab, and the barcoded sample will be tested by the Animal Molecular Genetics Lab at the University of Missouri, with results reported directly to the owner by OFA.

Owners who had submitted samples for research prior to Sept 1, 2009 may request test results for their dogs using this [Test Request Form for existing samples](#) – [click here](#) for this form. These requests will be accepted now.

Owners of dogs that have been diagnosed as affected with lens luxation by an ACVO or ECVO boarded ophthalmologist are eligible to receive a free DNA test if they send a blood sample, pedigree copy, and a copy of the ophthalmologist's report – [click here](#) for the instructions and form to submit samples from affected dogs. Samples from affected dogs may be sent now as well.

Our thanks to the clubs and many individual owners who have supported this research and participated in the project by supplying samples and information on their dogs, as well as monetary support. We also greatly appreciate support from the **Jack Russell Terrier Club of America**, and past support from the **Canine Health Foundation** for the early stages of this research.

If you have questions, you may contact Project Coordinator Liz Hansen at HansenL@missouri.edu.

SENDING INFORMATION AND SAMPLES for DNA Research at the University of Missouri

First, THANK YOU for participating in this important research project! The samples you provide will allow researchers to continue discovering the genes controlling traits in your breed, and dogs in general. As the canine genome is mapped, breeders will have an unprecedented opportunity to identify and avoid producing disease, and concentrate on positive advances in their breeding programs.

It is of utmost importance that the information you provide with the samples is as complete and accurate as possible. The presence of disease, unusual, or "undesirable" characteristics should be revealed to the researchers wherever it has been identified. Information on specific, individual dogs will not be revealed - results of the research will identify what markers have been found, but not the names of those who submitted the samples where a characteristic was located, nor which individual dogs show affected or carrier status for any given condition. Information provided will be kept strictly confidential. As the research produces results, participants may request information on the genetic status of their dog(s).

Complete families are critical to locating specific genes and markers. *Wherever possible, submit samples from all siblings, both parents, and all available grandparents.*

Begin by gathering the pedigree, litter information, and litter list(s) for each family you plan to submit. You will need a correctly formatted (sire on top, dam on the bottom), typed or computer-generated pedigree (3- to 5-generation) of the litter where an affected appeared. If the sample is for a DNA bank, send a pedigree of the individual dog. The pedigree will connect each sample you submit to the family it comes from, so make copies for each individual dog who will be sampled. The breeder of the litter, or other person familiar with the litter should make a "Litter Packet" for each litter - this consists of the *Litter Information* sheet, *Litter List*, and the *Pedigree*. For the Litter ID code use the kennel name or breeder name, plus the date of birth of the litter, so if Pat Doe had a litter born May 15, 1992, the code would be "Doe 05-15-92". Dr. Johnson's staff has a different system of coding in the lab to anonymously identify samples, but the Litter ID code is a way to tie your information together and place individuals in the families where they belong as samples are submitted. This ID code should be on each form sent in. Keep a copy of the packet for your own records, and send a copy to Dr. Johnson. This family information may be sent with the blood samples, or separately.

Next, begin collecting and submitting samples for DNA extraction. See the *Sample Handling* sheet for procedures. The *Individual Dog* submission form should accompany each sample, along with the marked *Pedigree* copy that will tie in with the family information sent. Make copies of the *Sample Handling* and *Individual Dog* forms as needed for all samples to be submitted. If several dogs' samples are being sent together, number the forms and samples to be certain there is no confusion (Sample #1, #2, etc). On a spare copy of the pedigree you may want to mark (for yourself) who is alive and sampled, not sampled, and those no longer living, to keep track of who you need to get samples from. As stated before, entire families will give the best chance at finding specific genes - do your best to include all living family members.

Send samples and information to Dr. Johnson's lab at this address;

Dr. Gary Johnson - (breed of dog) DNA Research
320 Connaway Hall
University of Missouri
Columbia, MO 65211

If you need clarification, or have any questions about any of these procedures, please contact Liz Hansen by
Phone: 573-884-3712

Email: HansenL@missouri.edu

Regular mail: 321 Connaway Hall, University of Missouri, Columbia, MO 65211

Liz is Dr. Johnson's Coordinator of Veterinary Information, and can help with any questions you may have.

Once again, thank you for participating - you are contributing to the betterment of future generations.

SAMPLE HANDLING
For Canine DNA Research at the University of Missouri

Blood Sample - The ideal sample for DNA extraction is 5-10cc's of whole blood, in purple-topped (EDTA) tubes. For very small dogs or puppies, 3ccs should be sufficient. The blood sample needs only to be put in the tubes and rocked gently a few times to distribute the anticoagulant - do not spin, extract serum, or anything further. Refrigerate if the sample is being held for any time before shipping.

Frozen Semen - If there is frozen semen stored from sires or affected dogs, DNA can be extracted from it. Please send 2 straws. They do not need to be shipped frozen, but do pack them in a crush-proof container.

Tissue Sample - Tissue removed as a result of surgery, or an organ sample upon death of the dog will provide a large amount of DNA for research. Please discuss this with your vet ahead of time if you intend to do this. (If the dog is to be euthanized, have a blood sample pulled first, if possible, and send both samples.) First choice is spleen, second choice kidney, and third choice is liver (a piece about the size of your thumb is all that is needed - not the entire organ). One tissue sample is sufficient. Have the organ removed as soon as possible following death, place into a labeled freezer bag, put that into a second bag, freeze, and ship.

Label sample with the following;

call name - owner's last name

(If samples from several dogs are sent together, number samples and forms)

An **Individual Dog Information form** should be completed, and a **pedigree copy** must be included with the sample to tie it in with the correct family. If the dog is not affected but is a relative of an affected, please indicate the relationship.

Shipping - Ideally the sample should be shipped immediately (with a tissue sample make certain it is completely frozen first). If samples are held for a day or over a weekend, blood must be refrigerated, and tissue samples must be kept frozen. Ship via overnight delivery (US Mail, UPS, or FedEx). **Do not send on a Friday** - there will not be anyone to accept the delivery on a weekend, and the sample could be unusable by Monday. Pack in a small insulated container (most vets have these for shipping samples to labs), with one or more cool packs - it is important that blood samples be kept cool but not frozen, and tissue samples be kept as frozen as possible.

The delivery address is;

Dr. Gary Johnson - (Breed of Dog) DNA Research
320 Connaway Hall
University of Missouri
Columbia, MO 65211

If you need clarification, or have any questions about any of these procedures, please contact Liz Hansen by phone (573-884-3712), email (HansenL@missouri.edu), or regular mail (321 Connaway Hall, University of Missouri, Columbia, MO 65211). Liz is Dr. Johnson's Project & Information Coordinator, and can help with any questions you may have.

Thank you for your cooperation and participation!

CANINE DNA RESEARCH

Individual Dog Information

Blood – Tissue – other _____

Breed _____

Litter ID code: _____

Registered Name _____ Call name _____

AKC# _____ Birth Date _____ Male / Female - - Intact / Neutered

Sample Submission Date: _____ Color _____

Sample submitted for which research project? _____

Owner: name _____ Alternate _____

Address _____ Contact _____

Phone (day) _____

Phone (eve) _____

Fax _____

E-mail _____

Does this dog exhibit any of the following conditions? *(Please attach history for any Yes answer)*

- | | |
|-----------------------------------|--|
| Y - N Allergies | Y - N Digestive difficulties |
| Y - N Arthritis | Y - N Heart Problems |
| Y - N Autoimmune Disorders | Y - N Hernia (where? _____) |
| Y - N Bite or Tooth Abnormalities | Y - N Reproductive Problems |
| Y - N Cancer / Tumors | Y - N Seizures |
| Y - N Cataracts / Vision Problems | Y - N Skin / Coat Problems |
| Y - N Deafness / Hearing Impaired | Y - N Skeletal Abnormalities (Hip Dysplasia, etc.) |
| other (please list): | Y - N Temperament Problems (shy, aggressive, etc.) |

Testing done on this dog:

OFA/PennHip Y - N age at test: _____ result: _____ # _____

CERF Y - N age last tested: _____ result: _____ # _____

Thyroid Y - N age last tested: _____ result: _____

other (please list):

Other Comments / Questions / Concerns?

Please circle your response to the following;

- I am / am not willing to provide additional blood samples if needed for research.
- I will / will not consider donation of a tissue sample (spleen, kidney, or liver) upon the death of this dog, and will discuss this decision with my veterinarian so that a notation is placed in my file.

I submit this sample and pedigree for the purpose of DNA research; I understand that the identity of dogs and owners participating in the research will not be revealed; and I have supplied complete and accurate information, to the best of my knowledge.

Signed: _____ Date _____

CANINE DNA RESEARCH

LITTER INFORMATION

(attach Pedigree, and Litter List)

Breed: _____

Litter ID code: _____

Breeder: _____

Litter birthdate: _____

Information Contact:(name) _____

(address) _____

(city, state, zip) _____

(phone-day) _____

(phone-eve) _____

(Fax) _____

(e-mail) _____

Number of pups: - at birth - live M _____ F _____ dead M _____ F _____

- surviving at 6 weeks - M _____ F _____

- surviving at 6 months - M _____ F _____

- surviving at submission date - M _____ F _____

Color(s) present in litter: _____

Known health problems in litter:

(List problem, dog name and ID # from litter list, age of onset, pertinent details)

Other litter notes or comments:

Submitted by (name) _____ on (date) _____

CANINE DNA RESEARCH

LITTER LIST

(attach with Pedigree, and Litter Information)

Breed _____

Litter ID code: _____

Information and samples being submitted for which research project? _____

# - Registered name	Call name	M/F	Affected?	Alive now?
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.