Berger Picard Health & Research report – 2016

This year's report is being shared with Berger Picard fanciers across Europe, as well as the US. Overall, the breed is quite healthy and most dogs are living a good lifespan, free of major problems. There are some areas of concern to breeders and owners however, and research is in progress or planned for some of these concerns.

Very recently, the research groups lead by Dr Catherine Andre at the University of Rennes in France, Dr Louise Burmeister at the Animal Health Trust in the UK, and Dr Gary Johnson here at the University of Missouri in the USA have agreed to fully cooperate and collaborate on genetic research targeting PRA (progressive retinal atrophy) and other diseases in Berger Picards. These research teams will share information and samples, and use complimenting skill sets and access to the most current technologies available to genetic researchers to identify disease-causing mutations in Picards. When this is accomplished, the worldwide Picard community will have access to DNA tests to allow breeders to make informed choices of breeding partners that will maintain the genetic diversity and positive qualities of the breed, while at the same time eliminating or reducing the risk of inherited disease in future generations of Picards. This is a very positive step forward, and should be good news for all Picard fanciers!

As this report is written, a total assessment of individual dogs currently sampled by all 3 labs is just underway. At the University of Missouri, there are currently 303 samples from 293 individual Picards DNA banked for any reason. Some of these came in specifically for disease research, but the majority are healthy dogs sampled for inclusion in the CHIC DNA Bank. About 2/3rds of these dogs reside in the US, and about 1/3 are from Europe and Scandinavia. Numbers of dogs banked at Rennes and AHT will be shared when available.

At the University of Missouri, we currently have Whole Genome Sequence (WGS) data on 4 Picards. One is a clinically apparently normal dog, one is a dog diagnosed with CMR (canine multifocal retinopathy), one is a dog diagnosed with PRA and blind by age 2 years, and most recently we have sequenced a dog diagnosed with epilepsy. In the past year we investigated several mutations suggested by initial evaluation of the PRA and CMR sequences, but eliminated these as the mutations responsible for these diseases in Picards. Improved analysis techniques developed here and in collaboration with other labs employing WGS for gene discovery provide better and better tools to search through the millions of variants in the genomes of the dogs sequenced. One of the new analysis algorithms is running a breed mutation report for all 4 WGS's as this is being written. This report should suggest additional candidate genes to be evaluated by the combined research teams.

Dr Burmeister is preparing to run a WGS on a Picard with PRA, and when that sequence is completed, comparison of the 2 genomes from PRA-affected dogs could greatly assist the search for the cause of PRA in this breed. Dr Andre's lab has been collecting samples and pedigree data on PRA-affected dogs, and these will be very useful to assist the research groups as they evaluate candidate mutations found by evaluating the sequence data.
Evaluation of these WGS's also reveals mutations that could be responsible for many other conditions found in Picards. Researchers can see mutations in genes that have a known function in other species, and it is likely these genes have the same or very similar function in dogs. The initial review of the first 3 Picard WGS's revealed mutations in genes which may cause the following conditions:

- Abnormal brittle hair & nails
- Abnormal and/or discolored teeth
- Anxiety

- Chronic pulmonary disease
- Congenital ichthyosis (hair loss)
- Congenital myasthenia (muscle wasting)
- Diabetes
- Dilated cardiomyopathy
- Erythrocitosis (abnormally high blood cell count)
- Extra toes, renal disease (unusual combination for one gene but this is what has been reported)
- Eye color (may determine light vs dark eyes)
- Hemophilia
- Hypertrophic cardiomyopathy
- Multiple developmental defects (possible cause of fading puppies?)
- Muscle weakness
- Neonatal diarrhea & jaundice
- Paroxysmal dyskinesia (uncoordinated movement)
- Peripheral neuropathy (may not know where feet are, or tingling sensation in extremities)
- Sensory neuropathy (similar to peripheral neuropathy – lack sensation in feet, limbs)

At this time the research team does not know if many of these conditions appear in Picards, or if the mutations identified are actually causing any disease. However, if there are Picards with these or any other potentially heritable issues, please report this to any of the collaborating research teams so the appropriate samples can be evaluated.
Success of the research initiatives reported here is dependent on samples, pedigrees, and health data provided by individual owners and breeders of Picards. Please participate in blood draws for DNA banking and provide the samples and information to whichever of the collaborating labs is most convenient for you. We hope that news of this collaboration of research efforts by three leading laboratories will encourage all who care about Picards to provide the samples and information needed to make this research effort a success, and benefit Picards wherever they may live.

Website for Dr Andre's laboratory in Rennes: http://igdr.univ-rennes1.fr
Website for Dr Burmeister at Animal Health Trust (UK): www.aht.org.uk
Website for Dr Johnson's laboratory at University of Missouri:www.CanineGeneticDiseases.net
Or contact Liz Hansen by email at HansenL@missouri.edu, or call 573-884-3712