Project update: **Genetic Investigation of Gastric Cancer in Belgian Sheepdogs and Belgian Tervurens**

The Dog Genome Project, under the direction of Dr. Elaine Ostrander, at the National Institutes of Health is leading an expanded study aimed at understanding the **genetic predisposition to canine gastric cancer** (GC) in specific breeds, most notably the Belgian Sheepdog and Tervuren. The project goal is to identify the mutation(s) that increase risk for this lethal disease, which will inform genetic testing and the development of therapeutic strategies.

To date, the Ostrander group has generated genome-wide marker data in a small cohort of affected and healthy American Belgians as well as whole genome sequences (WGS) from multiple affected dogs. Analyses conducted thus far indicate that there are likely multiple regions of the genome that contribute to increased risk, and that additional DNA samples from both affected dogs and healthy (no cancer history) seniors are required in order to find genes associated with risk for GC. The already available WGS will be used to interrogate the identified regions for specific mutations, or alterations in the DNA sequence, that are likely to contribute to pathogenesis. By extension of the above project, we are also seeking to collect tumor samples, as information gleaned from genetic analysis of tumors may identify genes underlying lethal metastasis.

The research is a continuation of work begun by Dr. Elizabeth McNiel, and is being carried out in collaboration with Dr. Anita Oberbauer at UC Davis, who has amassed Sheepdog and Tervuren samples for the study of idiopathic epilepsy in the Belgians, and Drs. Peter Leegwater and Paul Mandigers at Utrecht University, who have collected samples from European Belgian Shepherds. These collaborations help us to maximize the resources available for the study, and many of the DNA samples serve both the gastric and epilepsy projects. Especially valuable are the samples from aged healthy seniors collected at the various specialties over the years. At the 2019 BSCA Nationals alone, 41 samples, about half of which were from senior dogs, were collected by members of the Ostrander lab and blood draw volunteers.

Embark has also teamed up with the gastric study, and with explicit permission from owners who submit a Belgian for DNA analyses, will share that data with the Ostrander lab. It is also possible for owners to submit their raw data from Embark, found under the Advanced section of their dog's results, directly to **Dr. Jacquelyn Evans** (**jacquelyn.evans@nih.gov**), who is the postdoctoral fellow in the Ostrander lab working on the project. We are especially interested in data from healthy senior dogs and dogs who developed gastric cancer. Embark's data can be directly incorporated into the ongoing gastric study; **however**, we ask owners to also submit their dogs' blood samples for the gastric cancer study to the Ostrander lab when possible. Having this DNA is essential for follow up studies that must be done to confirm any initial genetic findings.

Even if you have not submitted samples to Embark, the gastric cancer study is still in need of blood samples from gastric cancer cases as well as aged healthy Belgians (10 years or older with no cancer history). Please contact the Ostrander lab Samples Manager, **Andrew Hogan**, at **dog_genome@mail.nih.gov** if you wish to

participate in the study, and you will be provided with blood kits and collection instructions. Requests for additional information or questions regarding the gastric cancer study can be directed to Dr. Evans at jacquelyn.evans@nih.gov. All owner and dog information will be kept confidential.

Tumor samples are also extremely valuable at this time from dogs diagnosed by biopsy and histopathology or for whom histopathology is planned. Please contact the lab if you think you might be able to donate a tumor sample, as a special kit and protocol will need to be provided to your veterinarian ahead of time. Tissue is very delicate, and the collection process is time-sensitive and requires advance preparation. Unfortunately, the lab cannot cover the cost of tissue collection but will provide pre-paid FedEx shipping labels to send the samples.

For the ongoing epilepsy study, including sample submission, contact **Dr. Oberbauer** at **amoberbauer@ucdavis.edu**.

We look forward to everyone's contributions and assistance!