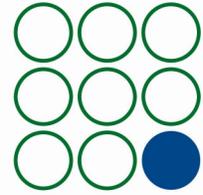




THE KENNEL CLUB
GENETICS CENTRE

AT THE ANIMAL HEALTH TRUST



Canine DNA storage for future genetic research

Sample Collection

Whether it's for a specific genetic condition or to simply archive samples in the event that heritable problems may arise within a breed at a later date, then the AHT is happy to assist breed clubs and owners alike. DNA can be collected using buccal (cheek) swabs, which is non-invasive to the dog and simple and convenient for the owner to obtain. Providing the instructions are followed it is usual to collect enough high-quality DNA for most research purposes via this collection method. Ideally the DNA would be collected by a vet as a blood sample, up to 5mls preserved in EDTA. However, Home Office regulations restrict the drawing of blood for non-diagnostic reasons, and if solely intended for research has to be performed under very specific license. Although if a dog is having blood drawn for a veterinary procedure then a vet is permitted to draw a little extra for research purposes.

Follow Up Information

The AHT always welcomes updated health information about any dogs we have stored DNA from, and particularly when there has been a change in clinical status relating to a heritable condition, such as developing cataracts, epilepsy or some other inherited disorder. This information can be vitally important to a particular study when our researcher's are analysing this particular individuals DNA among others. Equally so, it is important to let us know if a dog is still healthy many years after sample submission, as older clinically clear dogs to can be used as study controls. Typically there would be a desired lower limit on the age for best use as a control, but this will vary depending on the condition being studied. For new sample submissions or health updates please feel free to get in touch with Bryan McLaughlin (bryan.mclaughlin@aht.org.uk)

DNA Analysis

Once a clinical problem within a breed has been identified as hereditary, and the mode of inheritance has been more or less established, then we can begin to formulate a project plan as to how many samples would be needed and how to use them. For a simple single gene recessive condition we would require at least 12 affected dogs (cases) and the same number of unaffected dogs (controls). If the condition were dominant or a more complex polygenic multifactorial one, then the number of affected and unaffected cases needed would considerably increase to a minimum between 24 and 36 of each.

After each individual DNA extraction has been obtained in sufficient quantities and quality, then a typical course of action would involve running a Whole Genome Scan (WGS). This compares the DNA from cases with the DNA from controls at currently around 220,000 different positions in the genome, in an attempt to find regions that are consistently similar in all the cases and different in the controls. Such regions are highly likely to contain mutations associated with the case condition in question. Once these regions of the genome are identified, additional experiments will be necessary to pinpoint the precise causal mutation, but finding an associated region is a very important initial step on the way to the development of a DNA test.

Funding

Canine genetic research staff here at the trust are currently generously supported by the Kennel Club, as part of the Kennel Club Genetics Centre at the Animal Health Trust, but resources such as consumables and laboratory materials are being funded solely by donations from funding organisations, breed clubs and individuals.

The swab kits we issue are free of charge. Although for sample collections that don't already have funding in place, such as breed DNA archiving, then we do ask that a donation of some kind is made to the charitable trust. Some breed clubs in the past have chosen to purchase a piece of needed laboratory equipment such as a freezer to store samples, but most common however is a £5 donation per swab kit issued which helps to cover our costs.

The initial WGS analysis is the most expensive overall outlay on consumables, and it currently costs approximately £200 to analyse the DNA from a single dog. There is a minimum order run of 48 samples, therefore to maximise cost efficiency we can perform WGS's for several studied conditions in conjunction. Additional costs would ultimately depend on the samples, and how the study would proceed after analysing the data obtained by a WGS.