The Canine Biobank Project

Principal Investigator: Associate Professor Peter Williamson

Many dog breeds are susceptible to specific diseases because of their pedigree or genetic background. The recent advances in canine genomics provide a basis for a detailed dissection of the genetic component of these diseases, which can then be incorporated into disease management and eradication plans. These diseases range from single gene defects, such as inherited diseases of metabolism, through to complex diseases, e.g. diabetes and cancer. The dog was the first companion animal to have a complete genomic DNA sequence. This has lead to a much more detailed understanding of the haplotype structure of the genome, and how it relates to dog breeds. The capability to perform genomewide analysis in dogs has recently taken another leap forward with the release of a genome microarray that is commercially available. This array provides a whole genome analysis using single nucleotide polymorphisms (SNPs) and can therefore simultaneously compare the entire genomes of individual animals. This represents a major departure from previous capabilities to study small regions of the genome or individual genes. This detailed genetic tool in combination with an appropriate experimental design, can reveal the unique regions of the genome that are present in different dog breeds, and how they may be associated with breed traits or disease. This kind of research has proven to be particularly powerful in dogs because of the breed structure and common ancestry.

The fundamental biological materials for these studies, most commonly DNA, create a platform for such studies, and are most effective when organized into a well managed collection, also commonly referred to as a "biobank". Once a critical mass of biological material is established in a biobank it provides a powerful resource to help understand complex disease processes, to detect and eliminate existing disorders, to prevent the proliferation of disease related genes, and to help devise new therapies.

With funding support from the Australian Canine Research Foundation and bequests of the Faculty of Veterinary Science, University of Sydney, Associate Professor Peter Williamson has established a project to create a canine biobank. The biobank forms the basis for continued studies on the genetic basis of canine health and disease.