

CANINE RESEARCH FOUNDATION – GRANTS AWARDED FOR 2016

The Canine Research Foundation is a Public Charitable Trust to support research conducted at Australian universities from funds generated via the levy on puppy registrations, fund raising functions, tax-deductible donations and bequests from the public. The purpose of the Foundation is to provide funding for research directed at improving **canine health**. Canine health refers to research into disease and disease related processes, and/or the prevention of injury and/or disease.

The CRF was founded by the VCA in 1992 and 110 research grants have been awarded for projects through to those commencing in 2016. Just over one million dollars of funding has been distributed since 1992 for research. Funding to the CRF is received from all ANKC Ltd Member Bodies.

Current trustees of the Canine Research Foundation are: Mr Roger Bridgford, Ms Louise Brodie, Dr Steve Holloway, Professor Brian Corbitt, Associate Professor Jan West, and Mr James Rodger.

In 2016 five grants were successful in receiving funding and summaries of the projects are outlined below.

Combination novel immunotherapeutics for the treatment of dogs with cancer

(Dr Rachel Allavena, University of Queensland)

Cancer is an extremely common and devastating disease in many breeds of pet dogs. The use of immune-based cancer treatments is of great potential in human and veterinary medicine. Intratumoural Complete Freund's Adjuvant (iCFA) injection and streptavidin-based autologous anti-cancer vaccine (Kvax) are two novel Australian invented, safe and effective, experimental immune-based treatments for naturally occurring cancer in pet dogs. To date we have tested these therapies individually against a range of very common naturally occurring cancers in dogs of many breeds, such as mast cell tumours, melanoma, and soft tissue sarcomas. We believe a combination of the local iCFA and body wide Kvax treatment will result in even higher cure rates and increased tumour shrinkage than each method alone. Individually, both treatments are safe and work against dog cancers in pilot studies in rodents and pet dogs conducted at our universities. Our aim is to assess the safety and effectiveness of single and combination iCFA and Kvax in pet dogs naturally suffering from a range of cancers that have been unable to be cured by currently available treatments. We will explore the immune mechanisms causing tumour shrinkage and cancers cures, and compare these with dogs who fail to respond to the treatments. By understanding how and why the treatments work; we will be able to optimise these treatments as new weapons against the cancers which commonly plague multiple dog breeds and bring heartache to countless dog owners.

Genetic variants associated with development of canine visceral haemangiosarcoma

(Caroline O'Leary, University of Queensland)

Canine visceral haemangiosarcoma is a cancer affecting the internal organs, especially the spleen, liver and heart in many dog breeds, but especially German Shepherds, Golden Retrievers and Labradors. The cancer originates from cells lining the blood vessels and is not usually diagnosed prior to the cancer

having spread internally in the body. Diagnosis and treatment of haemangiosarcoma has not improved for decades. However, better outcomes for dogs and their owners are likely if individual dogs at high risk of developing this cancer can be identified early using a genetic test, and then monitored for cancer development using ultrasound. Further, such genetic diagnostic tests could allow breeders to breed away from genetic markers which are associated with increased risk of developing this cancer. This study aims to develop such a genetic test by determining the DNA sequence from dogs with the cancer and comparing it to the DNA sequence from normal dogs to identify genetic changes which are associated with increased or decreased risk of developing the cancer haemangiosarcoma. Previous studies identifying genetic areas of interest in this cancer have been identified in by this group (some funded by the CRF), and the current study will take these findings further to identify actual DNA coding changes associated with the development and spread of this cancer. This will improve understanding about the development and spread of the cancer, helping to diagnose the cancer earlier and improve treatment.

Characterisation of pyometra-causing *Escherichia coli* in young and old dogs

(Dr Natalie Krekeler, The University of Melbourne)

Pyometra is one of the most common, life-threatening reproductive diseases in female intact dogs. Pyometra not only affects the animal's health but also its breeding value. The pathogenesis of the disease is only incompletely understood. Previous studies undertaken at the University of Melbourne led us to hypothesize that the disease process differs between healthy young dogs and older dogs with uterine abnormalities. The aim of the present study is to characterize *Escherichia coli* (*E. coli*) isolates (bacteria that cause the disease) from young and old dogs affected by pyometra in order to investigate if bacterial strains between the two differ in their pathogenic profile. Another aim is to determine the presence of *E. coli* strains at different sites including the uterus, vagina and rectum and to type these strains in order to determine if the same strains are present at all sites. A third aim is to explore the biofilm forming potential of *E. coli* strains found in the canine urogenital tract. Bacterial biofilms have recently been the subject of investigation to explain recurrent disease, which is a feature of pyometra. In order to achieve these aims we propose to collect bacterial samples from dogs affected by pyometra and healthy control animals. The virulence of factor profile and biofilm forming potential for *E. coli* strains from young dogs will be compared with the profile of old dogs at the different anatomical sites. Healthy control animals of both age groups are included in the study.

Enteric Parasitism and the Aetiology of Diarrhoea in Puppies

(Prof Richard Thompson, Murdoch University)

Diarrhoea in puppies is a significant and ongoing problem for breeders. Although there are many possible factors that can contribute to diarrhoea such as overcrowding, stress and poor nutrition, diarrhoea occurs in well-nourished and cared for puppies and it is widely believed that enteric parasitism is the cause. However, there is uncertainty about which parasites are responsible, how they are transmitted, and how best to treat and control infections. The aims of this project are to identify the factors that contribute to diarrhoea in puppies prior to weaning and to optimise approaches to

treatment and control. We will investigate which intestinal parasites are most common in puppies, when they first appear after birth, and the intestinal bacterial flora. This will be achieved by regular, twice weekly, faecal sampling of naturally infected puppies from birth to weaning. Such an intensive study has not been undertaken previously. The information obtained will identify when anti-parasitic drugs (anti-coccidial and anti-giardial) should be administered in order to prevent parasite multiplication and associated diarrhoea. The project is innovative because we will simultaneously characterise both parasite and bacterial (the 'microbiome') communities in the intestine using sophisticated molecular, DMA sequencing approaches in puppies on the same diet but exposed to different treatment regimes, including the administration of probiotics.

Genetic management of canine lymphoma

(Assoc Prof Peter Williamson, University of Sydney)

Cancer is a common cause of mortality in dogs. One of the most common forms of canine cancer is lymphoma, a cancer of the lymphocytes that accounts for approximately 25% of cancer cases. Lymphoma in dogs is in most cases treatable but not curable, with more aggressive forms leading to rapid decline and death within 1-6 months. The occurrence of this cancer is higher in some breeds compared to others, indicating that there may be specific gene mutations that cause the predisposition to developing the disease to be inherited. The aim of this study is to find the mutations that are causing lymphoma to occur and to use this information to inform dog breeders when deciding to mate their dogs.

Further information on the Canine Research Foundation can be found at: <http://oz.dogs.net.au/crf/>

Assoc Prof Jan West
Trustee Canine Research Foundation
January 2016