Man's best friend gives more than loyalty and love

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Prof Andrew Leisewitz

Man's canine companion is set to unravel the mystery of human disease through a study about to commence at UP's Faculty of Veterinary Science. Prof Andrew Leisewitz is embarking on a study of canine diseases which will hopefully lead to a better understanding of human diseases such as malaria and multiple sclerosis and possibly yield more effective treatments. Using animal models to learn more about these human diseases, Leisewitz's two research areas are a tick-borne disease and a viral disease, namely canine babesiosis and canine distemper.

Canine babesiosis, commonly known as tick bite fever, is a tick-borne blood disease with effects similar to those of malaria in humans. Research will begin at the pathological level and the first phase will involve retrospective collecting of data from the brains of dogs that had died of cerebral babesiosis for comparison to the brains of children who have died of cerebral malaria. A prospective portion of the study will also commence for the sake of comparing the pathology in dogs with that in humans, and a tissue bank will be established for future molecular and genetic studies.

The traditional animal model used in malaria research is the mouse. Leisewitz will therefore be exploring new territory with this canine study since he believes dogs may have more in common with the human disease, which would allow for more accurate comparisons.

An interesting aspect of the study will look at genes that may offer protection or cause susceptibility to disease. The inbred nature of dog breeds and the fact that certain dog breeds are more prone to certain diseases may make it easier to find such disease associated genes in dogs than in the very outbred human population. (Dogs have certainly been utilised to look for cancer genes.) This will be the first attempt to use the dog as a model of infection. Scientists at the University of Edinburgh will be collaborating with Prof Leisewitz on some of the genetic aspects of the research.

Another component of the research is transcriptomics, which is one way of studying gene expression. Transcriptomics aims to understand how cells 'think' by evaluating host responses, whether helpful or harmful, under certain conditions. Distinctions between the various responses will lead to a better understanding of what is damaging to or protecting the infected host. Leisewitz will be comparing dogs with good and poor outcomes to try and understand these differences.

Leisewitz will also embark on a first-of-its- kind study on canine distemper. This is a common measles-like viral disease that affects the brain of dogs. Puppies are vaccinated against the disease, but it is still common in dogs in rural areas because as they are less likely to have been vaccinated. Once the virus reaches the brain, the prognosis is hopeless and the dog will normally die. The pathology the virus causes in the dog's brain has been compared to, and used as, a model for multiple sclerosis in humans. Similar molecular genetic methods as described for the babesia study will be employed in the distemper work.

Canine distemper is a potentially devastating disease because it has a wide host range and can infect several species, including other mammals. It is becoming an increasing threat to South Africa's wildlife. Prof Bloomer of the Department of Genetics in the Faculty of Natural and Agricultural Sciences will be collaborating with Prof Leisewitz and will explore the aspects that play themselves out at the interface between the domestic dog and wild carnivores.

Leisewitz's study is the first of its kind in South Africa and promises to deliver very interesting and meaningful results. Postgraduate students in veterinary science, health sciences and natural sciences are encouraged to get involved.

It is important to note that all dogs that will be used in the research will have been naturally infected with either babesiosis or distemper and that no experimental infections will be used.