RESEARCH PROGRESS REPORT SUMMARY

Grant 02819: Identification of Bartonella henselae In Vivo Induced Antigens for Development of a Reliable Serodiagnostic Assay for Canine Bartonelloses

Principal Investigator: Edward Breitschwerdt, DVM

Research Institution: North Carolina State University

Grant Amount: $52,317.00

Start Date: 1/1/2021 **End Date:** 12/31/2023

Progress Report: FINAL

Report Due: 12/31/2023 **Report Received:** 1/24/2024

(The content of this report is not confidential and may be used in communications with your organization.)

Original Project Description:

Bartonella, a genus of gram-negative bacteria, are associated with a wide spectrum of life-threatening diseases in animals and humans. More than 40 Bartonella species have been reported to infect mammalian reservoir hosts, and infection often leads to chronic bacteremia. At least ten Bartonella species have been implicated in association with serious diseases in dogs, including endocarditis, hemangiosarcoma, myocarditis, peliosis hepatis, polyarthritis and vasculitis. Despite biomedical advances and ongoing research in the field of canine bartonelloses, currently available PCR, culture, and serological based assays lack sensitivity for diagnosis of bartonelloses. Dogs throughout the United States and much of the world are exposed to Bartonella species. From a public health perspective there is an increased risk of direct and vector-borne transmission of Bartonella species from animals to humans. These factors justify the need for the ongoing development of a reliable serodiagnostic modality and ultimately an effective vaccine for prevention of bartonelloses in dogs. We will employ In-Vivo Induced Antigen Technology (IVIAT) to identify Bartonella in-vivo induced antigens, which will allow us to evaluate their potential as diagnostic markers for canine bartonelloses. This proposed study will result in development of a novel and sensitive ELISA assay for diagnosing Bartonella infection in dogs and will provide insights into the development of effective vaccine candidates for preventing Bartonella infection.

Publications:

None at this time.

Presentations:

None at this time.

Report to Grant Sponsor from Investigator:

Bartonella, a genus of gram-negative bacteria, are associated with a wide spectrum of potentially life-threatening diseases in animals and humans. More than 40 Bartonella species have been reported to infect mammalian reservoir hosts, and infection often leads to chronic bacteremia. At least 10 Bartonella species have been implicated in association with serious diseases in dogs, including endocarditis, hemangiosarcoma, myocarditis, peliosis hepatis, polyarthritis and vasculitis. Despite biomedical advances and ongoing research in the field of canine bartonelloses, currently available PCR, culture, and serological based assays lack sensitivity for diagnosis of bartonelloses. Dogs throughout the United States and much of the world are exposed to Bartonella spp. From a public health perspective there is an increased risk of direct and vector-borne transmission of Bartonella spp. from animals to humans. These factors justify the need for the ongoing development of a reliable serodiagnostic modality and perhaps ultimately an effective vaccine for prevention of bartonelloses in dogs. Identification of Bartonella antigens that are expressed or upregulated during the infection will be key to the development of diagnostic and vaccine candidates, as well as the clinical management of canine bartonelloses. In addition to providing more reliable epidemiological data and facilitating the understanding of Bartonella pathogenesis in dogs, our efforts will reduce the diagnostic costs and turn-around time for serological testing and can help clinicians make treatment decision in timely manner compared to tedious and time-consuming traditional IFA testing.