



## RESEARCH PROGRESS REPORT SUMMARY

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

**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:** Mid-Year 3

**Report Due:** 6/30/2023      **Report Received:** 7/6/2023

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### **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 bartonellosis, currently available PCR, culture, and serological based assays lack sensitivity for diagnosis of bartonellosis. 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 bartonellosis 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 bartonellosis. 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 to date.



**Presentations:**

None to date.

**Report to Grant Sponsor from Investigator:**

As previously reported, due to COVID-19 pandemic and backorders of supplies, we had a short delay in starting the study. We have now received all the lab supplies. Screening of Bh SA2 expression genomic library by colony immunoblotting (Aim1) require additional time and research effort to identify potential diagnostic antigens for Canine Bartonellosis. Once we identify potential diagnostic markers, we will evaluate utility of these proteins and develop a reliable ELISA for serodiagnosis of Bartonella infection in dogs.

Dr. Pradeep Neupane received his doctorate in Intracellular Pathogens Research Laboratory and Comparative Biomedical Sciences and started a postdoctoral scientist position at UNC Medical Center. He took some time off to visit family in Nepal for the first time in four years due to his Ph. D. research and the pandemic. He also got married while in Nepal and was in the process of bringing his wife to the US. After numerous HR delays, we were able to hire a research technician to continue to move this study forward. We began to determine if we are able to bring Dr. Neupane back to NCSU from UNC Medical School to finish this work as his expertise proved invaluable to the project. We are reasonably sure that Dr. Neupane will be return in July and have received an extension through December 31, 2023 to finish this research.