RESEARCH PROGRESS REPORT SUMMARY

Grant 02441: Evaluation of a New Vaccine for Canine Brucellosis

Principal Investigator: Angela Arenas, DVM, PhD

Research Institution: Texas A&M AgriLife Research

Grant Amount: $67,221

Start Date: 3/1/2018 **End Date:** 8/31/2019

Progress Report: FINAL

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

Original Project Description:

Canine infection by *Brucella spp*. constitutes a serious problem for dog breeders and pet owners, leading to the economic burden associated with reproductive loss and veterinary care. Canine brucellosis is also considered a public health concern because of its potential to be transmitted to humans. Within the U.S., the disease has reemerged due to the chronic persistence of the organism, low dose for infection, low sensitivity and specificity of the current diagnostic tests, and most importantly, the lack of a protective vaccine for dogs. Historically in the U.S., brucellosis control efforts for cattle, sheep, goats and domestic pigs have been successful mainly due to the availability of protective and efficacious vaccines. The goal of the proposed research is to develop a brucellosis vaccine that is safe, stable, free of side effects and efficacious for dogs. Previous AKC CHF funding (Grant #02175-A) has permitted the investigators to successfully engineer a promising live attenuated vaccine candidate denominated *B. canis* RM666ΔvjbR. This study will further investigate the ability of the vaccine candidate to induce appropriate immunity prior to its testing in dogs and will also develop a diagnostic assay capable of differentiating naturally infected vs vaccinated animals, necessary for mass vaccination. The development of a safe and highly protective brucellosis vaccine for dogs, will significantly impact owners, breeders and human health by limiting the spread of the disease.

Publications:

Hensel M, Negron M, Arenas-Gamboa AM. 2018. Brucellosis in dogs and public health risk. Emerging Infectious Diseases. Vol. 24, No.8, pp. 1401-1406. *Selected for monthly press release.

Presentations:

Poster Presentation: Park JY*, Stranahan LW*, Chaki SP, Arenas-Gamboa AM. Cloning and purification of immunodominant Brucella proteins for improved canine brucellosis diagnostics tests. Worcester State University. Cummings School of Veterinary Medicine. Worcester, Massachusetts (July 26, 2019)

Oral Presentation: Park JY, Stranahan LW, Chaki SP, Arenas-Gamboa AM. Cloning and purification of immunodominant Brucella proteins for improved canine brucellosis diagnostics tests. Research Symposium. Veterinary Medicine Summer Research Training Program. Texas A&M University, College Station, Texas, USA (July 23, 2019).

Report to Grant Sponsor from Investigator:

Canine infection *by Brucella spp*. constitutes a serious problem for dog breeders and pet owners, leading to the economic burden associated with reproductive loss and veterinary care. Canine brucellosis is also considered a public health concern because of its potential to be transmitted to humans. Within the US, the disease has reemerged due to the chronic persistence of the organism, low dose for infection, low sensitivity and specificity of the current diagnostic tests, and most importantly the lack of a protective vaccine for canine use. Historically in the US, brucellosis control efforts for cattle, sheep, goats and domestic pigs have been successful mainly due to the availability of protective and efficacious vaccines. The goal of our research is to develop a brucellosis vaccine that is safe, stable, free of side effects and efficacious for dogs. Towards this goal, previous funding (CHF Grant- 2175-A) has permitted us to successfully engineer a promising live attenuated vaccine candidate denominated *B. canis* RM666ΔvjbR. Initial in vitro studies have demonstrated that this candidate is highly attenuated in canine macrophages as well as laboratory animals. In this study we demonstrated that the RM-666ΔvjbR vaccine candidate induces a robust cellular immune response capable of protecting against infection, and that this vaccine will also provide the means to differentiate vaccinated from naturally infected animals. No animal testing has been performed using funds from AKC Canine Health Foundation. Serum samples utilized for this project are part of the serum repository from our laboratory. Fresh canine blood was obtained from the Texas A&M Teaching Hospital from leftover samples not utilized for patient treatment or diagnostics.