



RESEARCH PROGRESS REPORT SUMMARY

Grant 03053-A: Genome-wide Association Study to Investigate Genetic Markers for Antimicrobial Resistance in *Mycoplasma cynos* Associated with Canine Infectious Respiratory Disease

Principal Investigator: Grazieli Maboni, DVM, MSc, PhD
Research Institution: University of Georgia
Grant Amount: \$16,114.98
Start Date: 3/1/2023 **End Date:** 7/31/2024
Progress Report: Mid-Year 1
Report Due: 8/31/2023 **Report Received:** 8/31/2023

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

Original Project Description:

Mycoplasma cynos is an emerging respiratory bacterium in dogs. It is associated with kennel cough and may lead to fatal pneumonia. This bacterium is very complex, and the lack of standardized diagnostic and knowledge on antibiotic therapy makes clinical management difficult. Since no vaccine is available, current treatment of *M. cynos*-associated outbreaks relies on antibiotics. However, the in vitro activity of antibiotics against *M. cynos* has never been studied and the effectiveness of antibiotic therapy for *M. cynos* disease is completely unknown. This may lead to unsuccessful treatment and antibiotic resistance. In vitro testing of antibiotics is an urgent need to provide appropriate treatment, and to avoid inappropriate use of antibiotics. Unfortunately, these tests are very time-consuming for mycoplasmas, partially explaining the absence of information on *M. cynos*. In this project, researchers will investigate the in vitro activity of antimicrobials against *M. cynos* isolated from dogs with respiratory disease, and implement the first genome-wide association study to identify genetic mutations linked to antibiotic resistance in *M. cynos*, which has never been investigated before. This will help develop genetic-based diagnostic assays for the rapid detection of resistant *Mycoplasma* isolates to better allow the results to inform clinical therapy. Results from this project will direct effective diagnosis and therapeutic interventions for an emerging respiratory disease in dogs.

Publications:

Framst, Isaac, Cassandra D`Andrea, Monica Baquero, and Grazieli Maboni. "Development of a Long-Read next Generation Sequencing Workflow for Improved Characterization of Fastidious Respiratory Mycoplasmas." *Microbiology* 168, no. 11 (November 14, 2022). <https://doi.org/10.1099/mic.0.001249>.



Presentations:

None to date.

Report to Grant Sponsor from Investigator:

We would like to thank AKC CHF for supporting our research on *Mycoplasma cynos*, which is an emerging respiratory bacterium in dogs. *M. cynos* is associated with kennel cough and may lead to fatal pneumonia. This bacterium is very complex, and lack of standardized diagnostic and knowledge on antibiotic therapy makes clinical management difficult. Since no vaccine is available, current treatment of *M. cynos*-associated outbreaks relies on antibiotics. However, the in vitro activity of antibiotics against *M. cynos* has never been studied and the effectiveness of antibiotic therapy for *M. cynos* disease is completely unknown. This may lead to unsuccessful treatment and antibiotic resistance.

In this project we are developing methods to identify antibiotic resistance in *M. cynos*, which are so far inexistent. To date, we initiated sample collection (i.e. *M. cynos* strains), and we developed methods to culture this bacterium in agar and broth media. We also optimized a method to count *M. cynos* cells which will be essential to develop the method that detects antibiotic resistance in *M. cynos*. Further, we sequenced the whole genomes of *M. cynos* strains using a real-time sequencing approach. The genomic sequences will allow us to search for antibiotic resistance markers in the genomes. In summary, we are working on developing genetic-based diagnostic assays for the rapid detection of resistant *Mycoplasma* isolates to better inform clinical therapy. Results from this project will direct effective diagnosis and therapeutic interventions for emerging *Mycoplasma* respiratory disease in dogs.