RESEARCH PROGRESS REPORT SUMMARY

Grant 03368: Advancing Canine Health: Liquid Biopsy for Early Relapse Detection and Improved Treatment of Mast Cell Tumors

Principal Investigator: Paulo Vilar Saavedra, DVM, MS

Research Institution: University of Florida

Grant Amount: $239,030.00

Start Date: 2/1/2025 **End Date:** 7/31/2027

Progress Report: Mid-Year 1

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Original Project Description:

Mast cell tumor (MCT) is the most common malignant canine skin tumor, which accounts for 16~21% of all skin tumors. Although all breeds have a potential risk for developing MCTs, many pure breeds(e.g., Boxers, Boston Terriers) are predisposed, resulting in a high disease incidence. Despite the efforts, clinical management decisions are difficult because of thechallenging biological behavior of some MCTs and the inaccuracy of the predictive and prognosticbiomarkers or other molecular descriptors (i.e., c-KIT staining pattern and mutation status, KI-67, AgNOr). While surgery is the mainstay of managing canine MCTs, toceranib phosphate (Palladia) showed clinical benefits to those MCTs that require chemotherapy. However, most will develop acquired resistance within months of starting the treatment. Currently, there are no means of identification of treatment resistance apart from clinical characteristics, which usually capture the relapse late, when the disease is already disseminated. In addition, most procedures used for monitoring patients with MCT require sedation or general anesthesia. Early disease progression detection by quantifying minimal residual disease is thus an unmet clinical need. The development of such an assay could significantly affect disease management, improve patient outcomes and welfare, and help emerge novel therapeutic targets through better patient stratification. Next-generation sequencing (NGS) based liquid biopsy can measure tumor burden and minimal residual disease in a minimally invasive way, such as blood sampling, utilizing different tumor-related entities (e.g., cf/ctDNA, exosomes). Although liquid biopsy has been proposed for screening and initial results for monitoring have been published, the clinical utility of liquid biopsy for canine MCTs has yet to be established. The proposed study would open a critical new area of monitoring MCT patients and could significantly improve their quality of life and significantly impact veterinary oncology.

Publications:

N/A

Presentations:

N/A

Report to Grant Sponsor from Investigator:

Since January, our team has been working hard to start the study. First, we set up all the important steps and trained our team. We also told others about the study, both inside the hospital and in the community. From March to July, we looked at 398 dogs to see if they had Mast Cell Tumors. We found 24 dogs with MCT, and 5 of them joined our study. July was a great month because we found more dogs who could join, maybe because we got better at finding and recruiting (community awareness of trial). We also sent some samples to our DNA analysis located in another country to be tested. Everything arrived safely, and next time we'll send even more so the tests can be stronger. When we looked at the DNA in the samples, we found some important changes, especially in a gene called KIT, which is linked to the illness. We also found other clues that might help veterinarians choose better treatments in the future. Later, we tested samples (plasma – blood) from the same dog at different times and found a new change in a gene called OR8S14. This might help us track how the illness changes over time. So far, everything is going well—we're on schedule, and all the dogs who joined the study are still part of it!