Detection of circulating tumor DNA and microRNA in dogs and cats with lymphoma

Purpose

To investigate whether genetic material (DNA and microRNA) from cancer cells can be identified in the blood of dogs and cats with lymphoma.

Background

A few techniques are available to diagnose lymphoma, the most common blood-related cancer in dogs and cats. However, these techniques may fail to provide a definitive diagnosis, or the collection of samples may not be possible because of tumor location, financial constraints, or the patient's clinical condition.

Small fragments of genes (also called DNA) and other regulatory molecules (also called microRNA) usually are present in the blood in minimal amounts. Therefore, when an animal has cancer, both the DNA and microRNA of the cancerous cells will also circulate in the blood.

This study aims to perform whole-genome and microRNA sequencing in the tissues of dogs and cats diagnosed with lymphoma. Then, we will investigate whether these same DNA mutations and microRNA signatures can also be identified in the patient's blood. In the future, we plan to follow patients along their treatment and post-treatment phases to evaluate if these biomarkers will be associated with disease progression or remission during chemotherapy and whether they will predict the patient's outcome.

Eligibility

- Dogs and cats of any age, breed, or sex
- Undergoing complete blood work (CBC and chemistry panel) as part of routine clinical care
    - Availability of at least 2 mL of plasma after blood work is completed
- Fine-needle aspiration and cytologic evaluation as part of routine clinical care
    - Availability of at least 2 cellular diagnostic smears from fine-needle aspiration of neoplastic tissues
- Confirmation of lymphoma and phenotyping based on histopathology, flow cytometry, and/or PARR

  Healthy control animals must be clinically healthy with no signs of systemic disease

Exclusion Criteria

- Cats positive for FeLV or FIV
- Animals currently treated for lymphoma (including corticosteroids)
- Primary or previous diagnosis of chronic or acute leukemia
- Presence of other life-limiting diseases or diseases that could preclude biopsy/blood collection (e.g., coagulopathy)

Study Design

For this study, we are seeking dogs and cats diagnosed with B-cell and T-cell lymphoma and healthy animals to serve as controls. For each patient, we will perform whole-genome and RNA sequencing of cancerous tissues. Then, we will evaluate whether the cancer’s genetic material is also present in the blood plasma.

Aiming to cause minimal distress to enrolled animals, we intend to minimize the collection of extra samples as much as possible. Thus, we will use leftover samples collected for diagnostic purposes (i.e., smears obtained for initial cytologic evaluation and blood submitted for complete blood count) during regular clinical workup, not material collected for this study's sole purpose. The exception is the collection of additional biopsies (either by fine-needle aspiration, core biopsies, or surgical procedures) to analyze the genetic material and confirm each lymphoma,

additional blood samples in case the remaining plasma volume is less than 2 mL after blood work is completed, and in the case of the healthy controls.

Patients can be enrolled regardless of the decision to pursue treatment.

Compensation

The study may cover the costs of genetic and cellular analysis related to the cancer diagnosis.

The cost of any other tests or procedures considered standard of care in treating the animals' illness, including clinically necessary bloodwork, surgery, aftercare, and follow-up treatment, is not covered by the study and is the owner's responsibility.

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