

Title: Investigation of exosome concentration as a potential biomarker for canine cancer

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Exosomes are nano-sized extracellular vesicles that are secreted by cells, mediate cell-to-cell communication, and carry cargo including DNA, RNA, proteins, lipids, and metabolites. Exosomal cargo has been significantly associated with various disease states including cancer, highlighting the potential applications of exosomes as biomarkers in liquid biopsy through exosome enrichment and molecular analysis. Previous work in the Modiano Lab has identified an exosome-based blood test that reliably identified the presence of minimal residual osteosarcoma in dogs, providing the rationale for Canine Osteosarcoma Early Detection (COED), a study to develop an exosome-based early detection blood test for canine osteosarcoma. By comparing the exosomal concentrations of dogs enrolled in the COED study from two groups, (1) healthy dogs between 2 and 4 years old, and (2) dogs of any breed, age, and gender with a confirmed diagnosis of cancer, these studies aim to provide a better understanding of exosome shedding and concentration in health and in cancer, and to assess whether exosome concentrations could be one parameter of an early detection exosome-based blood test for canine osteosarcoma and other cancers. Exosomes were enriched from the plasma of 26 healthy dogs and 29 dogs with cancer, and exosome enrichments were analyzed via nanoparticle tracking analysis (NTA) to obtain an absolute size distribution and concentration. Following NTA, there was a larger range of concentrations for the cancer group, demonstrating a potential difference in exosome shedding and providing the groundwork for further investigation of exosome concentration as a diagnostic test parameter.