CREATION AND POPULATION OF A NATIONAL BIOREPOSITORY OF TRANSLATIONALLY RELEVANT CANINE CANCER SPECIMENS: THE CANINE COMPARATIVE ONCOLOGY AND GENOMICS CONSORTIUM EXPERIENCE (CCOGC)

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Canine Cancer

Each year approximately six million dogs develop cancer. Canine cancers share many characteristics with human cancers, including histology, biology, and metastatic potential making them relevant models for the study of human cancers. There are several important reasons why the canine cancer model has translational advantages compared to rodent models. Figure 1

-Canine cancer arises spontaneously, in addition our pets share our environment.

-Natural, functional immune system and more genetic syteny to humans when compared to the mouse.

-Canine patients are relatively outbred when compared to mice but relatively inbred when compared to humans.

-Favorable body size- repeated sampling of biologic specimens and similar imaging modalities to humans including MRI and PET-CT.

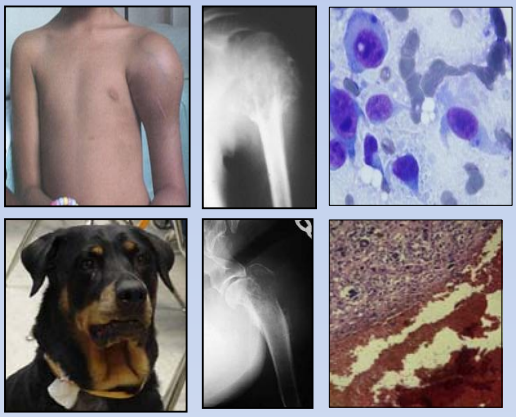

Figure 1
Canine cancer as a comparative model for Human disease.

The CCOGC

Formed in 2004, the Canine Comparative Oncology and Genomics Consortium (CCOGC) is a group of veterinary and medical oncologists, pathologists, surgeons, geneticists, and cellular and molecular biologists who share the common goals of facilitating collaborations across disciplines, focusing on the problem of cancer in dogs. Priorities of the CCOGC include advocacy for the field of Comparative Oncology, expansion of available canine specific research reagents, and the development of a biospecimen repository.

Pfizer Biorepository

In 2007 sample collection began at three veterinary institutions with a focus on collecting three histologies of interest in the field of comparative oncology (osteosarcoma, lymphoma, melanoma). The goal was to collect 3000, annotated and optimally collected sample sets from naïve canine cancer patients. In 2008 four additional collection sites were added, and four new histologies (pulmonary tumors, mast cell tumor, soft tissue sarcomas, hemangiosarcoma) were added.
Samples are collected and processed according to a standardized SOP. Informed owner consent and IACUC approval is obtained prior to collection and samples are de-identified at the collecting site. (Fig 2&3) A samples shipping and collection database (Tissue Tracker) is used and permits real time connection between CCOGC collection sites and the central physical bank housed in Frederick, MD. Patient clinical information is contemporarily collected and logged as well. As of January 2011, 1526 sample sets have been collected. (Figure 4 &5)

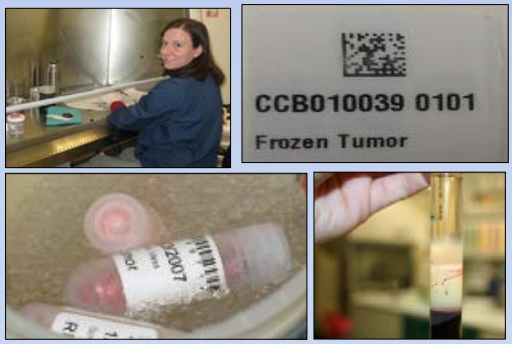

Figure 2
Fluid Collection and Processing
Approximately 25-30 milliliters of blood and 2-3 milliliters of urine are collected before surgical excision or biopsy of the tumor tissue. Body fluids are processed and stored within one hour of collection. A percentage of whole blood is stored for future DNA and RNA extraction. The remaining blood is processed to obtain plasma and serum samples. All fluid samples are placed in bar coded and placed CCOGC storage tubes for storage at -80°C.

Figure 3
Tissue Collection and Processing
The processing of tumor tissue and corresponding normal tissue begins within five minutes of the samples being removed from the body. These tissues are processed and stored a number of different ways. The tumor tissue is divided into pea-sized segments that are then fixed in several different ways (formalin, cryopreservation media, and flash frozen in liquid nitrogen).

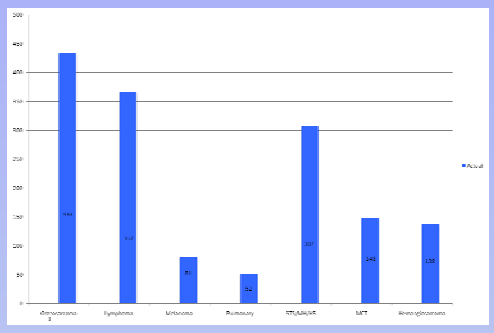

Figure 4
Total number of each histology collected as of 12/2010.

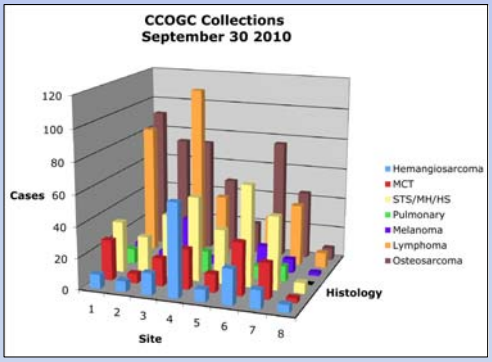

Figure 5
Total number of histologies collected per site. The following 7 sites are actively collecting-
Colorado State University
The Ohio State University
University of Wisconsin at Madison
Tufts University
University of Missouri
University of California at Davis
Michigan State University

Current Efforts

Development of a quality assurance program and pathology review process is underway as well as tissue release guidelines. It is anticipated that tissues will be available to the scientific community in late 2011. Prospective collections will also be available via the CCOGC tissue network.