

Smiling Blue Skies

Taking a bite out of cancer since 2001



OVC Pet Trust

Update Report

2019

**UNIVERSITY
of GUELPH**

IMPROVE LIFE.

Smiling Blue Skies



Since 2001, OVC Pet Trust at the University of Guelph's Ontario Veterinary College (OVC) has been incredibly fortunate to benefit from Suzi Beber's dedication and generosity.



Suzi Beber
Founder, Smiling Blue Skies Cancer Fund
Honorary Doctorate recipient, University of Guelph
www.smilingblueskies.com

Smiling Blue Skies began with a \$1,000 donation in memory of Suzi's beloved Golden Retriever, Blues; through Suzi and her community, The Smiling Blue Skies Cancer Fund has grown to become an important and vital support in the fight against cancer.

I was lucky enough to attend my first ever Smiling Blue Skies Walk for Canine Cancer in Barrie, Ontario in September 2019. At the event, I was struck by the passion, love and commitment of the volunteers and supporters for fighting the devastating disease of canine cancer. It was clear they truly believed in Suzi's mission and they were eagerly sharing that belief with their community. Inspired by Suzi, volunteers and supporters of Smiling Blue Skies are helping to drive research and discovery in canine cancer at OVC, but the impact extends outside of the walls of the OVC Health Sciences Centre (OVC HSC) in Guelph, Ontario. Our clinicians and scientists are looking for answers to canine cancer and their discoveries may impact other species of animals and humans across Canada and around the world.



Thank you to Suzi and to the entire Smiling Blue Skies community for playing a part in helping to improve life for the pets and the people who love them. You are making a true difference in the lives of our beloved companion animals.

Bailey Kagan
Managing Director (Acting), OVC Pet Trust

Suzi Beber founded The Smiling Blue Skies Cancer Fund in 2001, after losing her Golden Retriever, Blues, to lymphoma. To honour his memory, and in gratitude for the care he received at OVC, Smiling Blue Skies has raised more than \$1.88 million to support OVC Pet Trust's quest to find more and better ways to deal with canine cancer.

Learn more at www.smilingblueskies.com.



Thank you! You are receiving a copy of The Smiling Blue Skies Cancer Fund 2019 Update Report as a thank you for your support of OVC Pet Trust. Your generosity helps improve and advance cancer care, education and innovative discoveries in the field of veterinary oncology at the Ontario Veterinary College (OVC), University of Guelph.

This report has been prepared for The Smiling Blue Skies Cancer Fund © 2019.

Front cover: "Puzzle" and "Cedar"

SMILING BLUE SKIES SUPPORTS VITAL CANCER CARE AND RESEARCH AT OVC

By supporting OVC Pet Trust, Smiling Blue Skies funds cancer care and research at the Ontario Veterinary College (OVC).

In addition to funding various oncology-related research projects (see page 8), Smiling Blue Skies also supports the roles of the Clinical Research Coordinator (Vicky Sabine) and Tumour Bank Coordinator (Deirdre Stuart) at the OVC Health Sciences Centre.

The clinical trials team oversees the recruitment of owners and their pets, the collection of necessary data and the acquisition of samples for tumour banking.

Working with researchers and specialists throughout OVC, the clinical trials team actively seeks patients from all veterinary specialty services that could be included in a clinical study, thus increasing and advancing veterinary medical knowledge that could lead to the discovery of new treatment options that could help current and future patients.

These two roles are vital to the cancer care treatments and possibilities that OVC is able to offer while advancing research that may benefit animals and humans alike.



OVC Clinical Trials Coordinator Vicky Sabine visits her daughter Meghan's kindergarten class at Aberfoyle Public School, to talk about her job as a veterinary cancer researcher.



OVC Tumour Bank Coordinator Deirdre Stuart, pictured at the Ontario Veterinary College.

Impact

at the Ontario Veterinary College

Clinical Trials

Between 2014 and 2019, 1,215 patients have been recruited into 43 oncology-related studies, many of which have been funded by Smiling Blue Skies and OVC Pet Trust. There are currently 20 active studies at the OVC HSC; 16 are open for recruitment and another four are closed for recruitment for which we are still actively tracking 151 patients, collecting samples and obtaining follow-up data. More than 1,400 aliquots were collected from the 276 patients participating in clinical research studies in 2019. These figures include those patients both recruited and actively tracked in 2019.

Bench Basics

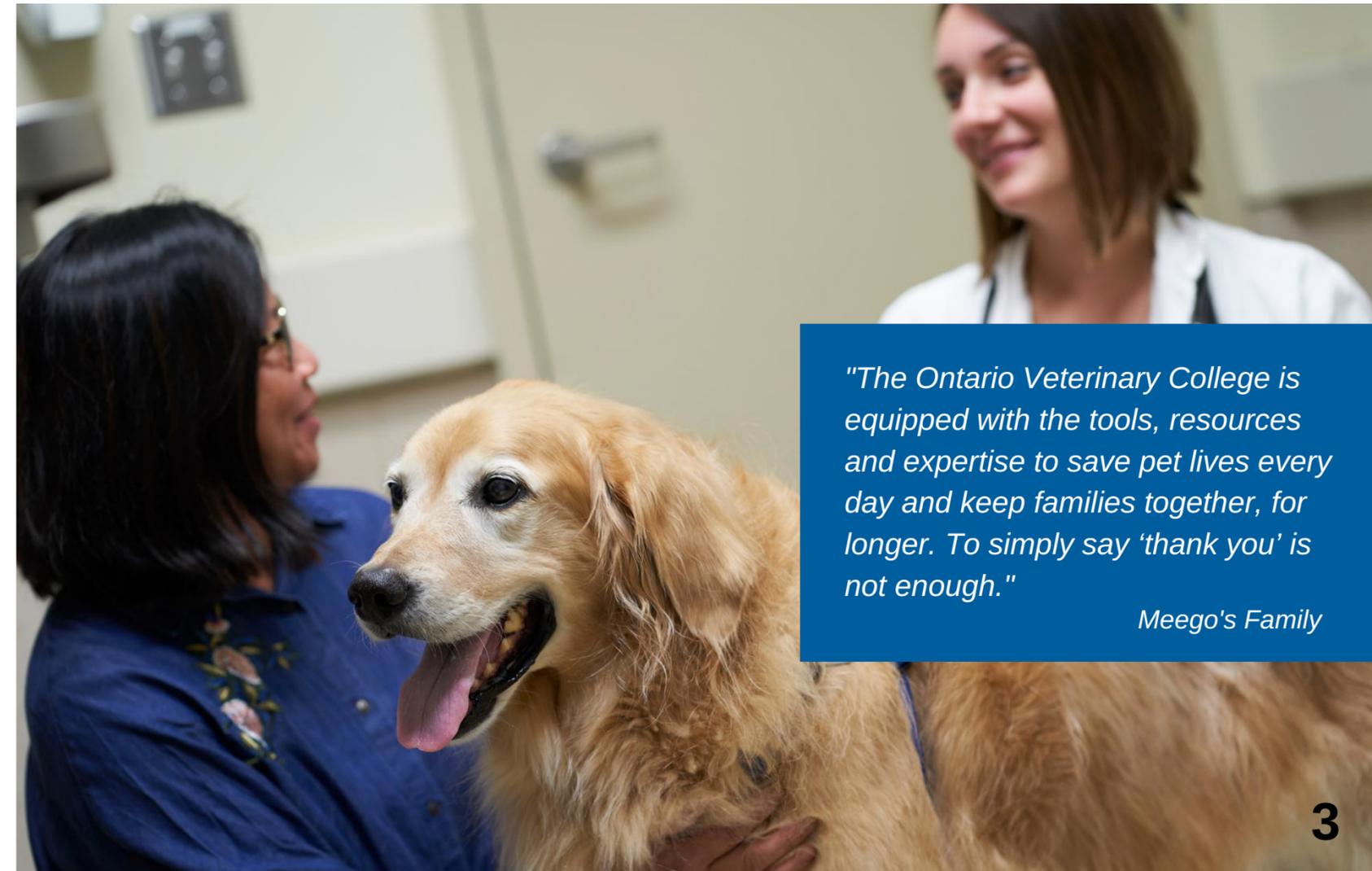
"Bench to Bedside" is a term used to describe the process by which the results of research done in the laboratory are directly used to find and develop new ways to treat patients. OVC's medical and surgical oncologists are exploring more and better ways to deal with canine cancer at the microscopic level. For example, OVC medical oncologist Dr. Sam Hocker is one of the first Canadian-based veterinary researchers studying the effect of cannabidiol (CBD) on urinary bladder tumours in dogs. Dr. Hocker says, "I chose to focus my work on this specific type of cancer because I want to make a difference and tackle a cancer that is both challenging to treat and equally as difficult for pet owners to manage. We are exploring if, with the right variables, CBD can kill a canine bladder cancer tumour on a cellular level in a preclinical or laboratory setting."

Best in Care Treatment

OVC is a world class centre of excellence in veterinary medicine. Our cancer centre benefits from support from Smiling Blue Skies, positioning OVC to provide best in care treatment to our canine patients. Funds raised have helped us to provide crucial equipment, staff and resources to offer our patients the most innovative treatment options currently available in veterinary medicine. Families like Meego's turn to OVC every day to help diagnose, treat and battle cancer in their pets.

The impact of Smiling Blue Skies can be felt across many areas of the OVC. With the funds raised for OVC Pet Trust through Smiling Blue Skies, we are investing in the future of veterinary oncology through clinical trials, bench research and best in care treatments and equipment.

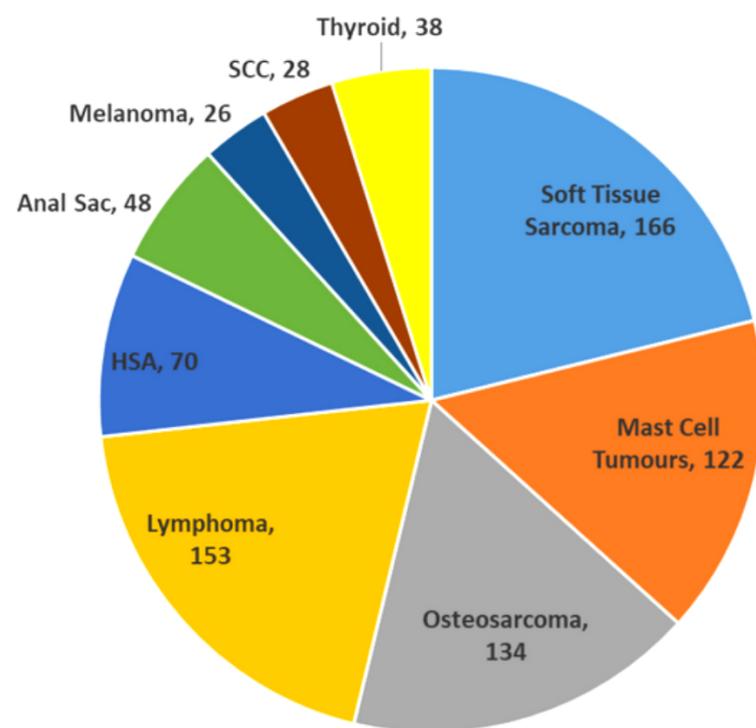
OVC cancer patient, Meego, with his family and veterinarian



"The Ontario Veterinary College is equipped with the tools, resources and expertise to save pet lives every day and keep families together, for longer. To simply say 'thank you' is not enough."

Meego's Family

THE DISTRIBUTION OF THE NINE MOST PREVALENT CANINE TUMOUR SAMPLES IN THE COMPANION ANIMAL TUMOUR SAMPLE BANK (CATSB)



Abbreviations:

- HSA: Hemangiosarcoma
- SCC: Squamous Cell Carcinoma

THE FOUR MOST PREVALENT FELINE TUMOUR TYPES BANKED AT OVC:

Tumour Type	Number of Cases
Mammary	11
Soft Tissue Sarcoma	10
Osteosarcoma	8
Lymphoma	9

PATIENT ENROLLMENT: COMPANION ANIMAL TUMOUR SAMPLE BANK (CATSB)

Numbers of oncology patients recruited into oncology and oncology-related studies and banked in CATSB and requests made by researchers during each calendar year (1 Jan – 31 Dec) from 2014 – 2019.

Year	Clinical Research Studies			CATSB		
	# Oncology-Related Studies	# Patients Recruited	# Golden Retrievers Recruited	# of Cases Banked	# Golden Retrievers Banked	# Research Studies That Obtained Samples
2014	11	258	23	120	9	2
2015	13	172	16	292	28	2
2016	19	180	21	272	30	6
2017	23	274	31	207	20	4
2018	18	206	15	201	20	3
2019	19	125	5	161	11	3

Table: Number of cases banked and recruited into studies varies per year based on types of studies being conducted and timing of recruitment for each clinical trial. Multiple studies requesting samples from the same patients may reduce the number of samples obtained for the tumour bank. Number of cases banked varies by year depending on the number of suitable surgical cases.

ABOUT THE COMPANION ANIMAL TUMOUR SAMPLE BANK (CATSB)

The University of Guelph Institute for Comparative Cancer Investigation (ICCI) has developed a unique resource that provides access to clinical specimens from naturally occurring cancers to the scientific community: The Companion Animal Tumour Sample Bank (CATSB), located at the Ontario Veterinary College (OVC) and funded by Smiling Blue Skies.

This depository facilitates retrospective analysis of cancer cases for which outcome data is available, a powerful tool for scientists to identify biomarkers for more reliable patient outcome prediction, as well as to obtain insight into the underlying causes of cancer.

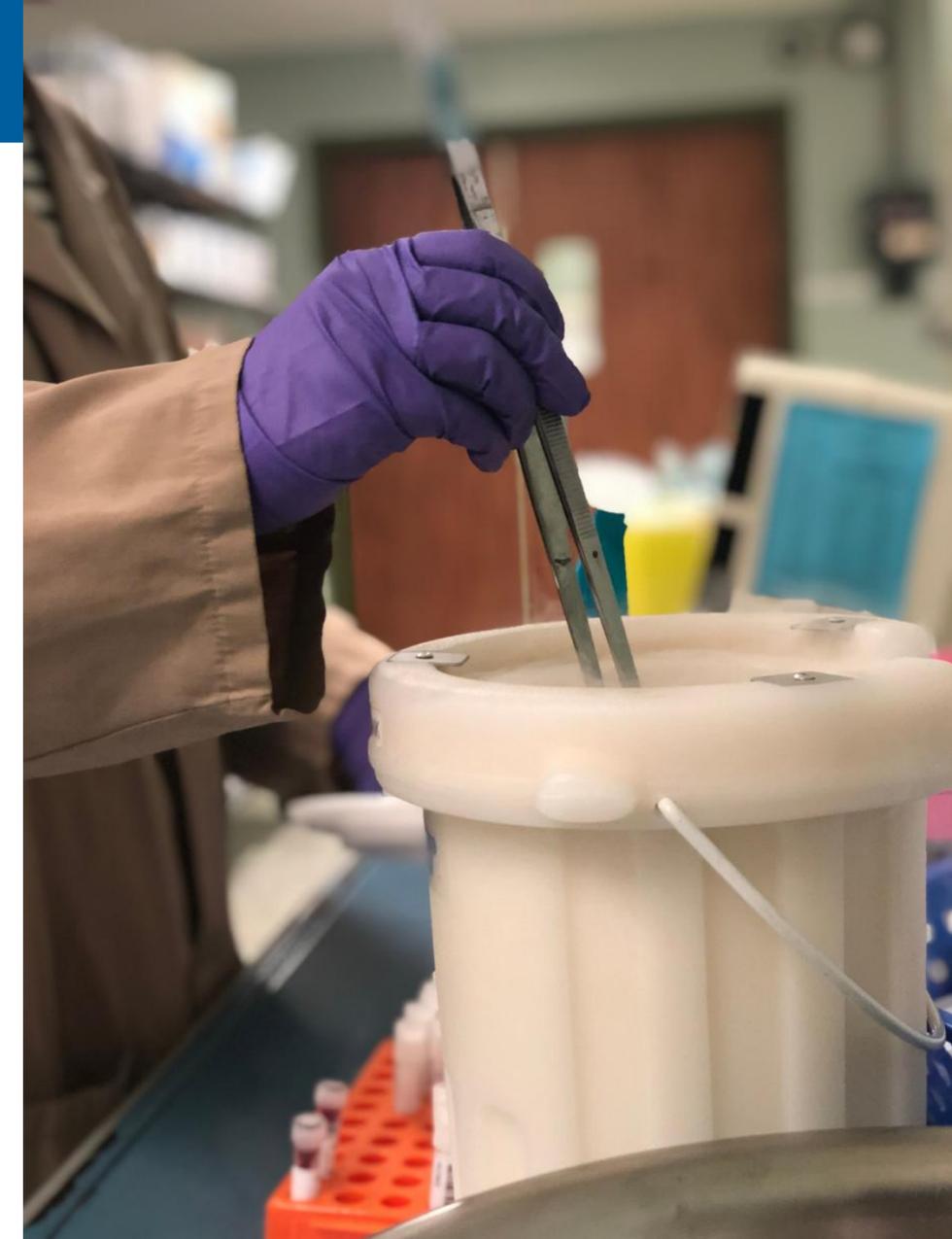
The CATSB aims to promote basic and translational cancer research at the University of Guelph and elsewhere, with the ultimate goal of improving the lives of companion animals with cancer. For inclusion in the CATSB, informed owner consent must be obtained, and banking of tumour samples must not interfere with the clinical histologic diagnosis for the patient.

Aliquots of samples are available to qualified investigators for retrospective studies. OVC currently has in excess of 28,000 aliquots from over 1,550 unique cases, and cell lines from approximately 40 different cases. As of January 2016, the CATSB was registered in the Biobank Resource Centre, developed by University of British Columbia Office of Biobank Education and Research and the Canadian Tissue Repository Network.

The Companion Animal Tumour Sample Bank as well as the Tumour Bank Coordinator and the Clinical Trials Coordinator – are supported by donations made to OVC Pet Trust through The Smiling Blue Skies Cancer Fund.



OVC oncology patients visit the cancer centre for treatment.



Tumour samples are collected for the CATSB from a clinical trial participant during surgery at the OVC Companion Animal Hospital.

CURRENT CLINICAL CANCER STUDIES AT THE ONTARIO VETERINARY COLLEGE



OVC oncology patient Joey with Drs. Sarah Laliberte and Chris Pinard.

Canine Oncology Studies:

- Collection of biological specimens from dogs diagnosed with cancer and not scheduled to undergo surgery for tumour removal.
- Collection of biological specimens from dogs scheduled for biopsy or surgery for suspected or known cancer.
- Investigation of gastrointestinal lesions and gastrointestinal bleeding in dogs with mast cell tumours (MCT) by the use of video capsule endoscopy (VCE).
- PD-1/PD-L1 expression on canine peripheral blood lymphocytes in patients with urothelial carcinoma.
- Profiling and validation of extracellular vesicles as circulating biomarkers in canine osteosarcoma: a DOGBONE project.
- Prognostication of canine T-cell lymphoma.
- Investigating biomarkers for metronomic cyclophosphamide treatment of canine soft tissue sarcoma.
- Acute Myeloid Leukemia Study.

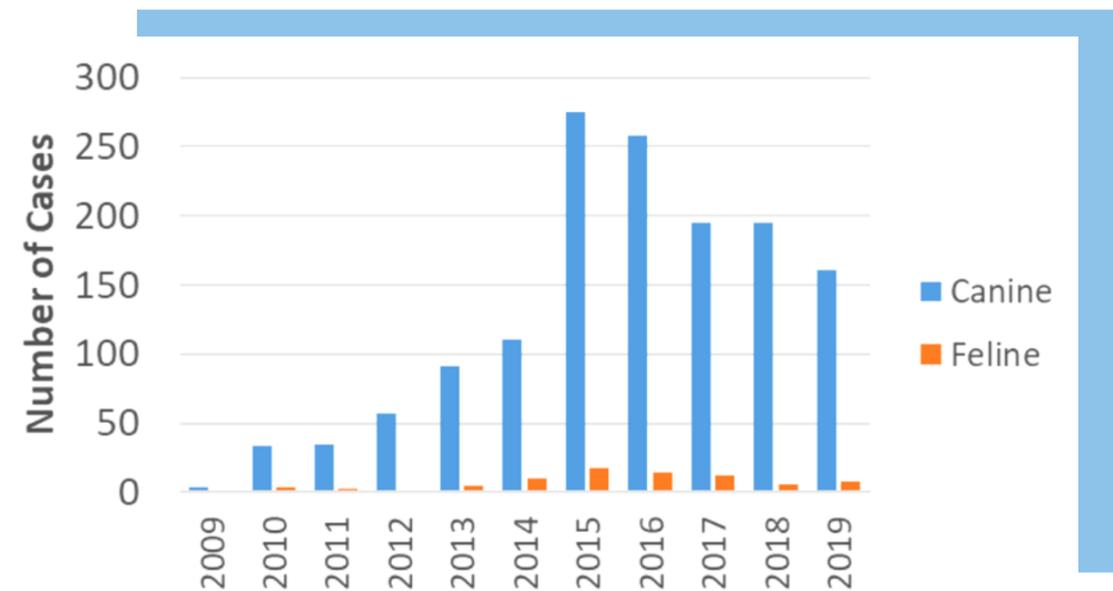
Oncology Related Studies:

- Evaluation of bedside ultrasonography of the optic nerve sheath diameter (ONSD) to assess elevated intracranial pressure in dogs.
- Evaluation of bladder microbiome in canine and feline stone formers.
- Prevalence of acute kidney injury (AKI) post general anesthesia (GA) in cats.
- Feline acute kidney injury study.
- BUN/creatinine and BUN/symmetric dimethylarginine ratio in dogs with occult gastrointestinal bleeding.
- Usefulness of blood urea nitrogen(BUN)/creatinine and BUN/symmetric dimethylarginine (SDMA) ratio in localizing gastrointestinal bleeding in dogs.

Several oncology studies finished recruiting new patients in 2018 and 2019; however, samples are still being collected and information obtained from the patients (n=151) who continue to receive care at the OVC's Animal Cancer Centre. Including:

- Evaluation of a recombinant, attenuated *Listeria monocytogenes* expressing a chimeric human HER2/neu protein in dogs with osteosarcoma in the adjuvant setting.
- Evaluation of the safety and effectiveness of standard-of-care therapy, with or without adjuvant rapamycin administration in dogs with osteosarcoma.
- Identification of response to chemotherapy in relapsed canine lymphoma patients.
- Detection of Minimal Residual Disease in Canine Lymphoma.

THE COMPANION ANIMAL TUMOUR SAMPLE BANK (CATSB): 2009 – 2019 OVERVIEW



Total number of cases banked in the Companion Animal Tumour Sample Bank from 2009-2019. CATSB now has samples from 1,550 patients, totalling approximately 28,000 vials.

EDUCATING THE NEXT GENERATION OF VETERINARY LEADERS

With the goal of exposing students to alternative career options and increasing opportunities to learn more about the research side of veterinary medicine, the oncology team at the OVC continues to provide valuable learning experiences to students. Through placement opportunities, students gain valuable skills in the areas of data collection and management, clinical research sample collection and cancer patient outcomes.

Placements and Learning Opportunities

- Two Doctor of Veterinary Medicine (DVM) students who were hired as part of the University of Guelph Work Study Program, one who focused on data collection and patient outcome for the CATSB (Jan – April 2019) and the second on assisting with culturing primary cancer cells for the CATSB (Sept 2019 – Dec 2019).
- One DVM student (CORE summer student May – Aug 2019) who focused on developing primary canine cancer cell lines for the CATSB.
- One advanced biotechnology student from Sir Sanford Fleming College, Peterborough who completed a four-month internship (May – Aug 2019) assisting with CATSB, clinical research and data management studies.
- Four volunteer placements: Two U of G undergraduate students and two MSc students who wish to become veterinarians and are applying to gain entry to the OVC: assisting with clinical research studies, sample collection and data management associated with the NIH COTC canine OSA trials and data collection and patient outcome for the CATSB.

Conferences

Four posters presented by summer students at the end of the Career Opportunities & Research Exploration (CORE) summer program involved contributions from canine cancer patients recruited into clinical research studies:

- Genes associated with CHOP therapy response in canine lymphoma.
- In search of effective prognostic molecular markers to assess canine osteosarcoma.
- Plasma MiRNA as Circulating Biomarkers for Canine Appendicular Osteosarcoma.
- Characterization of immune repertoires in lymph nodes from dogs with appendicular osteosarcoma.

Your Gifts at Work

Annually, OVC Pet Trust invests \$500,000 in new projects and equipment to advance health and well being for pets. With the support of Smiling Blue Skies, OVC clinicians and researchers are searching for more and better ways to deal with animal cancer. Here are several of the new oncology studies that were funded in 2019:

Discovering potentially targetable modulators of canine osteosarcoma metastasis

Professor Alicia Vilorio-Petit

This research aims to demonstrate that the communication among three proteins, ezrin, TAZ and YAP, is key for the lung dissemination (metastasis) of dog bone cancer. By targeting this communication in the future we might be able to significantly prolong the life and enhance the quality of that life in dogs with bone cancer.

Optimizing concentrations of a novel imaging agent for lymph node mapping in cancer

Dr. Michelle Oblak

Study aims to improve understanding of a novel imaging agent, indocyanine green dye (ICG), for use in cancer surgery in dogs. Improvements in surgical method and creating consistency in the procedure would benefit owners, patients and clinicians with improved surgical outcomes.

Comparing pre and intraoperative lymph node staging methods in dogs with cancer

Dr. Michelle Oblak

This research will evaluate a novel method for staging pets with cancer and help develop protocols for using this method in clinical patients that present for cancer surgery.

Testing a new approach to improve chemotherapy in dogs with lymphoma

Professor Brenda Coomber

Findings may help pet owners decide on the best treatment for their dog with lymphoma and could also lead to the development of a new type of treatment for canine lymphoma that may improve responses to the standard chemotherapy drugs now in use.

Effect of cannabidiol (CBD) on canine urinary bladder tumours

Dr. Sam Hocker

Treatment and overall prognosis for canine urinary bladder tumours has not significantly changed over the last couple of decades. Cannabidiol (CBD), a naturally occurring compound found in cannabis plants, may represent a novel innovative treatment option for this type of cancer.

Early detection of a canine cancer by routine blood sampling

Dr. Geoff Wood

Hemangiosarcoma is a highly lethal cancer in dogs that is commonly detected late in the course of disease when it has already spread. Finding a way to screen for this cancer when it is still very small may allow for early surgical removal and greater chance of cure.

In 2019, several studies were published by ICCI researchers, all of which were in part funded by Smiling Blue Skies and OVC Pet Trust:

- Flow Cytometric Detection of Circulating Osteosarcoma Cells in Dogs.
- MicroRNA profiling in canine multicentric lymphoma.
- RNA disruption indicates CHOP therapy efficacy in canine lymphoma.



OVC clinical trial participant and bone cancer patient Bella.



"Getting the ball rolling on a novel concept can be a major challenge, and almost every cancer researcher hears the same thing from funding agencies . . . "Come back when you have some evidence you are on the right track". The support of the Smiling Blue Skies Fund for Innovative Cancer Research fills an urgent gap at the OVC and enhances the cancer centre's ability to support creative cancer research at its most fragile and vulnerable stage."

- Dr. Brenda Coomber, Co-Director of the University of Guelph's Institute for Comparative Cancer Investigation



Thank you for taking a bite out of cancer!

Smiling Blue Skies



"Long live blue skies, where Hope is a kite and dreams really do come true."



Learn more at
smilingblueskies.com

Contact us at
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OVC Pet Trust, founded in 1986 at the Ontario Veterinary College, University of Guelph, is Canada's first charitable fund dedicated to the health and well-being of companion animals.

OVC Pet Trust honours the relationship between pets, their people and veterinary caregivers by raising funds to support innovative discoveries that improve the prevention, diagnosis and treatment of diseases of pets.

Funds also help train veterinarians to provide exceptional healthcare for pets and provide equipment and facilities for the Ontario Veterinary College.

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