Fifteen years ago, the Robert H. and Mary G. Flint Animal Cancer Center started on the path to create one of the first on-site biorepositories in veterinary medicine. The project was spearheaded by medical oncologist, Dr. Sue Lana. Proper collection, processing, and storage were critical considerations when designing the program.

“Our focus from day one has been on collection and storage,” said Lana. “It was extremely important that the samples were handled in a way that would not affect the integrity of the DNA, RNA, and proteins. With safe handling, samples are available for decades.”

The goal was to build an archive that would serve the needs of Colorado State University cancer center researchers first and then scientists around the globe. At the time, scientists needed better access to a variety of tissue samples to take advantage of advances in molecular biology and to learn more about the life of cancer cells. The hope was to discover how cancer cells differed from normal cells and how they interacted with the cells around them with the goal of developing new treatment strategies.

“When I joined the Flint Animal Cancer Center faculty in 2007, it was the first time I had access to patient samples,” said Dr. Dawn Duval, associate professor of molecular oncology. “It provided an opportunity to actually try to understand what was happening in real patients. Not only that, but the tumors were matched with blood, serum, plasma, and normal tissue samples from the same patient. So not only could I ask what was happening in the tumor, I could also ask how the patient’s body was responding and if those changes could be measured from a simple blood sample.”

One example of the importance of the biorepository has been in the study of osteosarcoma. “Since most human osteosarcoma patients are treated with chemotherapeutic drugs prior to surgery to remove the tumor, the tumors have been exposed to a lot of agents that change their biology and cause a lot of damage,” said Duval. “The standard of care for dogs is to remove the tumor first, so we have better samples to study, and...
VISION FOR THE FUTURE

Thanks to an anonymous lead gift, Flint Animal Cancer Center faculty are excited to build the power of the biorepository for the next generation of discovery. Plans include investment in personnel to increase data collection and to build a robust database that can link all forms of information tied to a sample.

“The power of the biorepository is not just in the samples, but in linking the samples with patient information, including diagnosis, treatment, outcomes, successes, and failures, and also linking basic science research back to that sample,” said Lana. “Our vision is to have the complete package for every sample used.”

New investment will also allow the cancer center to take advantage of advances in sample collection techniques and facilitate the study of additional tumor types. According to Dr. Rod Page, director, Flint Animal Cancer Center, “Modernizing our biological collections, deriving new cell lines, and building a clinical data repository is a critical initiative for our future work to find solutions for better cancer diagnostics and therapy.”

To learn more about future plans for the biorepository or how you can support this initiative, please contact Lauren Mingus, lauren.mingus@colostate.edu.

What is a biorepository?

According to the National Institutes of Health National Cancer Institute, a biorepository is a facility that collects, catalogs, and stores samples of biological material, such as urine, blood, tissue, cells, DNA, RNA, and protein, from humans, animals, or plants for laboratory research. At the Flint Animal Cancer Center, samples are collected from companion animals with owner consent. Once collected, samples are processed, catalogued, and stored in controlled conditions through the use of ultra-low temperature freezers. Scientists use the samples to examine the molecular and biological traits of cancerous tissue, normal tissue, and other patient samples. The ultimate goal is to find better therapies.

HOLLY'S LEGACY REMOVES FINANCIAL BARRIERS TO TREATMENT

ROCKY IS A SMART, LOVING, LOYAL companion for 9-year-old Nikolai.

As Nikolai’s service dog, Rocky has been by his side through every doctor visit, surgery, MRI, EEG, EKG, therapy appointment, hospital stay, night terror, and moment of distress. They are best friends and soul mates.

In August 2018, Rocky was diagnosed with a very aggressive maxilla tumor. After meeting with clinicians at Colorado State University’s Flint Animal Cancer Center, Rocky’s family learned there were few options to treat this type of cancer. The best option was intensive radiation therapy. However, the cost of this treatment posed a huge financial burden for the family.

Thanks to Holly’s Legacy Fund, Rocky’s family received the financial help they needed to cover the cost of radiation therapy. Holly’s Legacy fund provides monetary support for elderly and disabled pet owners seeking treatment for their companion animals at the Flint Animal Cancer Center.

“Thank you Holly’s Legacy Fund,” said Nikolai’s mom. “This gift is an incredible blessing to our family and allows us to focus on our son’s needs while he endures cancer treatment.”

The Legacy fund is recognized as a national best practice in veterinary oncology, according to Dr. LaSalle, director, Flint Animal Cancer Center. “Holly’s Legacy fund is providing life-changing support to companion animal owners.”

To learn more about the Holly’s Legacy fund, including how you can support future patients and their families, please visit hollysllegacy.org.

ABOUT HOLLY'S LEGACY FUND

This fund was established in memory of Holly, a remarkable chocolate lab who endured many health challenges in her 12 years. Through numerous health diagnoses, Holly remained good-humored and embraced her treatments with enthusiasm and energy. The compassionate care Holly received at CSU inspired Terry and Bart Mayes to create Holly’s Legacy.

“Helping animals is high on our priority list,” said Terry. “We established Holly’s Legacy to make sure seniors and persons with disabilities, who often don’t have resources for companion animal care, can choose the best treatment option without worrying about the financial burden.”

With gifts from Terry and Bart as well as Terry’s mother, Mary Anderson, Holly’s Legacy fund will grow to $25,000 by the end of the year, which is the threshold to reach permanent endowment status. However, a generous gift from an anonymous donor allowed the fund to start providing assistance beginning in 2017. To date, 16 patients have benefited from treatment sponsored by Holly’s Legacy.

“We are truly grateful to the anonymous donor for helping us grow Holly’s Legacy,” said Terry. “We love knowing that this fund is already making a difference in the world.”

Terry and Bart plan to continue to support Holly’s Legacy into the future and have included the fund in their estate plan as well. They invite others to support this fund to ensure future patients will have access to the best possible care. To contribute, please visit hollysllegacyfund.org.

Above: Best friends and soul mates, Rocky and Nikolai, received financial assistance from Holly’s Legacy Fund.
This year, the Flint Animal Cancer Center hosted not one, but two events to raise awareness and critical funding for One Cure, which supports the clinical trials program at the Flint Animal Cancer Center. Thanks to generous supporters, we have received more than $700,000 in gifts to One Cure this year. These contributions will be used to finance our clinical trials operating costs, including five full-time staff and up to three additional clinical trials in 2019.

SEVENTH ANNUAL ONE CURE DINNER

Eighty friends of the Flint Animal Cancer Center along with furry guests gathered Aug. 11, 2018, for the seventh annual One Cure Dinner. For the first time, the event was held in Fort Collins on the campus of the Colorado State University. James L. Voss Veterinary Teaching Hospital. In addition to spending time with old and new friends, dinner guests had the opportunity to tour the newly remodeled Luxy Oncology Clinic at the Flint Animal Cancer Center.

The evening’s theme, Growing Hope, was inspired by a promising new clinical trial for patients with metastatic osteosarcoma, an aggressive form of cancer with no effective treatment options. The clinical trial, which uses a known anti-cancer agent in combination with a repurposed blood pressure medication, was designed by cancer center scientists Drs. Steve Dow and Dan Regan. “In canine patient studies we’ve seen, in some cases, tumor regression, cessation of tumor growth in a disease that’s really stymied other investigations,” said Dow. “We feel like this is a breakthrough.” In addition to supporting the next phase of study at the cancer center, One Cure monies will be used to launch a similar clinical trial in patients with metastatic osteosarcoma at Children’s Hospital Colorado.

“I don’t know any other center that would be able to take the resources in basic science, clinical trials experience, and the connections to take these opportunities to humans as quickly as we are,” said Dr. Brad Page, director of the Flint Animal Cancer Center.

The dinner’s featured speaker, Dr. Megan Mary, a pediatric oncologist at Children’s Hospital Colorado, spoke about her team’s excitement about the upcoming clinical trial.

“We’ve not moved the needle in 20 years,” said Mary. “Through this trial, we can provide our families with new hope.”

DINNER IN WHITE

Since 2010, Dinner in White has “popped up” annually in a secret location in the Denver Metro area to raise support for the University of Colorado Cancer Center. This year, in a unique twist, Dinner in White headed to Fort Collins in addition to Denver for two simultaneous events to raise awareness of comparative oncology research at CU’s Flint Animal Cancer Center, one of the American Cancer Society’s consortium members. Event highlights included stories from Flint Animal Cancer Center patient families. Dinner guests heard from Brad and Heidi Robinson whose dog Duke was diagnosed with osteosarcoma and is participating in a clinical trial designed to personalize his chemotherapy.

In Fort Collins, retired K9 tracking dog PC took the stage with his human Tina and Scott Walker. Toney-eyed, Tina shared the story of PD’s diagnosis with hemangiosarcoma and their journey through PD’s treatment at CTU.

Fort Collins’ guests also heard from human osteosarcoma patient, Travis Vagher, one of the first surgical limb spare patients more than 30 years ago. He credited Flint Animal Cancer Center for good surgeon, Dr. Steve Wirtz, with saving his life. Dr. Wirtz originally perfected the surgical limb spare technique in dogs and later shared his work with Travis’s orthopedic surgeon, Dr. Ross Wilson. Travis quipped, “It might have been the drugs, but I’m pretty sure there was a veterinarian in my surgery.” According to Dr. Christine Hardy, Flint Animal Cancer Center One Cure program lead, “Dinner in White provided an amazing opportunity to connect with both old and new One Cure friends. We are grateful to every single guest in both Denver and Fort Collins and to the CU Cancer Center staff for spending a lovely evening focused on the potential of comparative oncology for all cancer patients.”

STAFF NEWS

Flint Animal Cancer Center staff members, Drs. Ruth Rose, Amanda Guth, and Valerie Johnson recently received loan repayment awards through the National Institutes of Health and the National Center for Advancing Translational Sciences. The NIH Loan Repayment Programs were established by Congress to recruit and retain qualified professionals into biomedical or behavioral research careers. The increasing costs of advanced education and training in medicine and clinical specialties force some scientists to abandon their research careers for high-paying careers in the private sector. “The financial relief the award provides is truly remarkable,” said Rose. “After paying off my student loans (equal to a monthly mortgage payment) for almost 10 years, the total amount I owed decreased by only a few thousand dollars. In the next two years, it will be reduced by half. I am truly honored to receive this award along with my colleagues.”

According to Rose, “It has been extremely difficult for veterinarians in research to achieve any significant means of debt relief. These awards acknowledge the value of translational research.”

Flint Animal Cancer Center’s Dr. Dan Regan received the same award last year. “By removing the financial stress of student loan payments, the award has been invaluable toward helping me continue my career and focus in basic and translational cancer research,” said Regan.

COMINGS & GOINGS

Louie’s story was featured at the Dinner in White event in Denver.

Amanda Jenkins joins us as project coordinator working with Dr. Doug Thimm. Jenkins brings 12 plus years of experience in biomedical research and was most recently an assistant scientific investigator in the Department of Otalaryngology at the University of Arizona.

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Above: Drs. Ruth Rose, Valerie Johnson, and Amanda Guth received loan repayment awards from the National Institutes of Health to help pay off their student loans.
Kim selected the COXEN clinical trial, which offers a personalized chemotherapy protocol based on the individual patient's tumor characteristics. Before chemotherapy could begin, Annie would have to have her left hind leg amputated to remove the primary tumor. Annie recovered well from surgery and began chemotherapy a few weeks later. In October, routine chest X-rays revealed that the cancer had spread to Annie's lungs, which happens in about 90 percent of osteosarcoma cases. Due to the lung tumors, Annie was withdrawn from the clinical trial.

“I had hoped the combination of amputation and chemotherapy would help Annie,” said Kim. “Unfortunately, she didn’t tolerate chemotherapy very well, and then we learned the cancer had spread to her lungs. We made the tough decision to stop chemo and keep her comfortable. She died in December 2017.”

Just two months after Annie passed away, Ollie started limping. “I brought him to our vet right away,” said Kim. X-rays revealed a suspicious lesion on Ollie’s right front leg, likely bone cancer.

Without hesitating, Kim scheduled an appointment for Ollie at the Flint Animal Cancer Center. After radiographs and a fine needle aspirate confirmed the osteosarcoma diagnosis, Kim faced more treatment decisions. “I wanted to try something different for Ollie, so we enrolled in the COTC026 trial,” Kim said.

“Losing Annie was extremely difficult, and I wanted to do the best I could for Ollie, to give him a chance to enjoy life to the fullest and for the longest period of time.”

The COTC026 clinical trial is investigating the effectiveness of a Listeria vaccine in delaying or preventing metastatic disease in dogs with osteosarcoma that are treated with standard chemotherapy. Following amputation in late February, Ollie began the treatment protocol.

“The first few weeks post-surgery were tough,” said Kim. “Ollie had a nerve impingement that caused a lot of pain, but about a month later, he was much better.”

After surgery, Ollie received four doses of chemotherapy followed by three vaccinations over the course of several weeks. “We held our breath at the five-month mark, hoping to have more time with Ollie than we did with Annie,” said Kim.

Eight months after his diagnosis, Ollie races around in the backyard with the two newest greyhound family members, Smiley and Lucy.

“I’m grateful to the caring and extremely professional team at the Flint Animal Cancer Center, including our surgeon, Dr. Megan Mickelson, Drs. Monica Fernandez and Brittany Wittenberns, and the clinical trials team, especially Karah Hall,” said Kim.

“Kim’s dedication to Annie and Ollie’s care has been amazing,” said Hall, clinical trials technician at the Flint Animal Cancer Center. “Despite having faced cancer multiple times with her dogs, Kim’s heart for helping us advance therapies for future patients has never wavered.”

“I’ve seen so many benefits to participating in clinical trials, not just for Annie and Ollie, but for the students who are learning about cancer, for the clinicians who can use the information to improve future treatments, and for the next osteosarcoma patients. I’m happy that Annie and Ollie can make a difference. It’s been a big commitment, but it’s worth it to know that we are part of a team that is racing for a cure.”

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— Kim Thomsen
Flint Animal Cancer Center Client

Post-amputation surgery, Ollie is participating in a clinical trial for dogs with osteosarcoma.

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Littermates Annie and Ollie race again, but this time for a cure
Speeding up the cure

Thanks to a generous One Cure supporter who hates cancer and loves car racing, One Cure’s message reached millions of racing fans worldwide in 2018. Building on last year’s partnerships, three professional race car drivers, Jay Howard, Clint Bowyer, and Graham Rahal, proudly sported the One Cure colors at six races across the country.

Featured races included Howard’s second appearance as a driver for One Cure at the Indianapolis 500; three NASCAR races with Bowyer; and two races with Indy Car driver, Rahal. The drivers and teams used their collective voices to share One Cure’s story of hope and potential with their fans.

For nearly two years, Howard has championed One Cure via his social media channels. He’s adopted the hashtag #LoveDogsHateCancer to rally his fans. “One Cure is literally my ideal program. It’s just incredible.”

For me, racing for a cure is personal,” said Rahal. “I don’t want to see anyone else I love go through cancer.”

One Cure is all about speeding up new and promising treatments for all cancer patients – pets and people – which is why we’re thrilled to team up with the car racing industry. All of these efforts have succeeded in amplifying our message and helping us raise critical funding for our comparative oncology research.

“We’d love to see everyone else I love go through cancer.”

Through his 2018 charity golf tournament, Rahal donated $100,000 to One Cure. According to Rahal, “to speed up a cure, it’s going to take all of us rallying together.” Please visit www.onecure.com to join this effort and help us race toward a cure.

One Cure’s message reached millions of racing fans worldwide this season.
I that might reveal disease correlations – why the long-term, expansive prospective studies to the same cancers in humans, as well as common in golden retrievers – lymphoma and to the development of four types of cancers identify potential risk factors that may lead for cancer and other major diseases in dogs. It is environmental, lifestyle, and genetic risk factors their lives, to identify the nutritional, more than 3,000 golden retrievers, throughout six years. The study is gathering information on Dr. Rod Page, director of the Flint Animal Cancer Center and the Golden Retriever Lifetime Study. The study began as a way to fill a major The overarching goal of the study is to take advantage of current data to expand samples for approximately eight more years. They will be actively collecting data and dedication of each owner. The team estimates 85 percent are compliant with enrollees, an incredible 95 percent remain in the study and 85 percent are compliant with all study tasks. Those statistics would be unheard of in human studies and speak to the dedication of each owner. The team estimates they will be actively collecting data and samples for approximately eight more years. The project has accumulated enough data to authorize research projects that take advantage of current data to expand knowledge about canine health. New projects include:

- Genetically identifying breeding close-ness to help breeders optimize the preservation of desirable traits
- Establishing new “normal ranges” in blood levels to better predict the development of diseases
- Determining environmental and gut microbiome contributions to obesity risk in Golden Retriever Lifetime Study participants

The Golden Retriever Lifetime Study team will continue to share its gold mine of information through published reports and data sharing with outside researchers. For more information on the Golden Retriever Lifetime Study, visit www.morrisanimalfoundation.org/golden-retriever-lifetime-study.

Excerpted with permission from Morris Animal Foundation.
ONE CURE

Cancer is cancer. At the Flint Animal Cancer Center, we believe the answer to curing cancer lies in comparative oncology. Our One Cure initiative works to advance translational cancer research through comparative oncology clinical trials. Every day, our scientists look for new treatment options that benefit our pet patients – and people too. Your support is critical to our continued work. Please visit www.onecure.com to learn more.