ADVANCING CANCER TREATMENT THROUGH COMPARATIVE ONCOLOGY RESEARCH

FLINT ANIMAL CANCER CENTER

NEWSLETTER | Spring 2018

HAVE WE FOUND THE ANSWER TO PREVENTING CANCER?

Dr. Doug Thamm will lead a new cancer prevention vaccine clinical trial.

SMALLPOX, A DEVASTATING DISEASE FOR CENTURIES, was eradicated in 1980, thanks to a vaccine. Vaccines for polio, whooping cough, and influenza are a few of the reasons that our lifespans have nearly doubled since the beginning of the 20th century. A newer vaccine for chicken pox has dramatically reduced the number of cases of that disease. So, why not a cancer vaccine? Seems logical, right?

The challenge: All cancers are different. For decades, conventional wisdom has suggested that a general, preventive vaccine would not be possible because all cancers are unique. For the last 10 years, however, Dr. Stephen Johnston, director of the Biodesign Center for Innovations in Medicine at Arizona State University, and his team, including Dr. Luhui Shen, senior science director, vaccine project, and Penny Gwynne, research laboratory manager, have been working on a one-size-fits-all cancer prevention vaccine.

Key to Johnston's work are tumor antigens (proteins that are recognized as foreign and targeted by the immune system) that are common among different cancer types. Johnston's lab has discovered a potentially high-impact way of identifying these common tumor antigens; these make up the key components of their vaccine.

The new vaccine, called a multivalent frameshift peptide vaccine, was developed by Johnston and his team. The vaccine has been already tested for efficacy in mice and shown to be safe in dogs.

NEXT STEPS

To move the vaccine from the lab to the clinic, Johnston partnered with Dr. Doug Thamm, a veterinary oncologist and director of clinical research at the Flint Animal Cancer Center.

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Cancer Vaccine Trial | continued from Page 1

"Stephen and I have been collaborating for more than a decade on a number of projects, mostly involving new cancer diagnostics," said Thamm. "When he brought up the idea of a universal cancer preventative vaccine, I was appropriately skeptical. However, the data he has shared has convinced me that his approach, while not guaranteed to work, is definitely worth testing."

Cancer is the leading cause of death in adult pet dogs, and many of their cancers are very similar to those of their human counterparts. The dog immune system responds to tumors and vaccines very similarly to humans. But dog years and the course of tumor development are much shorter compared to the average human lifespan. The team thinks it can evaluate the effectiveness of the vaccine in five years or less, versus the 15 to 20 years it would take in a human trial. The vaccine they are studying in pet dogs will have a composition very similar to the one they would test in people.

"This is a really critical study in the evaluation of this vaccine," said Thamm. "While effectiveness has been shown in mouse models, moving immediately to a very large, expensive, and time-consuming human study is a leap that is hard to justify. Testing this approach in dogs will serve as the perfect bridge to human studies. Additionally, if successful, we will have a new tool for cancer prevention in our pets, potentially decades before it is available for humans."

The clinical trial, called the Vaccine Against Canine Cancer Study, is scheduled to begin enrolling patients in Summer 2018. It will be the largest interventional canine clinical trial ever conducted. Under Thamm's direction, 800 healthy, middle-aged pet dogs will be enrolled, continuing to live their normal lives at home and receiving biannual exams with a complete clinical pathology workup for five years. Participating pets will be randomized to receive either the cancer vaccine or a placebo. Dogs receiving the placebo are expected to develop cancer at normal rates.

Any owner whose dog develops cancer during the trial, on either the test or control, will be given a credit toward medical expenses. Because of the size and scope of the trial, three veterinary schools will enroll patients; Colorado State University's Flint Animal Cancer Center, the University of Wisconsin–Madison, and the University of California, Davis.

If successful, this trial would provide strong support for the concept of employing FSP vaccines to prevent cancer in its earliest stages, possibly leading to a canine preventive cancer vaccine, and could eventually justify human clinical trials.

"We are fairly confident that if the vaccine works in dogs, it could work in people," said Shen.

The cancer prevention vaccine is one of the many ways scientists, veterinarians, and medical doctors are working together to fight cancer in both pets and people. For more information about the clinical trial, please see below or visit www.vaccs.org.

Left to right: Penny Gwynne, Dr. Luhui Shen, Dr. Stephen Johnston of the Biodesign Center for Innovations in Medicine at Arizona State University developed the cancer prevention vaccine.

Vaccine Against Canine Cancer Study Eligibility

The goal of the VACCS trial is to evaluate a new vaccine strategy for the prevention of canine cancer. Healthy dogs of certain breeds, 6 years or older, will be randomized to receive either the cancer prevention vaccine or a placebo vaccine.

To qualify for the VACCS trial, dogs must meet the following criteria:

- Owners must live within 150 miles of one of the participating trial sites:
  - Colorado State University · Fort Collins, Colo.
  - University of California, Davis · Davis, Calif.
  - University of Wisconsin–Madison · Madison, Wis.
- Older than 6 years
- Weigh at least 12 pounds (5 kg)
- No history of previous cancer
- No significant illness that could result in a life span of less than five years
- No history of previous autoimmune disease
- No current treatment with oral or injectable immunosuppressive medications such as prednisone, cyclosporine, mycophenolate, or tacrolimus

For more information, including qualifying breeds, please visit www.vaccs.org.

ONE CURE IN ACTION

CANCER IS CANCER, WHETHER YOU HAVE two legs or four. With that principle in mind, Flint Animal Cancer Center scientists, Drs. Steve Dow and Dan Regan, are collaborating with pediatric oncologists at Children's Hospital Colorado to study a promising new therapy to treat metastatic bone cancer in both dogs and kids.

THE SCIENCE BEHIND THE STUDY

Tumor progression depends on help from the immune system, specifically from a type of white blood cell known as an inflammatory monocyte. These monocytes, which eventually differentiate into specialized cells called macrophages, help promote survival of metastatic tumors, in part, by stimulating new blood vessel growth. Consequently, treatments that can block monocyte and macrophage activity can help prevent the spread of cancer to other parts of the body and treat existing tumors by removing immune suppression and blocking new blood vessel growth.

However, the Food and Drug Administration has yet to approve a drug that can be used to block monocyte migration for humans or animals. To overcome this barrier, Regan and Dow set out to find FDA-approved drugs that blocked monocyte migration as an unintended drug effect. The goal would be to repurpose these drugs as cancer immunotherapies. After a long search, they discovered a class of drugs known as angiotensin receptor blockers that demonstrated strong monocyte migration-inhibiting activity in multiple species (mouse, dog, human).

Regan and Dow selected one of the drugs in this class (losartan) to evaluate the effect in mouse tumor studies. These studies showed strong activity using losartan alone in helping control the growth of metastatic tumors. When combined with a second drug, sunitinib, a targeted cancer drug that also has immune-modulatory properties, studies in mice showed even greater activity.

FROM LAB TO PATIENT

Based on laboratory results, the investigators designed a clinical trial to study the effects of losartan in dogs with metastatic bone cancer that had progressed to their lungs. At this stage of disease, few treatments have succeeded in extending life beyond approximately two months after diagnosis. For the study, scientists administered high-dose losartan with Palladia (toceranib), a targeted drug that has minimal activity against osteosarcoma, but does have immune-modulatory effects in dogs. Results from 16 dogs treated in this trial have been very encouraging, with 50 percent of the dogs responding and almost 30 percent experiencing actual tumor regression. Importantly, adverse events have been few and typical of those expected for Palladia treatment.

ONE CANCER. ONE CURE.

The striking similarities between osteosarcoma in dogs and humans make dogs the best animal system to study human bone cancer. Each year, more than 8,000 dogs are diagnosed with osteosarcoma. While bone cancer is more common in dogs, according to the Children's Hospital Colorado, osteosarcoma usually occurs in school-age children and adolescents and is the sixth most-common type of cancer in this age group. The five-year survival rate for human patients with bone cancer that has spread only to their lungs is 40 percent (www.cancer.org).

The encouraging results of the losartan study in dogs and the discouraging survival rates in children with advanced osteosarcoma, prompted Regan and Dow to reach out to oncologists at Children's Hospital Colorado. Both entities are members of the University of Colorado's Cancer Center consortium and readily share information. Dow and Regan proposed a study using losartan in pediatric bone cancer patients with tumor metastases who have failed to respond to conventional treatment. Working with pediatric oncologists, Drs. Lia Gore, Carrye Cost, Margaret Macy, and Kelly Faulk, the combined team is now designing a clinical trial similar to the canine trial using high-dose losartan and sunitinib for pediatric bone cancer patients. The team hopes to begin enrollment later this year.

"These studies build on the important connections between the human and veterinary sarcoma fields first established by Drs. Ross Wilkins and Steve Withrow, and provide real-world evidence of the impact of the One Cure concept," said Dow.

One Cure's goal is to raise awareness and funding for the Flint Animal Cancer Center's clinical trials program and other comparative oncology research to find better treatment options for both pets and people with cancer. Currently, both Children's Hospital and Flint Animal Cancer Center are seeking funds to support the upcoming pediatric trial. The Shipley Foundation in Boston, a longtime supporter of CSU's cancer center, funded much of the initial laboratory study and canine clinical trial. For more information about the trial or to learn how you can contribute your support, please contact Dr. Christine Hardy, christine.hardy@colostate.edu.

Children's Hospital Colorado patient, Solei, and Flint Animal Cancer Center patient, Alba, are both osteosarcoma survivors. A new study hopes to find a better treatment option for canine and pediatriac cancer patients with metastatic osteosarcoma.

The YAPS program matches pediatric oncology patients with dogs and cats who have survived cancer to establish pen pal relationships.

YAPS Program Links Kids & Pets with Cancer

The Flint Animal Cancer Center is proud to partner with the Youth and Pet Survivors Program. YAPS is a pen pal program that matches pediatric oncology patients with dogs and cats who have survived cancer or other serious medical conditions. Children and pets (via their owners) establish relationships and communicate through letter writing.

This allows children (ages 7 to 18) the unique opportunity to share feelings about having cancer with a safe, unconditionally loving animal. YAPS child participants report enhanced well-being; YAPS pet owners report a sense of contribution knowing that their pet's illness can make a difference in a child's life.

The mission of YAPS is to facilitate healing, fun, and creative relationships between animals and humans by connecting children with cancer to animal cancer survivors. The program has met with tremendous success, with more than 100 child and animal families participating in YAPS since it began in 2001.

For more information, please visit www. youthandpetsurvivors.org.

MEMORIES OF MARY

The entire team at the Flint Animal Cancer Center and the CSU James L. Voss Veterinary Teaching Hospital were stunned by the sudden loss of beloved colleague and oncology nurse Mary Lafferty. Mary died in a tragic horseback accident on April 15, 2018. Those who knew her took some solace in the fact that she died doing what she loved.

Mary began her career as a "bone nurse" in 1990 after graduating from Bel-Rea Institute of Animal Technology. Back then, she worked closely with the cancer center's founding director and surgical oncologist, Dr. Steve Withrow. Most of their work focused on osteosarcoma (bone cancer) treatment and research for the benefit of people and pets.

"With a wonderful sense of humor and a huge heart, Mary kept us all grounded in what mattered ... the patients and their families," said Withrow. "Mary was a true and trusted friend and colleague. Thousands of pets and people are beneficiaries of Mary's devotion to her life's work. She has now 'retired' to a bigger calling and is sorely missed."

As the cancer center grew from 20 members to today's staff of 100, Mary's role changed and evolved. Over the years, she served as a nurse, supported oncology clinical studies, maintained patient records and databases, and so much more. She also co-authored 17 publications, a unique accomplishment for a veterinary nurse. Mary was one of a kind.

Five years ago, Mary moved off the clinic floor to focus on helping clients as they navigated treatment. She offered a quiet, comforting voice of experience as she worked with families through scheduling appointments, obtaining medical records, answering questions, and sometimes just listening.

She was the resident champion of the Youth and Pet Survivors Program and a member of their board of directors. (See sidebar for information.)

Mary touched the hearts and lives of countless individuals, including surgical oncology fellows and residents. We received an outpouring of communications from former trainees after they learned of Mary's passing. Common themes emerged in the messages "she taught us so much," "she had a wonderful sense of humor," "great smile," "she was always so helpful and patient," "she was tiny in stature, but towered over us in many ways."

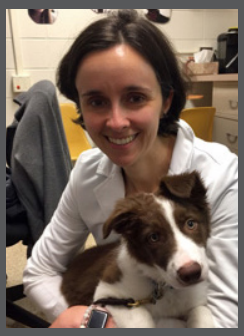
Mary was an animal lover and a passionate horsewoman. She frequented local riding trails so much that park rangers knew her well. She was also a sister, a mother, a grandmother, and a dear friend.

"Each of us grieves not only at the passing of a tremendous individual, but also for the loss her family and friends suffer," said Dr. Rod Page, director, Flint Animal Cancer Center. "She will be profoundly missed by everyone whose lives she touched."

WHERE ARE THEY NOW?

Over the last four decades, many residents and fellows have graced our halls with their intelligence, dedication, and caring, often leaving deep and lasting impressions with our clients, who ask "where is____ now?" Here's an update on three of our amazing "graduates".

DR. LAURA SELMIC
SURGICAL ONCOLOGY AND RESEARCH FELLOW
2010-2013



After leaving CSU, I accepted a faculty position in soft tissue and oncologic surgery at the University of Illinois College of Veterinary Medicine. During my time at Illinois, I have enjoyed teaching students and house officers more about the different aspects of surgical oncology. In addition, I like helping our patients and clients make good decisions and navigate surgical cancer treatment. In July, I will be leaving my position at Illinois for a faculty position in surgical oncology at The Ohio State University.

I have many fond memories of my time at the Flint Animal Cancer Center. There are so many great people creating such a great atmosphere that surrounds the center. Everyone cares so much about the shared patients, clients, colleagues, and research. I look forward to bringing what I've learned from all of my experiences to my new position at OSU.

DR. MONIQUE MAYER
RADIATION ONCOLOGY RESIDENT
2002-2004

Following my training with Dr. Susan LaRue at the Flint Animal Cancer Center, I joined the faculty at the University of Saskatchewan, Western College of Veterinary Medicine. Today, I am a professor in the Department of Small Animal Clinical Sciences at WCVM. During my tenure here, I have helped to develop our radiation oncology program. The program includes radiation therapy services and teaching. It also involves collaborative research with other WCVM scientists and with human medicine researchers at the University of Saskatchewan's College of Medicine, at the Saskatoon Cancer Centre, and at other oncology centers in North America.

I love that my job gives me the opportunity to continue to learn. I still look to the Flint Animal Cancer Center for guidance on the best cancer treatments available based on evidence from their clinics.

DR. JIM PERRY
MEDICAL ONCOLOGY RESIDENT
2008-2010

Veterinary oncology and oncology in general are my passions, which is why I was happy to spend two years as a resident at the Flint Animal Cancer Center.

After graduation, I worked in private practice. During that time, I collaborated with human and comparative oncology researchers in the Seattle area.

Currently, I am an assistant professor of medical and surgical oncology at the comprehensive cancer center at the University of Pennsylvania. In this position, I collaborate with a vast network of expert researchers and clinicians (both medical and veterinary), which I find incredibly exciting.

The FACC provided me with a valuable foundation and perspective in veterinary oncology that has shaped my career and life. The camaraderie among the FACC faculty, and especially the staff, was one of a kind.

DINNER IN WHITE EVENT TO BENEFIT ONE CURE

Inspired by Diner Blanc held annually in Paris, Dinner in White balances the right mix of philanthropy, fellowship, and fun. Organized by the University of Colorado Cancer Center, the popular annual event raises funding for cancer research.
In 2018, the CU Cancer Center has generously offered to dedicate the stage to comparative oncology research to help both pets and people. All net proceeds from this year's event will benefit CSU's Flint Animal Cancer Center's One Cure initiative to fund comparative oncology clinical trials and other research.

For the first time, the event will be held in two locations: Denver and Fort Collins, Colo. This exclusive event also has a unique twist. Both outdoor locations will remain a secret until the day of the event, when all paid guests will be notified of the venue via email and social media. Like Diner Blanc in Paris, guests dress in all white and assemble for Colorado's biggest "pop-up party" of the year.

Sponsorship opportunities are available. Contact Dr. Christine Hardy for details, christine.hardy@colostate.edu. To learn more or purchase tickets for this intriguing event, please visit www.dinnerinwhite.com.

FACC Celebrates Opening of Radiation Oncology Planning Suite

Left to right: Dr. Keara Boss, radiation oncologist, and Amber Prebble, radiation therapy technician, examine Kapper in the new radiation oncology procedures room.

FOR NEARLY TWO YEARS, THE SOUNDS OF HAMMERS and drills mixed with barks and meows as construction crews worked to expand and remodel the Lucy Oncology Clinic at CSU's Flint Animal Cancer Center. On March 22, the center celebrated the exciting completion of the last phase of the project with the formal dedication of the new Radiation Oncology Planning Suite.

Grateful Flint Animal Cancer Center client, Jeff Neu, provided funding for the project. His dog, Lucy, received stereotactic radiation therapy in 2011 as part of a treatment protocol for metastatic osteosarcoma (bone cancer).

"Lucy was treated here with radiation for her osteosarcoma," said Neu. "She couldn't walk because of a tumor in her spine. Following her radiation, she walked out of the hospital – a true miracle!"

The renovation adds 1,400 square feet of space next to the existing Edward L. Gillette Radiation Oncology Suite, which houses the service's Varian Trilogy linear accelerator. The new Radiation Oncology Planning Suite includes a rounds room that also functions as a multi-station radiation therapy planning office, a client consult room, a resident office, a procedures room, a day patient room, and a patient kitchen, all in one integrated space.

"Veterinary radiation oncology is rapidly changing, with a focus toward SRT," said Dr. Susan LaRue, professor and radiation cancer biology and oncology section head. "As the leaders in veterinary oncology, it becomes more important than ever to advance the field with outcome-based studies and meaningful clinical trials. This project allows us the space to lead into the future."

In 2017, radiation oncology staff served 408 patients and performed nearly 1,900 treatments, a 35 percent increase since 2015.

"With the rising caseload over the last few years, a well-designed space improves efficiency within the clinic and helps the team continue to provide world-class and empathetic care to all," said Neu.

IN MEMORY OF LUCY

In 2010, Neu brought his beloved Rottweiler, Lucy, to the center for evaluation and care after Lucy lost her right hind leg to osteosarcoma. He knew the cancer might return and was determined to catch it early. At that time, the most sensitive diagnostic test to look for metastatic disease was a Positron

Emission Tomography-Computed Tomography scan. CSU's Flint Animal Cancer Center was the only veterinary hospital to house that type of unit. After Neu and Lucy traveled to CSU from their home in southern California, CSU's veterinary oncology team confirmed that Lucy's cancer was in remission and recommended follow-up PET-CT scans to monitor her condition. Days before a follow-up PET-CT scan scheduled eight months after her first, Lucy suddenly lost use of her hind limbs. The scan revealed new tumors in her spine, pelvis, and lungs.

Following this finding, Lucy received three high doses of stereotactic radiation therapy to manage the spread of the disease and shrink the tumors. Amazingly, after treatment, she walked out of the hospital. A scan in September 2011 found a new tumor in her liver and she received another dose of radiation to help slow the growth. In all, the radiation therapy extended Lucy's life and improved her quality of life for 17 months after her initial diagnosis, which is about five months longer than the average survival time.

"Lucy was my best friend, and I brought her to CSU for the very best veterinary cancer care available," said Neu, "They gave me more time with Lucy, and through this gift, I want to honor Lucy and help others receive the kind of care Lucy experienced."

STATE-OF-THE-ART VETERINARY ONCOLOGY CLINIC

The radiation oncology project complements the main oncology clinic remodel, which opened in December 2016. Both phases of construction were made possible by generous gifts from the Neu family, along with several others who contributed to name spaces within the clinic. The comprehensive, state-of-the-art clinic facilitates the Flint Animal Cancer Center's team-based approach to multi-modality patient care, in which medical, surgical, and radiation oncology specialists provide input in a single appointment for every patient.

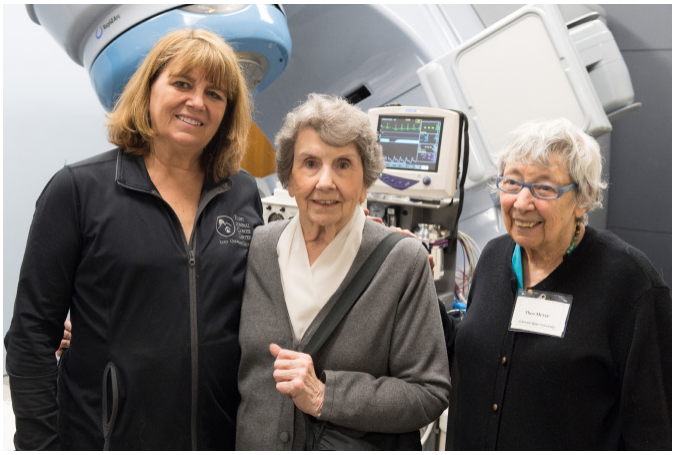
"The completion of this space fulfills my vision and commitment to ensuring the oncology team has the best space to work in to continue to provide unparalleled care," said Neu.

With 100 scientists, clinicians, and staff, the Flint Animal Cancer Center is the world's largest veterinary cancer center. The center has trained more surgical, medical, and radiation oncologists than any other veterinary institution in the world. Each year, the center serves more than 1,600 new patients and provides an additional 2,000 consultations.

"We are, once again, humbled and grateful to the Neu family for their transformative investment in the Flint Animal Cancer Center," said Dr. Rodney Page, director of CSU's Flint Animal Cancer Center. "The legacy that began with Dr. Ed Gillette 50 years ago is sustained with the opening of the Radiation Oncology Planning Suite of the Lucy Oncology Clinic. Our mission continues to drive the care, research, and education that distinguishes our program, and the new facility will support that mission for decades to come."

Left to right: Brothers and philanthropists, Robert and Jeff Neu, dedicate the new Radiation Oncology Planning Suite at the Lucy Oncology Clinic in March.

Visitors tour the spacious new radiation oncology rounds room.



Left to right: Dr. Susan LaRue, radiation cancer biology and oncology section head, shows off the new Radiation Oncology Planning Suite to her mom and friend.

Duke is enrolled in the Flint Animal Cancer Center's COXEN clinical trial.

A love of people, popcorn, and peanut butter fuel Duke's recovery from osteosarcoma

AFTER TAKING TIME TO MOURN THE LOSS OF THEIR beloved golden retriever, Bailey, who died of cancer at the age of 10, Heidi and Brad decided the time was right to bring a new fur family member home. They planned to surprise their three girls with the ultimate Christmas gift: a new puppy.

Plans changed in November when the couple learned about a litter of 10-week-old golden retrievers.

"When I went to visit the puppies, there were only two available, a boy and a girl," said Heidi. "Someone else was considering the female, and when I met this fluffy, adorable 10-week-old little guy, I knew I couldn't wait until Christmas." Duke joined their home soon after that first visit in the winter of 2010.

He quickly became the center of the family's world with his loving and chill personality.

"He is truly a lovable dog; he loves his family and people in general," shared Heidi and Brad.

"He just has this personality that attracts people," said Heidi. "I've never seen anything like it; strangers are drawn to him and will walk right up to him when we're out in public."

Duke also loves when the house is full of guests or when the girls' friends come to the house to play.

In addition to people, Duke has two other passions. "Duke loves popcorn and peanut butter," shared the couple's youngest daughter.

In November 2017, the family noticed a bump on Duke's left front leg. It didn't seem to bother him, so they continued to monitor. After returning home from a trip in early January, they noticed the bump had grown significantly. Concerned, they brought Duke to their veterinarian who performed a fine needle aspirate as well as X-rays. The results indicated osteosarcoma or bone cancer. Their veterinarian referred Duke and family to a veterinary oncologist to discuss treatment options. They learned about conventional treatments, as well as clinical trials, particularly two trials at CSU's Flint Animal Cancer Center.

While taking time to consider the treatment options, Brad talked to his brother, an orthopedic surgeon, who had friends at the Limb Preservation Foundation, an organization dedicated to the prevention and treatment of limb-threatening conditions. Through that connection, Brad learned about Dr. Nicole Ehrhart, a surgical oncologist at the Flint Animal Cancer Center, who has collaborated extensively with the Limb Preservation Foundation.

"All signs seemed to be pointing us to CSU," said Brad.

The family visited CSU's Flint Animal Cancer Center a few days later with intention of pursuing a clinical trial.

"We really wanted to participate in a clinical trial," said Brad. "We hoped it would help Duke as well as other dogs and possibly people in the future."

During their first visit, they met with members of the clinical trials team to learn more about the center's current clinical trials for patients with osteosarcoma. Pending the results of additional testing, the family considered two different trials. The goal of the first study is to investigate the effectiveness of a Listeria vaccine in delaying/preventing the spread of cancer following amputation and chemotherapy.

The goal of the second trial is to determine if dogs with osteosarcoma treated with chemotherapy protocols based on the sensitivity of the individual patient's cancer cells will have better outcomes compared to standard treatment. Prior to enrolling in either trial, Duke would need to have his front leg amputated to remove the primary tumor.

That day, the family also met with surgical oncologist, Dr. Deanna Worley, to learn more about Duke's upcoming surgery.

"We were surprised and grateful that we had a chance to talk to Duke's surgeon before the procedure," said Brad. "She was very informative and explained what the experience would be like, how things would go. She answered our questions and was very reassuring. After that conversation, we knew Duke was in good hands."

Three days later, following a successful surgery, Duke returned home to his family. Although he tired easily the first few days, it didn't take Duke long to get used to life as a tripawd.

"Through all of this, it's amazing how resilient and happy Duke has remained," said Brad.

Ultimately, Duke's family decided to enroll in the COXEN clinical trial, which personalizes Duke's chemotherapy protocol based on his specific tumor characteristics. The COXEN algorithm to detect drug sensitivity of cancer cells is proven in people, and clinicians at the Flint Animal Cancer Center are working to prove its efficacy in veterinary patients like Duke too. Duke started the trial three weeks after his surgery, receiving his first dose of doxorubicin, a type of chemotherapy. He returned three weeks later for blood work and his first dose of carboplatin, another type of chemo medication. To follow the clinical trial protocol, Duke will return every three weeks for several months to receive alternating doses of chemotherapy drugs. The clinical trials team will also monitor his blood work to ensure the chemotherapy isn't compromising his white blood cell count and perform X-rays to watch for metastasis.

"The clinical trials team is really impressive," said Brad. "They are quick to follow up and answer questions and are clearly dedicated to Duke's care."

"Duke is an incredible, trusting, and lovable boy," said Lindsay Carroll, clinical trials nurse. "Even if he isn't feeling well, he manages to make everyone around him happy. We are grateful to have him enrolled in a clinical trial with us."

Four months after surgery, Duke is doing well. He continues to enjoy his family, (shorter) walks, visits from people, and, of course, peanut butter and popcorn. "His personality has remained the same as it has always been," said Brad.

"I would recommend CSU to anyone whose pet is diagnosed with cancer," said Brad.

"Initially, this was a scary diagnosis to wrap our heads around, but after meeting Duke's surgeon and the clinical trials staff, we were really put at ease. Everyone is truly committed to providing the best care and outcome possible for Duke, and that means a lot."

Each year, approximately 8,000 dogs are diagnosed with osteosarcoma. The median survival rate for patients receiving standard of care is approximately 12 months. Clinical trials, such as the COXEN study, are looking at better ways to treat osteosarcoma and provide a longer and better quality of life for pet patients, with the goal of also helping people.

COXEN CLINICAL TRIAL FOR OSTEOSARCOMA

Osteosarcoma is a painful and aggressive cancer that originates in the bone. Current treatment options include amputation of the affected limb followed by chemotherapy to curb cancer metastasis. Recent studies have shown that cancer gene signatures, patterns of how genes are expressed within individual tumors, can predict whether a tumor will respond to a specific chemotherapy drug. Determining a tumor's gene signature allows patients to be treated with drugs most likely to provide the greatest therapeutic benefit.

Coexpression extrapolation, or COXEN, is a method of predicting the sensitivity of tumor cells to specific drugs based on genes expressed by the tumor. The use of this method can help us to determine which chemotherapy drug(s) may be most effective against a particular tumor.

The goal of the Predictive Models of Drug Response in Canine Osteosarcoma: A Prospective Clinical Trial Testing the COXEN Approach is to determine if dogs with osteosarcoma treated with chemotherapy protocols based on drug sensitivity determined by the COXEN method will have better outcomes compared to previous reports.

The three-year study is funded, in part, by the Morris Animal Foundation. To date, 52 canine patients have participated in the trial. The study is a first step toward a personalized medicine approach in dogs with bone cancer.

For more information about the COXEN clinical trial, please visit www.csuanimalcancercenter.org/current-clinical-trials.

Dr. Susan Lana, Stuart University Chair in Oncology with Kelsey.

Dr. Susan Lana named new holder of the Stuart University Chair in Oncology

IN A CEREMONY FILLED WITH SYMBOLISM and celebration, the Stuart University Chair in Oncology passed from Dr. Stephen Withrow, founding director of CSU's Flint Animal Cancer Center, to Dr. Susan Lana, oncology professor and clinical oncology service chief at CSU. Colorado State University confers chairs to a limited number of faculty to acknowledge outstanding scholarship and teaching practices, making the University Chair one of its highest honors.

The Stuart University Chair in Oncology was established in 2001 by the late E. Hadley Stuart, Jr., a longtime advocate and benefactor of the center. It was the first endowed chair in the College of Veterinary Medicine and Biomedical Sciences. Stuart's daughter, Nan Stuart, attended the ceremony with her golden retriever, Kelsey.

Stuart's initial gift has grown to exceed $3 million today. The endowment supports research, equipment, and programmatic infrastructure for the chair holder.

Withrow retired as director of the cancer center in July 2010, but continues to work in several capacities as he transitions to full retirement. He felt, however, it was time to transfer the honor and responsibility the chair represents.

"As the first chair holder, it is my honor to pass the torch to a trusted and valued colleague," said Withrow. "The chair will allow Dr. Lana the flexible funding to continue her valuable work in comparative oncology."

In considering the transfer of the chair, cancer center leaders felt it was important to honor the purpose of the chair, which recognizes excellence in patient care as well as a true understanding of what compassionate care is all about.

"It was essential to select a person who embodies the values of vision, integrity, and passion, which have guided Dr. Withrow's tenure as the chair holder until now. The selection committee agreed that Dr. Lana is an exemplary recipient," said Dr. Rodney Page, director of the Flint Animal Cancer Center and holder of the Stephen J. Withrow Presidential Chair in Oncology,

"It's an amazing honor," said Lana. "It is also very humbling that the current chair, Dr. Steve Withrow, trusts me to continue his legacy and that the Stuart family trusts me as well."

Lana completed her D.V.M. at CSU in 1993. Following graduation, she attended Texas A&M University for a small-animal internship and then returned to CSU for a residency in medical oncology. She joined the CSU faculty in 1999.

In addition to teaching, Lana is responsible for the strategic vision of the oncology service as the oncology section chief, and working with staff to provide unparalleled care to cancer patients and their humans. She has mentored dozens of oncology specialist trainees and innumerable veterinary students.

"My priority has always been clinical service," said Lana. "With the resources provided by this position, I intend to maintain and build upon the culture Dr. Withrow established, and continue our multi-modality approach to providing comprehensive and compassionate care."

HONOR ROLL, SPRING 2018

Generous giving from the private sector to the Colorado State University Robert H. and Mary G. Flint Animal Cancer Center has become increasingly important over the years. The following individuals (in alphabetical order) are especially noteworthy in that they have given once, or in a sustained way, more than $25,000 to support the efforts of the CSU Flint Animal Cancer Center. Our heartfelt appreciation goes out to them.

Allen & Company Inc.
Herbert A. Allen
Brett and Dawn Anderson
Anschutz Foundation
Libby Anschutz
Philip Anschutz
John H.* and Raeia J.* Bell
Bow Wow Buddies Foundation
Timothy Brown
Don* and Katy Callender
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Rosamond R. Zetterholm*

*Deceased

We are grateful to the following individuals for honoring the Flint Animal Cancer Center in their estate planning.

Vikki and Arthur Anderson
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Julie Tyger
Jacqui and Russell Widener

THANK YOU FOR MAKING OUR WORK POSSIBLE!

2017 Impact

1,660
NEW PATIENTS

6,056
PATIENT VISITS

31
Clinical Trials

1,923
ONLINE CONSULTS

3,788
Chemotherapy and radiation therapy treatments

FLINT ANIMAL CANCER CENTER
COLORADO STATE UNIVERSITY

James L. Voss Veterinary Teaching Hospital
300 W. Drake Road, Fort Collins, Colorado 80523

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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 researchers look for new treatment options that benefit our pet patients – and people too. Your support is critical to our continued work. Please visit onecure.com to learn more.

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