



Tiffany Tse, a first-year veterinary student, has worked on feline viruses in Dr. Patricia Pesavento's lab as an undergraduate and was a co-author on a recent paper in the journal *Viruses*.



## FELINE Virus Hunters

Researchers in Dr. Patricia Pesavento's lab have spent the past decade investigating novel viruses in cats. Recently, they found that the newly discovered feline hepadnavirus is associated with hepatocellular carcinoma (HCC) and hepatitis in cats, which mirrors Hepatitis B virus infection in humans.

Methods of viral discovery and detection are increasingly sensitive, but detection alone doesn't explain how or whether a viral infection is impacting our cats.

"You have to have the right type of virus, (like hepadnavirus) in the right place (liver) for a long time to contribute to cancer," Pesavento said.

In other words, there are a multitude of viruses in cats and other species that don't appear to cause any disease process, or only do so when the right conditions are present, such as advanced age or a compromised immune

***"I love that cats are on the cutting edge of persistent virus research..."***

– Patty Pesavento



**UC DAVIS**

**VETERINARY MEDICINE**

Center for Companion Animal Health

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**LEADING VETERINARY MEDICINE, ADDRESSING SOCIETAL NEEDS**

# A Message from **THE DIRECTOR**

**C**are—it's a small four-letter word, yet it defines everything we do. It is the compassionate care we provide to our patients and their families, the compelling care that drives us to help change shelter management and reduce euthanasia, and the intellectual care we take in conducting research vital to changing the course of a disease. How do we make a positive impact on animal health? Simple. We do whatever it takes. We start by finding the brightest, most talented, caring people and make sure they have the resources to do their work.

The [CCAH](#) has embraced the need to incubate new programs that impact animal health, leading us to build the world's first hemodialysis center and develop a physical therapy center—both now part of the teaching hospital. The Koret Shelter Medicine Program was created to guide shelters in management practices to make them healthier and safer, thereby avoiding disease spread, decreasing euthanasia, and increasing adoption rates. These types of programs serve as models around the world, making even bigger impact and spreading our care.

However, all of this is only half of the caring equation. The other half is the resources to sustain these efforts. It is the care shown by others who make all this possible. It is our individual donors who support us year after year, the clinics who partner with us and give through the Companion Animal Memorial Fund, and the foundations who recognize the value of the work we do that make all this possible.

Care is the reason we exist and continue to work toward our goals – better health, less disease, and quality longevity. In other words, animal health and wellness.

Sincerely,

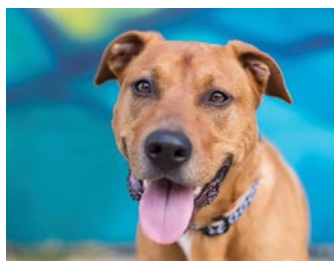


Michael S. Kent, MAS, DVM, DACVIM, DACVR  
Director, Center for Companion Animal Health



## Seeking Healthy Dogs for **CANCER VACCINE STUDY**

[UC Davis](#) is on the forefront of preventing cancer in our canine companions by joining the national Vaccination Against Canine Cancer Study (VACCS). The school's Veterinary Center for Clinical Trials is one of three participants in VACCS to evaluate a new strategy for the prevention—rather than treatment—of cancer in dogs.



Cancer is the leading cause of death in dogs (accounting for approximately 30 percent), and this will be the largest canine cancer clinical trial conducted to date. UC Davis joins collaborators at the University of Wisconsin and Colorado State University with the goal of enrolling a total of 800 dogs nationwide. UC Davis' portion of the goal is 275 dogs. Nationwide, approximately 200 dogs have enrolled to date.

The dogs will be randomized to receive either a series of vaccines similar to other routine vaccines, or placebo

vaccines. Dogs will live at home and be checked 2-3 times annually for five years after enrollment. A financial incentive will be offered to defray the cost associated with diagnostics and treatment of any cancers that dogs may develop, regardless of whether they are receiving a vaccine or placebo.

Dogs must meet the following criteria:

- Healthy, with no history of previous cancer
- Aged between 6 and 10 years
- Weigh at least 11 pounds (5kg)
- Be mixed breed, or one of 49 pure bred dogs (see the complete list of eligible breeds at the link below)
- Live within 150 miles of UC Davis
- Have visited a veterinarian within 12 months of study entry, and have three years of previous medical history available for review

In addition to potentially providing a new strategy for cancer prevention in dogs, this study could offer important justification for looking at a similar approach in humans.

For more information on the [VACCS trial](#) and to see if your dog is eligible, please visit [studypages.com/ucdavisvet](http://studypages.com/ucdavisvet).



# SAVING LIVES Close to Home

The [Koret Shelter Medicine Program](#) (KSMP) is on a mission to save lives. Since the program's launch in 2001, KSMP veterinarians have consulted with shelter personnel throughout the U.S. and Canada (and this year Australia), sharing their science-based approach to shelter management that improves care and enables more animals to be helped.

While it may be difficult to quantify how many lives they have saved far from home, KSMP's decade-long partnership with Yolo County Animal Services (YCAS) has seen measurable results. When Dr. Cindi Delany took over as YCAS Director in 2011, she put the KSMP principles into practice. A proud "data nerd," Delany ran the numbers and compiled detailed reports on the 4000+ animals coming into the shelter annually.

She found that the average amount of time animals spent in the shelter, known as their Length of Stay (LOS), was too long. No matter how nice and clean a shelter is, it's not a fun place for a dog or cat to stay for months on end. And not enough cats and dogs were making it out of the shelter alive. So, Delany went to work, first implementing changes that could lead to "easy, big wins," then dealing with progressively more difficult problems.

By the end of her tenure there in 2019, cat adoption rates had quadrupled and LOS had dropped by more than two-thirds. Dog adoption rates more than doubled.

"Nothing brings us more joy than teaching a shelter what we know works, and watching them add their own knowledge and experience to bring



RVT Emma Hewitt provides surgical support at Yolo County Animal Services.

their shelter up to its full lifesaving capacity," said Program Director Dr. Kate Hurley. "We're grateful that CCAH donors contribute to making that happen right in our own backyard."

Though Delany returned to campus late last year to deploy her data skills for multiple shelters, the KSMP connection with Yolo remains.

Dr. Stacy Kraus continues to act as [Chief of Service](#), where she supervises the clinical training of 55 UC Davis veterinary students during their 4th year shelter medicine and surgery rotation. RVT Emma Hewitt remains onboard as a surgical support technician.

At the beginning of this year, the KSMP welcomed several new members to the YCAS team: Chrissy Teuscher, Joseph Redmond, and Katie Blancett began serving as animal health technicians. Teuscher had already worked at the shelter in a variety of different capacities since 2012. Redmond, who earned a B.S. in Animal Science from UC Davis, was a vet assistant at a private clinic in Dixon before jumping into the shelter world. Blancett, who volunteered at vaccine clinics while attending the Yuba College Veterinary Technician program, says working in a shelter setting is a dream come true.

The latest addition to the YCAS team is Dr. Jennifer Kwan, who was excited to join as a veterinarian in February. She had been working as a Bay Area shelter veterinarian since 2013, most recently providing on-site assistance to Berkeley Animal Care Services.

◀ Joseph Redmond joined the Yolo County Animal Services this year as a veterinary technician. He received his B.S. in Animal Science from UC Davis.



# Improving Pain Management FOLLOWING AMPUTATION



When Dr. Erin Gibson came to UC Davis for her residency in soft tissue surgery nearly three years ago, she had limited experience in research. Thanks to the support and resources provided by the CCAH, she has participated in two research studies and is now pursuing a path in academia where she can continue working as a clinician scientist.

Gibson's current study is focused on evaluating a long-acting non-opioid local anesthetic for pain control in dogs following front leg amputation.

Gibson collaborated with Dr. Ingrid Balsa, assistant professor of clinical soft tissue surgery, to design the study through the school's Veterinary Center for Clinical Trials.

▶ Dr. Erin Gibson (left) and Dr. Ingrid Balsa with Magnus, a dog that participated in their clinical trial on pain management following amputation.

## Feline Virus Hunters Continued from page 1

system. In many cases, Pesavento said, researchers know very little about the viruses they discover. How do they persist? What is their target tissue? How do some cause cancer? What makes some infections incidental, and others fatal?

Thanks to CCAH support, Pesavento's lab has been able to expand the scope of studying individual viruses to looking at polymicrobial infections—conditions caused by a multitude of pathogens including persistent viruses. These persistent viruses are often overlooked in the veterinary diagnostic world.

"If they don't cause disease in every animal, then we ignore them, and we just can't," Pesavento said. "The horizon of diagnostics is to understand the whole virome—all of the viral passengers that live in the cat."

The Pesavento lab's approach to looking at the bigger picture of cat liver health also drew attention and funding from the Winn Feline Foundation for a collaboration between Pesavento and Dr. Julia Beatty, professor at City University Veterinary School, Hong Kong.

For cat owners, this research translates into being able to predict, at an earlier time in life, whether a cat is susceptible to chronic liver or potentially kidney disease, for example, depending on the viruses they carry.

Pesavento explained this recent hepadnavirus discovery isn't unrelated to other persistent feline disease. For example, lymphoma is quite common in cats, and in humans some types of lymphoma are caused by viruses. It is possible that cats with liver inflammation are immunosuppressed, and that other viruses are taking advantage of this as well.

"I love that cats are on the cutting edge of persistent virus research—it's an area with big open questions in medicine of all animals," Pesavento said. "These viruses are difficult to study in a dish, since they have evolved for millennia to hide in our cells. What are these viruses doing? How do they contribute as a whole to our health—for good or for bad? It might be that if you have a persistent virus you are healthier and you can react better to some other challenge—we just don't know. I love that about persistent viruses. I'll never solve these questions in a hundred lifetimes, but they're fascinating."



Balsa explained the reasons behind this study are three-fold: 1) conduct a clinical trial to provide data on effects of a local, non-opioid analgesic medication not previously used in amputation patients; 2) potentially decrease opioid consumption and the known side effects of opioids such as sedation, vomiting, and lack of appetite; and 3) serve as good stewards of opioid administration during a national crisis and shortage while not compromising patient care.

Currently, six dogs have completed the trial. Gibson and Balsa hope to enroll a total of 14 large breed dogs, aged six or older. Generous donors to the CCAH covered the expenses for the pain medications used in the study and helped defray some hospital costs.

“We hope that we can show this drug decreases the amount of opioids needed in dogs following this

surgery,” Balsa said. “Or not. If it doesn’t decrease opioid consumption, that’s also important information for veterinarians.”

Gibson said the process of submitting a grant to the CCAH for this study was helpful in her decision to stay in academia, as the supportive process allowed for edits and improvement.

“In the scheme of clinical trials, this is a smaller one,” Gibson said. “But I’m excited about the information we’re gathering and the potential implications for patients in the future.”

For more information on this [trial](#), please contact either Dr. Ingrid Balsa, [imbalsa@ucdavis.edu](mailto:imbalsa@ucdavis.edu) or Dr. Erin Gibson, [egibson@ucdavis.edu](mailto:egibson@ucdavis.edu).

## HEARTFELT GIVING to Advance Feline Health

**L**in Zucconi’s devotion to her three Abyssinian cats is well known throughout the CCAH. She drives more than 100 miles each way to and from her home in Truckee to ensure that Doc, Itsybelle and Pinky receive the best possible care at the UC Davis [veterinary hospital](#).

Doc and Itsybelle contracted feline herpes virus in utero that resulted in significantly impaired vision. Doc also has early stage chronic renal failure, a common disease in older cats.

“I just love cats in general and would like to do whatever I can to help make their lives healthier and happier,” Zucconi said. “It breaks my heart whenever I see a cat in need of a home, or one that is ill and not well cared for.”

Determined to help find preventions and cures for chronic feline diseases, Zucconi recently contributed a gift to the CCAH to establish the Zucconi Feline Family Support Fund. In addition, she is ensuring that the impact of feline health research will continue for generations through a planned gift to the CCAH.

Zucconi’s passion for companion animal welfare also compelled her to serve as an

advocate for feline health and medicine, and as a member of the school’s Dean’s Leadership Council.

“The infinite joy I receive from my cats has inspired me to [support the CCAH](#) over the years in pursuit of research breakthroughs that bring new hope for animals and their families,” Zucconi said.

Lin Zucconi and one of her cats, Pinky, recently visited Dr. Michael Kent. ▶



# ADVANCING FRACTURE REPAIR in Small Dogs

When Dr. Denis Marcellin-Little joined the school as a professor of orthopedic surgery in 2017, he brought fresh ideas to develop alternative options for fracture repair. Thanks to donations from CCAH patrons, those concepts will soon be brought to light with new equipment for the [JD Wheat Veterinary Orthopedic Research Laboratory \(VORL\)](#). This equipment will help him and biomedical engineers create and research custom implants to revolutionize fracture repair in small dogs whose legs easily break.

A key piece of equipment is a computer numerical control (CNC) milling machine, which fabricates a piece of metal or other material (such as a polymer) into a specific object based on programmed instructions – similar to 3D printing technology. Marcellin-Little will utilize the CNC expertise to machine specific plates to repair a dog's broken radius (bone).

"Commercially available metal plates work great in many instances," Marcellin-Little said. "But sometimes they are too stiff for small bones or don't work well for a dog whose bone has a unique geometry. Ideally, we would 3D print a plate, but it's very complicated. CNC machining in-house offers us an alternative to design custom plates. But only after trusting that the plate is optimized for fracture repair can we then move into deformity correction."

Before the CNC machine directly advances patient care, it will create different plates to be studied. Material options will include polyether ether ketone (PEEK) (a promising, high



Dr. Denis Marcellin-Little with Dexter, an orthopedic surgery patient.

performance polymer that is well tolerated by the body), polycarbonate (a non-resorbable polymer that might be easier to use), and stainless steel. Marcellin-Little feels that PEEK may become the obvious choice to replace metal to improve small dog fracture repair.

Of course, these newly fabricated plates will need to be tested. CCAH grant funding is also being used to 3D print small dog radii that are comparable to cadaver bones and validated to behave like real bones.

"The value of using manufactured bones to test the plates is that they are created equally against each other, unlike real bones," Marcellin-Little said. "How can you truly test if one plate is better than another if the environment in which you're testing them is not the same?"

3D printing of the bones creates a research environment that is 10 times more consistent than using cadavers."

The printed bones are then broken and fitted with various plates to test which is best. This plate research could drastically change the way orthopedic surgeons handle fractures that are not healing and may lead to amputations.

"CCAH funding is making a profound positive impact," Marcellin-Little said. "These projects are seeds for growth. We're not just creating better plates, we're developing an environment where we can do a better job of testing their long-term value."



Donations to CCAH will help create bone plates similar to this example.

## THE CCAH at Work

### 138

#### Faculty Projects

Dog .....	90
Cats .....	36
Bird .....	3
Rabbit .....	3
Fish .....	1
Multispecies .....	5

### 28

#### Resident Projects

Dog .....	17
Cat .....	5
Bird .....	1
Rabbit .....	1
Fish .....	1
Multispecies .....	3

#### 29 Major Pieces of Equipment

Purchased, Totaling: **\$340,277**



To see our complete Annual Report for 2019, please visit us at: [ccah.vetmed.ucdavis.edu/news/ccah-annual-report](https://ccah.vetmed.ucdavis.edu/news/ccah-annual-report)





# THANK YOU!

## Companion Animal **MEMORIAL FUND HONOR ROLL**

Thank you to our [Companion Animal Memorial Fund](#) veterinary partners. Through your nearly 33,000 meaningful tributes last year, you honored the memory of beloved pets and brought comfort to their caring families. Your gifts have also made an impact on improving animal health—enabling us to make great strides in advancing cancer treatment, identifying genetic causes of disease, saving shelter animals, and discovering other life-saving knowledge and treatments. The following partners contributed \$400 or more from January to December 2019.

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Acorn Veterinary Clinic, Inc.  
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