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ANNUAL REPORT

Center for Companion
Animal Health

2023

DIRECTOR'S MESSAGE

Greetings!

It is my pleasure to present you with this year's annual report. It is our chance to provide you an overview of what we have accomplished together in the last year as well as look toward the future by announcing newly funded studies. Keeping you up to date is an essential part of our work. As an animal lover, you should be aware of our latest research and the impact we are making. As a donor, you should know we are using your funds wisely and putting them to work as we fight to prevent, diagnose and treat animal diseases.

Through your donations, the Center for Companion Animal Health (CAAH) supports vital animal research that is not available elsewhere or through other means. Your funds buy the equipment we need and make possible the individual projects – both pilot studies and larger clinical trials – that lead to breakthroughs in companion animal health. Our grant programs also help train the next generation of researchers and specialists. One hundred percent of our funding is from donors like you.

I have led the CCAH for the last 10 years and am honored to work with my team, our scientific advisory board and all of you who believe in our mission and goals. Because of your support, we have been able to increase the funding of our resident grant program, we started an equipment fund and have been able to issue several large grant calls. The CCAH remains strong and healthy, with funding increasing each year. Thanks to your commitment, we have been able to consistently award more than \$1,500,000 annually. Importantly, we have also increased our endowment earnings from \$428,000 per year to just over \$1,400,000 this past year – an increase of almost \$1 million a year. This ensures our long-term future and strengthens our ability to carry out our work on behalf of animals and the people who care for them.

Thank you for your continued and ongoing support. This coming year is bringing exciting new developments as well, which we will share with you through our newsletters, mailers and of course next year's annual report.



Michael S. Kent, MAS, DVM, DACVIM, DACVR, ECVDI (RO - Add on)
Director, Center for Companion Animal Health
UC Davis, School of Veterinary Medicine

Front cover - Nico Pryt
courtesy photo

Animal photographer
Don Preisler
SVM Photographer

Back cover - Scramble Finno-Katzman
photo credit: Callie Wilcox

The Koret Shelter Medicine Program (KSMP) under the CCAH developed one of the first Shelter Medicine Programs in the Country. Today the student training program focuses on training senior veterinary students in shelter medicine and surgery with learning objectives primarily centered around High-Volume, High-Quality Spay/Neuter (HQHVSN) and population medicine.

Currently, spay/neuter services for free-roaming community cats is in greater demand than the industry can support, especially within the local communities of Yolo County, where UC Davis is located. A new opportunity to utilize a central University location has broadened the department's outreach to better assist local and regional animal welfare organizations with alleviating the current spay/neuter shortage crisis.

The impacts of offering this essential service for the School of Veterinary Medicine's Shelter Student Training Program will be profound. Teaching principles of High-Quality, High-Volume Spay/Neuter to future veterinarians will not only have an immediate benefit to the community and animals that lack access to veterinary care, it will also create lasting and exponentially sustainable effects for the industry in the foreseeable future.

Since the Shelter Student Training Program began operations at the University location in July 2023, they have accomplished spay/neuter services on nearly 500 animals, and are excited at the prospect of growing this essential service and training program!

“***By giving a home to emergent programs like Shelter Medicine, the CCAH supports breakthroughs in animal health that not only save countless lives, they have changed the landscape of the veterinary profession. When the CCAH took a chance on Shelter Medicine 20 years ago, most people had never even heard those words spoken together. Now Shelter Medicine is a recognized veterinary specialty and an established part of the curriculum at veterinary schools across the country.***

***Kate F. Hurley, DVM, MPVM, Dip. ABVP
Director - Koret Shelter Medicine Program***



Student Training Program participants spay a kitten before adoption.

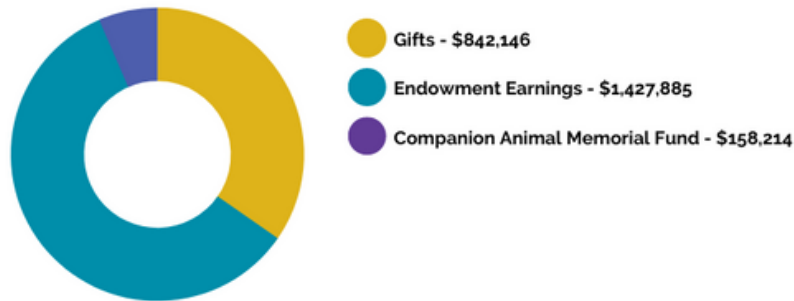


We are excited to introduce Karis Chun, who has joined our administrative team here at the CCAH. Karis is a third-year Redwood SEED (Supported Education to Elevate Diversity) Scholars student attending UC Davis from Southern California. She enjoys drawing and helping others in her free time. Karis' organizational, communication and administrative skills have been a valuable asset to the CCAH team. We are so happy that Karis has joined our team and will help contribute to our cause of improving animal health!

To learn more about the Redwood SEED Scholars Program:
redwoodseed.ucdavis.edu

The CCAH has granted over **\$30** million to faculty and residents for companion animal research studies since the program's inception, including a program that encourages extramural funding from external agencies and organizations through fund matching.

CCAH Income
July 1, 2022 - June 30, 2023



CCAH Research Support
July 1, 2022 - June 30, 2023

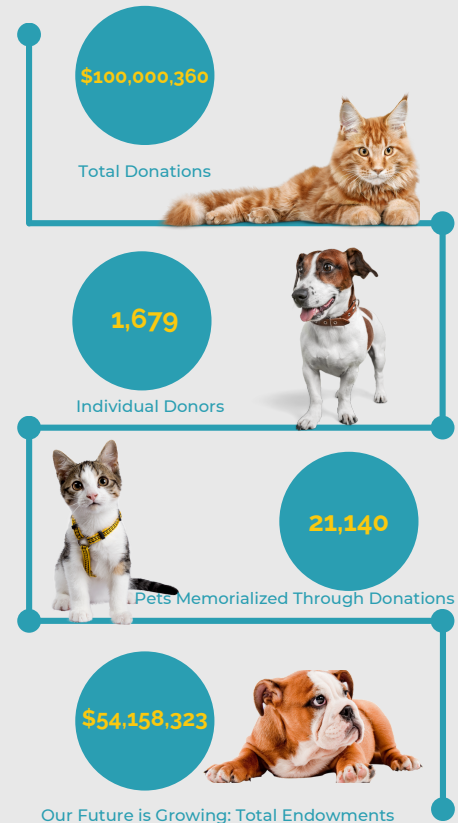


\$259,452
received in
extramural
research grants
leveraging CCAH
matching funds
FY22-23

“*Donors are essential to support clinically applicable research focusing on benefiting animals as there is limited funding available for this type of research. Many faculty in the clinical disciplines rely heavily on CCAH and its donor for funding research that impacts clinical practice.*

*Bruno Pypendop, DrMedVet,
DrVetSci, DACVAA
Professor - Anesthesiology*

2022-2023 DONOR SUPPORT



We are extremely grateful for every gift in support of our mission to improve the health of companion animals!

100% CHARGED BY YOUR SUPPORT

YOU MAKE INNOVATION POSSIBLE

ACADEMIC RESEARCH BY FACULTY MEMBERS

Thanks to you, our faculty has been awarded fifty grants in 2022-2023 to support cutting-edge research in order to advance veterinary best practices for dogs, cats, and other companion animals.

FOSTERING THE FUTURE GENERATION OF ANIMAL DISEASE PRACTITIONERS

Our research programs provide residents with a chance to conduct significant research in their specialized fields under the mentorship of experienced faculty members, guiding the next cohort of professionals dedicated to animal diseases.

EQUIPMENT FOR RESEARCH PURPOSES

To facilitate animal health research, it's crucial to have the necessary equipment. Our faculty relies on research equipment grants to fund new purchases, as well as repair or replace outdated equipment.

The CCAH is fully funded by donations from individuals, veterinary practitioners, pet-related industries, and private foundations. Through individual gifts and the growth of our endowments given by people and organizations committed to supporting animal health, we are able to provide research support to our faculty and residents.

CCAH Leadership & Administrative Team



Michael S. Kent, MAS, DVM, DACVIM, DACVR
CCAH Director

Dr. Kent is a specialist in radiation oncology whose main research interest is in radioimmunotherapy, specifically combining radiation along with immunotherapy to treat cancer. Dr. Kent started the stereotactic radiosurgery program at UC Davis. His clinical interests include advanced radiation techniques to improve clinical outcomes. He has a dog named Danson who is a career-change service dog, seahorses, fish and will soon be adopting a cat.



Rob Rebhun, DVM, PhD, Dip. ACVIM (Oncology)
CCAH Associate Director - Cancer

Dr. Rebhun's research includes comparative and translational oncology, veterinary clinical trials, novel cancer therapeutics, cancer immunotherapy, and canine longevity. He and his family have a variety of pets, including dogs, cats, and a guinea pig.



Kate F. Hurley, DVM, MPVM, Dip. ABVP (Shelter Medicine)
CCAH Associate Director - Shelter Medicine

Dr. Hurley's main research interest focuses on the relationship between environment, health, and reducing shelter euthanasia, as well as effective strategies to manage community cats. Her clinical focus is collaborating with shelters to improve conditions for the animals and staff, reducing the number of animals euthanized and increasing the number of animals safe in their homes. She has a one-eyed orange cat who believes he's a pirate, a small orange dog and a rotating assortment of foster pets.



Danika Bannasch, DVM, PhD
CCAH Associate Director - Genetics

Dr. Bannasch's main research focus is understanding the basis for inherited diseases in dogs. She also serves as the associate dean of research and graduate education and the Maxine Adler Endowed Chair in Genetics. She currently has two Nova Scotia duck tolling retrievers named Pint (the retired UC Davis Aggie Tee dog) and Ritz as well as two Danish-Swedish farm dogs named Cricket and Juice.



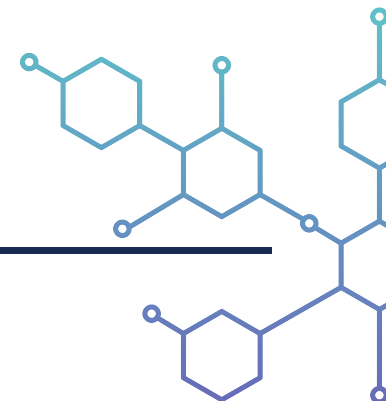
Nancy Bei
Center Manager



Lyra Pineda-Nelson
Account Manager



Karis Chun
Student Assistant

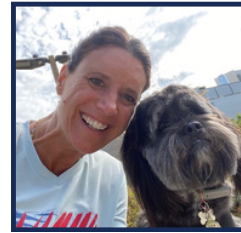


CCAH Scientific Advisory Committee



William T. N. Culp, VMD, DACVS

Dr. Culp's primary research and clinical focus includes surgical oncology as well as interventional radiology. He currently has two dogs named Louie and Lucas, two cats named Orrie and Butters, two guinea pigs named Lettuce and Cilantro, and many fish.



Jodi Westropp, DVM, PhD, DACVIM

Dr. Westropp's primary research focus includes various lower urinary tract disorders in dogs and cats, including novel therapies for bacterial cystitis, pathogenesis and treatment for urolithiasis and feline interstitial cystitis. She is also the director of the Gerald V. Ling Urinary Stone Analysis Laboratory and the director of the Center for Continuing Professional Education at UC Davis. She has two dogs, Clarence and Kevin, and two Nigerian Dwarf Goats named Lois and Audrey.



Denis Marcellin-Little, DEDV

Dr. Marcellin-Little is a veterinary orthopedic surgeon. He is interim chair of the Department of Veterinary Surgical and Radiological Sciences and interim co-director of the JD Wheat Veterinary Orthopedic Research Laboratory. Dr. Marcellin-Little's main clinical focus is small animal orthopedic surgery, specifically the management of joint disease and limb deformities. His clinical research includes the pathophysiology, impact, and management of chronic pain and the use of digital tools, such as 3D printing and computer-aided design (CAD) software, to manage complex orthopedic problems. He has a dog and a cat.



Luke A. Wittenburg, D.V.M, Ph.D, DACVCP

Dr. Wittenburg's main research is investigating transcription factor protein interactions in canine and human osteosarcoma, elucidating novel cellular roles for some of these proteins, and attempting to identify novel therapeutic targets based on these results. The Pharmacology Research Core is a part of his lab and focuses on supporting pharmacokinetic and pharmacodynamic research throughout the UC Davis veterinary and Comprehensive Cancer Center communities. His clinical interests consist of clinical pharmacology of anticancer agents. He and his family have four cats, three dogs, three ducks, two ball pythons, a leopard tortoise, a crested gecko and twelve fish.



Bruno Pypendop, DrMedVet, DrVetSci, DACVAA

Dr. Pypendop's main clinical focus includes anesthesia and pain management. His core research interest consists of the clinical pharmacology of anesthetic and analgesic drugs, particularly in cats. He currently serves as interim executive associate dean of the School of Veterinary Medicine. His pets include three dogs, four cats, three horses, one donkey, eight chickens, three guinea pigs, and several freshwater fish.



Natalia Vapniarsky, DVM, PhD, DACVP

Dr. Vapniarsky's primary research focus is on regeneration of tissues, in particular the immunological interface between tissue-engineered implants or stem cells and the recipient. Her clinical interests include musculoskeletal and maxillofacial pathology. She serves on the admissions committee for both graduate groups and as an academic advisor for integrative pathobiology graduate students. In addition, Dr. Vapniarsky serves on the House Officer Advisory Board and Graduate Clinical Education Committee. Dogs are her favorite animal, and she owns a small terrier mix named Daisy as well as a German shepard named Ragnar.

“As a committee, we strive to fulfill the CCAH mission and provide support to all the areas where it is needed. We aim to maintain a level of excellence in research and support investigators, clients and patients.”
William T. N. Culp, VMD, DACVS
Professor - Surgical Oncology

COMPANION ANIMAL MEMORIAL FUND

Thank you to our Companion Animal Memorial Fund veterinary partners for making a difference! Through your meaningful tributes, you honored the memory of beloved pets and brought comfort to their caring families. Your donations made a tremendous impact supporting clinical health research to improve treatment for diseases affecting companion animals. We are pleased to recognize the 200 veterinarians and clinics who raised over \$158,000.

A Gentle Rest
Acorn Hills Animal Center
Acorn Veterinary Clinic, Inc.
Adobe Veterinary Centers, LP
Aggie Animal Dental Center
Agoura Animal Clinic, Inc.
All Creatures Animal Hospital & Bird Clinic
All Creatures Veterinary Hospital
Alto Tiburon AVC, Inc.
Amador Valley Veterinary Center, Inc.
Amy L. Peyton, DVM
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Animal Clinic of Encino
Animal Doctors
Animal Hospital of Cloverdale
Animal Hospital of Sebastopol
Animal Medical Center
Anza Animal Clinic, Inc.
Aragon Veterinary Clinic, Inc.
Ark Veterinary Hospitals, Inc.
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B & B Veterinary Hospital, Inc.
Balboa Pet Hospital
Bay Area Animal Eye Care, Fremont
Bay Area Animal Eye Care, Pleasanton
Bear Valley Animal Clinic
Bel Marin Animal Hospital
Bird & Pet Clinic of Roseville
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Bishop Veterinary Hospital, Inc.
Blue Cross Pet Hospital
Blue Cross Veterinary Hospital
Blue Cross Veterinary Hospital, Inc.
Blue Oak Veterinary Hospital, Inc.
Blue River PetCare
Brandner Veterinary Hospital, Inc.
Broadway Pet Hospital, Inc.
Camarosa Veterinary Clinic
Cambria Veterinary Clinic
Camino Real Pet Clinic, Inc.
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Cat Clinic
Cats Only Veterinary Hospital, Inc.
Cedar Veterinary Hospital
Central Coast Veterinary Acupuncture
Ceres Veterinary Clinic, Inc.
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Dr. Evelyn Brand
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El Cerrito Veterinary Hospital
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Evergreen Veterinary Clinic
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Global Veterinary Services, PLLC
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VCA McClave Veterinary Hospital, Inc.
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Veterinary Medical Center, Inc.
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Village Square Woodside Veterinary Hospital
Village Veterinary Clinic, Inc.
Village Veterinary Clinic, Lompoc
Village Veterinary Hospital, Escondido
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Walnut Creek Veterinary Hospital
Waterhouse Animal Hospital, Inc.
White's Pet Hospital
Wikiup Veterinary Hospital
Willow Rock Pet Hospital, Inc.
Woodside Veterinary Clinic



FRIENDS OF COMPANION ANIMAL HONOR ROLL

We extend our heartfelt gratitude to our friends for making a difference in the lives of beloved animal companions. Your support helps us continue our vital work to make their lives better, healthier and longer. It's your dedication and compassion that drive us forward, and we are truly grateful for your generosity. We are pleased to recognize those who contributed \$1,000 or more to the Center for Companion Animal Health from July 2022 to June 2023.

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 Maxine Adler Estate
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“CAAH funding provides critical support to new and established investigators alike, allowing for expansion into new research areas as well as providing a crucial step in the generation of preliminary data for larger, externally funded projects. In the current funding climate in which it is increasingly difficult to secure funding from external sources, CCAH funding allows UC Davis faculty and resident researchers to continue pursuing projects that will improve the lives of pets.”

***Luke A. Wittenburg, D.V.M, Ph.D, DACVCP
 Associate Professor - Clinical Pharmacology***

Trinket Young
Clinical Trials



CURRENT DOG RESEARCH STUDIES



Newly Funded Research Studies for FY 2023-2024

Cancer

Interrogation of downstream OLFML3 signaling in canine glioma: a comparative approach

Canine gliomas are a common and lethal brain tumor. Even with aggressive treatment, most dogs typically survive a mere 9-15 months after diagnosis, highlighting the critical need for new treatment strategies. We have already demonstrated that olfactomedin-like 3 (OLFML3), a protein secreted from brain immune cells, increases migration and invasion capacity of gliomas. We are actively working to develop new therapies targeting OLFML3, but we need to further understand how OLFML3 works. We have shown that OLFML3 up-regulates the same tumor supportive genes in canine and human glioma cells. The pathways leading to these gene up-regulations are not known. Therefore, this study is evaluating which pathways are directly affected by OLFML3 treatment and which pathways are shared across species. We will further evaluate these pathways in dog tumor samples to correlate pathway activation with OLFML3 levels.

The effects of inhaled rhIL-15 therapy on pulmonary micro-metastasis of osteosarcoma

Osteosarcoma in dogs is almost always fatal due to a high rate of lung metastasis in these patients. Unfortunately, no significant advancements in treatment have been made over the last 30 years. As such, there is a need for investigating alternative treatments, such as immunotherapy. A recent UC Davis clinical trial in dogs used an immune-activating protein called IL-15 to treat osteosarcoma lung metastasis by delivering the IL-15 medicine directly to the lungs via inhalation of a vaporized formula. Results from this clinical trial showed that some patients with relatively large metastatic tumors in the lungs responded well to the treatment, but other patients with early, very small metastatic lung tumors did not respond. The purpose of this study is to understand why patients with early lung metastasis (very small lung tumors) did not respond to inhaled IL-15 treatment.

Cancer

Exploring the therapeutic potential of targeting mutant p53 for canine osteosarcoma

Osteosarcoma, an aggressive bone cancer that strikes more than 25,000 dogs annually has a dire prognosis, and there is an urgent need for novel therapies to improve the clinical outcome. Recent genomic analyses reveal that tumor suppressor p53 is frequently mutated in canine osteosarcoma, making mutant p53 a therapy target. This study will evaluate whether canine mutant p53 can be targeted for the treatment of osteosarcoma, which will lay a foundation for developing a small molecule as a drug to treat canine osteosarcoma.

Epithelial growth factor receptor (EGFR) expression in canine oral tumors

Treating cancer often requires surgically removing a tumor along with a border of surrounding normal tissue to ensure no cancer cells are left behind. In the mouth, removal of excess tissue results in significant cosmetic and functional changes, including the ability to eat. The risk of incomplete surgical margins and tumor recurrence remains high requiring additional treatments. EGFR is over-expressed in human oral cancer and has been explored as a therapeutic target. The aim of this study is to see if this protein is also over-expressed in canine oral cancer, allowing us to leverage current human data to help dogs.

Use of total-body 18F-fluorodeoxyglucose positron emission tomography for staging of canine lymphoma

High-grade lymphoma is a common type of cancer in dogs that shares many similarities with lymphoma in humans. Staging guidelines for people include the use of the positron emission tomography (PET) coupled with computed tomography (PET/CT). However, in dogs, the extent of diagnostic testing needed at initial diagnosis and after completion of chemotherapy is still a subject of debate. 18FDG-PET/CT, which marks tumor activity, has not yet been well-documented in veterinary patients. This study evaluates the use of 18FDG-PET/CT for staging of canine lymphoma patients, using a total-body PET protocol which will hopefully lead to better mapping of a dog's lymphoma.

Cardiology

Oral sotalol dosing strategies in the control of ventricular arrhythmias in dogs

Sotalol is an antiarrhythmic drug that is used to treat ventricular arrhythmias in dogs. In both dogs and people, sotalol is administered twice daily. The half-life of sotalol in dogs (4-5 hours) is much shorter than in people (10-12 hours). As a result, dogs are thought to have larger variations in their drug levels, with most of it eliminated prior to the next dose. This study tests if giving the drug three times daily improves control of arrhythmias compared to twice-daily administration.

Use of artificial intelligence to predict echocardiographic left heart enlargement on radiographs

Artificial intelligence (AI) is increasingly being applied to various types of medical imaging to improve the accuracy of detecting diseases. This study will assess the accuracy of an AI algorithm in identifying moderate or greater left heart enlargement on radiographs to determine if AI is more accurate than general practice veterinarians at identifying moderate heart enlargement from dogs with preclinical mitral valve disease with the goal of earlier disease detection.

Genetics

Canine LINE-1 (long interspersed nuclear element 1) ORF1 antibody

More than a third of the genome in dogs and humans is composed of transposable elements (jumping DNA). The largest class of transposable elements are called LINEs. Active LINE-1 replicates through a process called retrotransposition, where a DNA copy of LINE-1 RNA is inserted somewhere new in the genome. In humans new LINE-1 insertions can cause cancer. Different human malignancies express high levels of the LINE-1 protein ORF1p, which can serve as a biomarker for cancer. Dogs are predicted to have three times as many active LINE-1 elements as humans, yet the differences in LINE-1 activity and cancer has not yet been explored. We propose to make an antibody specific for a dog LINE-1 protein ORF1p in order to evaluate which dog tissues and cancers have active LINE-1.

Genetics (resident)

A suspected novel protein coding variant causing spinocerebellar dysfunction in a litter of Belgian Malinois

Identification of a candidate gene would allow for genetic screening and selective breeding, which could help reduce the incidence of spinocerebellar dysfunction within the Malinois population. This study aims to identify the gene variant that explains the puppies' neurological disease and will hopefully identify another cause for this disease.

Infectious Disease

Inter-laboratory variation in serologic test results for Coccidioidomycosis

Coccidioidomycosis ("Valley Fever") is a serious fungal disease of dogs and people that is increasing in incidence and geographic distribution. Proper understanding of the epidemiology of this disease relies on knowledge of variations in diagnostic test performance. The findings of this study will impact the design and interpretation of future surveillance efforts and will have implications for diagnosis in individual pet dogs.

Volatilome analysis of nasal lavage specimens for diagnosis of canine sinonasal aspergillosis

Sinonasal aspergillosis (SNA) is a common and devastating disease of dogs that is often advanced when diagnosed and difficult to treat. The ability to differentiate SNA from other causes of nasal disease based on analysis of volatilomic fingerprints in nasal lavage specimens may facilitate earlier diagnosis and treatment and improved outcomes for dogs with SNA. Ultimately, this study could lead to development of a noninvasive breath test for the disease.



CCAHA research grants provide new and tenured faculty with essential funding that allows clinician scientists to gain relevant data and improve the lives of companion animals.

*Jodi Westropp, DVM, PhD, DACVIM
Professor - Internal Medicine*

Pharmacokinetic comparison of transdermal, oral, and intravenous cisapride in healthy dogs

Abnormal motility of the stomach and intestines is common in dogs and can result in nausea, inappetence, vomiting, regurgitation, and aspiration pneumonia, which may require hospitalization and compromise quality of life. In addition, these things can impede the delivery of drugs administered by mouth into the small intestine for absorption into the bloodstream. Cisapride is a medication that is highly effective at improving motility of the gastrointestinal tract and is typically administered by mouth, though other formulations are available through compounding pharmacies. One such formulation is applied to the skin (transdermal) in a cream or gel form that is absorbed into the bloodstream. Transdermal formulations offer several potential benefits, including ease of administration for owners and absorption independent of stomach emptying. However, transdermal absorption of cisapride has not been evaluated in dogs, warranting investigation prior to veterinarians recommending this formulation for their patients. Therefore, the aim of this study is to compare the absorption of transdermal cisapride versus oral and intravenous cisapride in healthy dogs.

Transfusion Medicine

Platelet function, viability, sterility in canine platelet concentrate units stored at 4C for 14 day

Platelets are a blood cell that is vital to clotting and preventing bleeding. Platelet transfusions are important for treating patients who are at risk for excessive or life-threatening bleeding. Platelet concentrate is the ideal blood product for these patients, but its storage is limited to 5-7 days at room temperature after collection from a donor, following long-standing guidelines in human medicine. The primary concerns for storage beyond this time frame include bacterial contamination and diminished function and survivability of platelets with time. This study is looking at platelet function and safety of cold-stored platelets kept beyond a 7-day storage window which could extend the lifespan and utility of the product, thus improving supply to critically ill dogs and reducing waste of expired products.

Thomas Knipe
Neurology



CURRENT CAT RESEARCH STUDIES



Newly Funded Research Studies for FY 2023-2024

Coagulation

Effects of rivaroxaban on viscoelastic coagulation in cats

Cats can develop fatal consequences to underlying diseases such as heart disease and cancer through the development of clots in the heart that dislodge and block distant blood vessels. Drugs to reduce clotting activity are used to attempt to prevent this occurrence. This research will study the effects of a newer anticoagulant therapy (rivaroxaban) in healthy adult cats and assess the capability of a point-of-care coagulation analyzer (VCM) to detect coagulation changes after rivaroxaban administration. The VCM is faster and more accessible to clinicians compared to laboratory measurements of rivaroxaban in blood samples. Analyzer data will be correlated with blood concentrations of rivaroxaban to determine whether the VCM is an appropriate point-of-care device for veterinarians monitoring the anticoagulant effects of rivaroxaban.

Dental Disease

Candidate biomarkers for treatment stratification in feline chronic gingivostomatitis

Feline chronic gingivostomatitis (FCGS) is severe inflammation of the gums and oral mucosa. FCGS causes significant oral discomfort and hinders cats' ability to eat, drink, and groom. Treatment options involve extracting all or most teeth; but only helps about 70% of cats. For non-responsive cats, stem cell therapy can reduce the number of cats who don't respond from 30% to 10%. However, stem cell therapy is typically administered six months after extractions, which can significantly impact the quality of life of these patients in the meantime. This study uses a non-invasive test to predict response to extraction for patients with FCGS at diagnosis. We are evaluating specific genetic markers in buccal swabs of patients with FCGS to predict their treatment outcome. If successful, these markers will help us better determine the prognosis of cats with FCGS and guide treatment by adding medications, such as stem cell therapy early on, for those not expected to recover fully after extractions.

Infectious Disease

Pharmacokinetic and pharmacodynamic evaluation of nirmatrelvir with and without ritonavir in cats

Feline infectious peritonitis (FIP) is a fatal viral disease of cats caused by a mutated form of a feline coronavirus (FCoV). Although recent advances in antiviral therapies have resulted in the identification of several effective treatment strategies, there is currently no FDA approved and legal treatment for FIP. The combination of antiviral drugs nirmatrelvir and ritonavir (Paxlovid) has achieved conditional approval for treatment of COVID-19 in the US. It appears to be safe and effective in people, and there is evidence that it limits FIP virus replication in cell culture. However, no studies have been performed to establish how well this medication is tolerated in cats and its efficacy in treating FIP. We believe this medication shows promise as an effective treatment for FIP, and it may have a path to legal off-label veterinary use in the future. The study will establish if this medication can be safely administered to cats and identify a starting therapeutic dose for the potential treatment of FIP in preparation for clinical trials in naturally infected cats.

Nutrition (resident)

Assessment of nutritional adequacy and safety of commercial freeze-dried raw diets for cats

This study will assess concentrations of key nutrients and heavy metals in freeze-dried raw cat diets to better characterize product safety and provide veterinarians and cat owners guidance to protect cats' health and well-being.

Jorge Pires
Clinical Trials



Stem Cell

Immunoneutral stem cells for cats

Gingivostomatitis (inflammation of gums and oral mucosa) is common in cats. This disease presents with severe oral pain and difficulties with eating, drinking, and grooming, resulting in substantial distress and frustration for cats and their owners. Cats are currently treated by extracting all or most teeth or through palliative care using pain medication, antibiotics, and immune suppressants for the remainder of their lives. A 2013 clinical study at UC Davis discovered that refractory gingivostomatitis could be cured with two consequent injections of stem cells. Dozens of cats were cured, but some did not respond to the therapy. Cats with the least response had the most severe disease. They were treated with stem cells obtained from another healthy cat donor (allogeneic cells) instead of treatment with cells derived from self (autologous cells). We are concerned that the decreased utility of allogeneic cells is due to their destruction by the recipient's immune system when recognized as non-self. These observations and our recent efforts to engineer immunoneutral tissues for dogs inspired this study. This proposal will create immuno-invisible stem cells by removing the major gene responsible for recognizing non-self by the immune system. We expect these immunoneutral stem cells will help cure cats with the most severe forms of gingivostomatitis and other diseases resulting from immune system imbalances.



Simply put, CCAH grants support research and publications aimed at improving veterinary patient care and quality of life. CCAH grants allow our current faculty and residents to pursue questions and perform research that continuously expands our knowledge. In addition, because the CCAH grant program is a unique and tremendous resource, it also helps us attract and retain the best faculty and residents from around the world!

Rob Rebhun, DVM, PhD, Dip. ACVIM
Professor - Medical Oncology



Poco Preister
SVM Photographer



Newly Funded Research Studies for FY 2023-2024

Hematology

Determination of reference intervals for venous blood gas and clotting parameters in miniature pigs

Bloodwork is a primary diagnostic tool used in the evaluation of healthy and sick minipigs. Reference intervals have been published for complete blood counts (CBC) and serum biochemistry profiles in minipigs, but not for other commonly performed blood tests such as blood gases and coagulation profiles. Blood gases are performed to guide fluid therapy in sick patients, or when insufficient blood can be collected for a full CBC and biochemistry profile. Evaluation of coagulation is done before surgical procedures during and after which excessive bleeding could occur. Detecting coagulation abnormalities could allow the veterinarian to treat the problem before the procedure. This will be the first study to establish these reference intervals, and the results will provide crucial information the veterinary community can use to evaluate these diagnostics more critically in our pet minipig population.

Internal Medicine (resident)

Evaluation of orientation methods on histologic quality of endoscopic gastrointestinal biopsies

Disorders of the stomach and bowel are extremely common in dogs and cats and may require the collection of organ tissue samples for diagnosis. Tissue sample collection can be performed by a procedure called endoscopy that collects small pinch biopsies from the inside lining of the stomach and bowel for evaluation. Unfortunately, there are no standardized methods for the processing and orientation of these delicate biopsies, and at times these biopsies are processed in a way that makes them difficult to read. It is currently unknown whether efforts to optimize the orientation of the pinch biopsy samples at the patient-side following collection are of value, or whether the orientation of the pinch biopsy samples should occur in the laboratory during the embedding process. Our study will evaluate pinch biopsy samples collected from the stomach and bowel of dogs with chronic gastrointestinal disease to compare the processing methods. Our results should maximize the diagnostic accuracy of endoscopic procedures and could shorten the procedure time.

Internal Medicine

Effects of exercise on hepatic and plasma lipids in bearded dragons (*Pogona vitticeps*)

This study will help us better understand how exercise can affect fat metabolism in bearded dragons, and whether exercise can be beneficial for their health and as prevention or treatment for hepatic lipidosis (fatty liver). The findings could have important implications for the welfare of reptiles under human care.

Pain Management

Pharmacokinetics of oral acetaminophen with and without silymarin administration in orange-winged Amazon parrots (*Amazona amazonica*)

Acetaminophen is a fever-reducing and pain medication commonly used in human and veterinary medicine. When administered above the recommended dosages, accumulation of a toxic metabolite can result in liver toxicity. Silymarin, an antioxidant, has been shown to ameliorate these toxic effects. In this study, we will determine if acetaminophen can be safely administered orally to achieve target plasma concentrations in a parrot species. First, we will evaluate plasma concentrations in orange-winged Amazon parrots after oral administration of a single dose and multiple doses of acetaminophen with and without concurrent administration of silymarin. We will also measure liver enzymes to evaluate toxicity. This study will serve as a basis for future research evaluating the efficacy of acetaminophen to reduce pain alone and in combination with other pain medications.

Pathology

The mysterious oral epulides of carnivores - who is who and from where did they come? Can we finally settle this?

Several tumor-like lesions of the oral gum tissues, referred to as epulides, are common and important lesions in dogs and cats. The determination of the type of tissue from which lesions arise is a foundational cornerstone of medicine, as this knowledge facilitates an accurate diagnosis and treatment plan. Due to similarities between different epulides and clinically similar oral lesions, the accurate categorization (diagnosis) of epulides has proven to be problematic. Importantly, an inaccurate diagnosis can lead to inappropriate treatment. Unfortunately, we do not currently know the cell or tissue of origin for many of the oral epulides of dogs and cats. A group of antibody-based tests and special stains may facilitate this determination, thereby providing more accurate lesional categorization and diagnosis, which will help veterinarians make better treatment decisions for these patients.

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Research changes lives. In our field, this often means the lives of companion animals by offering diagnostics and treatments that may not have previously existed or improving the quality of our patients' lives for as long as possible. However, research not only changes the lives of our veterinary patients, but their guardians' lives as well, by giving them hope and a potential avenue to see their companion animal be more comfortable or even cured from a disease that may have historically been considered untreatable. Our residents represent the future of veterinary research, and when they are supported in doing their projects, we can see amazing things. Additionally, these grants inspire them to pursue research in the future which allows for the momentum to continue and further open the door to new diagnostic and treatment options.

*William T. N. Culp, VMD, DACVS
Professor - Surgical Oncology*



Danson Kent-Jandrey
Oncology & ER/ICU



CCAH equipment grants are essential because they are a main source of funding for research equipment. Many of the small foundation grants available specifically exclude equipment purchases. CCAH equipment grants fill a strong need to support the purchase of small equipment.

*Bruno Pypendop, DrMedVet, DrVetSci, DACVAA
Professor - Anesthesiology*

VetScan HM5

Principal Investigator: Amir Kol

The VETSCAN HM5 is a veterinary hematology analyzer that is able to use a very small volume of blood and provide a complete blood count (CBC). A CBC includes the quantification of white blood cells, which is critical for research that is focused on cats' immune response to chronic viral infections and therapeutic strategies to enhance these immune reactions to clear a virus. This equipment will be used to isolate specific immune cell subsets from cats' blood for downstream analysis. Obtaining reliable cell counts from the blood sample is a critical first step in this research process.

Upgrade of iBlot3 Transfer System

Principal Investigator: Brian Leonard

The iBlot3 Western Blot Transfer System is part of the necessary instruments to measure proteins in cells and tissue. The unit will be used to quantify antimicrobial peptides, small proteins made from the cells on the surface of the eye that combat infection. Additionally, this will determine the efficacy of small molecules to increase the amount of antimicrobial peptides synthesized and secreted in tears.

Boston Scientific Lithoclast Trilogy

Principal Investigator: Carrie Palm

This lithoclast device has tremendous research potential, including in projects focusing on its use for minimally invasive treatment of different stone types in multiple anatomical locations. Urolithiasis, or stones in the urinary tract, is a common disease across many species that can have life-threatening consequences. Historically, surgical removal was the main treatment but can be associated with significant morbidity. Laser lithotripsy is used in veterinary medicine as a minimally invasive treatment for uroliths (stones) in the lower urinary tract; however, when a patient has upper urinary tract stones or a large stone burden, laser lithotripsy is ineffective. Combined ultrasonic and ballistic lithotripsy has been used in humans to treat patients who cannot be effectively treated with laser lithotripsy, but its use in veterinary medicine is rare, which this equipment will allow.

Bead Mill, Vacuum System, Microscope, IHC, BSC and Pipettes

Principal Investigator: Daniel York

The equipment will support ongoing cancer studies evaluating genes associated with cancer risk in companion animals. It will be used to help evaluate cancer patient immune cell profiles that may predict a favorable outcome for companion animal cancer patients and potentially identify novel ways the immune system can be boosted to fight tumors. It will also benefit new and ongoing clinical trials for novel imaging techniques for diagnosing and monitoring patient cancer growth as well as studies evaluating novel cancer treatments, including the development of canine-specific immunotherapies.

Microcentrifuge and Pipetteman

Principal Investigator: Danika Bannasch

This equipment will be dedicated to studying genes in dogs that can make copies of themselves and determining which ones are still active and potentially dangerous. Having dedicated equipment strictly for this purpose in our genetics lab is necessary to prevent degradation of the RNA that is being evaluated.

MazeEngineers Custom-made Treadmill

Principal Investigator: Hugues Beaufrere

This custom-made treadmill designed specifically for bearded dragons includes adjustable speeds and inclinations and software to program exercise routines. The unit will be used to study the effects of exercise on liver and blood fat and cholesterol in bearded dragons and other companion reptiles. By studying the impact of exercise, we hope to find ways to prevent and treat diseases in reptiles, improving their welfare and lifespan.

Large Chamber for Barometric Whole-Body Plethysmography Chamber

Principal Investigator: Joao Soares

This is a large acrylic box with ports and sensors to quantify breathing patterns associated with normal and abnormal breathing function in large-breed dogs, without requiring manual restraint, anesthesia or sedation (i.e., it evaluates the natural breathing pattern). This equipment is essential to investigating whether a pre-anesthetic evaluation of the breathing pattern of these dogs can predict breathing problems during or after anesthesia.

RESEARCH EQUIPMENT FUNDED

Revco -80 Freezer for Infectious Disease Isolates

Principal Investigator: Jonathan Dear

This shared freezer will provide the internal medicine specialist focused on infectious disease much-needed space to store samples from patients in order to develop new diagnostics and treatment options.

iPads, Wi-Fi Boosters, and Portable Chargers

Principal Investigator: Kristin Jankowski

Funding will be used to purchase equipment that enables survey administration/data collection for research purposes by our student-assisted One Health clinics. Equipment costs cover five iPads with cases, two Wi-Fi boosters, and two portable chargers.

Optical Cartridges for AriaMX Quantitative Real Time PCR Instrument

Principal Investigator: Luke Wittenburg

This grant funded the purchase of additional cartridges for the quantitative real-time PCR instrument that is used to measure how much target DNA is in a research sample. By adding additional cartridges, we are now able to measure multiple target DNA sequences within the same sample instead of setting up multiple individual samples. This allows for more accuracy and confidence in comparisons between samples and reduces the amount of consumables that would be required to measure many target DNA sequences individually.

DinbeatUNO wireless monitoring system

Principal Investigator: Lynelle Johnson

Dinbeat UNO is a multi-parameter harness that allows real-time and wireless monitoring of the most important vital signs of patients. The system consists of a series of fabric vests of various sizes that can accept small electronic monitoring devices that will remotely measure heart rate, heart rhythm via generation of an electrocardiogram, body temperature, motion, and respiratory rate as the animal sleeps, walks, runs, or plays ball. This will allow veterinarians to assess changes in vital parameters during exercise or during illness such as heart failure or an arrhythmia, allowing easy access to data for exercise testing, early intervention in disease states, and assessment of response to therapy.

Surgical and Endodontic Treatment Instruments

Principal Investigator: Maria Soltero-Rivera

Surgical and endodontic instruments will be used to treat the most common dental and maxillofacial diseases seen in animals. These instruments will be used in procedures such as root canal and vital pulp therapy to save teeth with endodontal disease. In patients with lesions that require additional investigation, these instruments can assist in obtaining biopsies for histopathologic evaluation. These instruments will not only improve the quality of life of the animals treated, but will also allow us to obtain samples for our research projects looking at pathogenesis of orodontal diseases in different species, with the aim of gaining a better understanding of the causes and risk factors of these diseases and finding new treatment targets.

ELISpot

Principal Investigator: Patricia Pesavento

Enzyme-linked immunosorbent spot assay (ELISpot) is an immunoassay specifically designed to measure antigen-specific T cells. The ELISpot plate reader is for clinical research, with applications ranging from disease pathogenesis to the development of clinical diagnostic tests.

Doppler, Doppler Case, Multiparameter Monitor

Principal Investigator: Robert Rebhun

This equipment will help monitor vital parameters for clinical trials patients undergoing treatment, such as blood pressure, oxygen levels, heart rate and rhythm. This will enable us to detect any adverse reactions sooner and allow for quicker treatment if problems should occur.

Repair of 50 MHz Transducer of the Compact Touch Ultrasound Biomicroscopy (UBM)

Principal Investigator: Soohyun Kim

UBM is an advanced technology that provides highly detailed images of internal eye structures. This equipment is especially valuable as it allows us to examine critical structures that are not visible through any other non-invasive method. The UBM enables analysis of the primary role of different structures in various ophthalmic diseases, determination of the most effective treatments, and monitoring changes during therapy. The primary focus is using UBM to study the relationship between ocular structures and diseases that can lead to blindness in companion animals, such as glaucoma, intraocular cancer, and various corneal diseases.



Cori Tell
Avian Medicine &
Human Food Safety

Fluorescence Lifetime Imaging Machine

Principal Investigator: Stephanie Goldschmidt

The goal of oral cancer surgery is to remove all cancer cells to prevent local recurrence and distant spread to other organs. Currently, there is no way for a surgeon to tell if they have successfully removed all of a tumor while in surgery; they have to wait for biopsy results. This equipment has the potential to delineate healthy from cancer tissue in real time during surgery to ensure no cancer cells are left behind.

Repair of the Mechanical Testing System

Principal Investigator: Susan Stover

The mechanical testing system is used to test new treatment methods for repair of bone, joint, spine, and jaw fractures and disorders before these new methods are considered for use in animals. Many companion animals benefit from having more successful surgical outcomes, or from progress in the management of osteoarthritis, neurological disease, and abnormal bone density loss.

Milli-Q Ultrapure Water System

Principal Investigator: Karen Shapiro

Ultrapure water is essential for numerous everyday laboratory activities, including serological assays, pathogen cultivation in cell culture, and molecular detection and characterization of pathogens infecting companion animals. This shared equipment will allow us to produce ultrapure water directly in the laboratory.

DTen Zoom Monitors

Principal Investigator: CCAH & SVM Research Labs

This all-in-one video conferencing system is used to support companion animal research at the Center for Companion Animal Health and the School of Veterinary Medicine by allowing investigators to talk to each other in real time and share data instantly.

Anthex Synergy (laparoscopic surgery imaging tower)

Principal Investigator: William Culp and Philipp Mayhew

This is a laparoscopic surgery imaging tower that provides the capability to perform minimally invasive soft tissue surgery. This equipment not only allows us to perform surgery more safely and less invasively but also allows our surgeons to help develop these new procedures.

Boston Scientific Rhythmia HDx Mapping & Navigation System

Principal Investigator: Allison Gagnon

The Rhythmia HDx Mapping System is a 3D mapping and navigation system that can be used in cardiac electrophysiology research and patient care procedures. Significantly, it can help find the source of heart arrhythmias and allow these to be repaired.

21
equipment grants
funded in
FY 2022-2023
\$466,182

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For clinical researchers like myself, the CCAH equipment grants are tremendously important. In orthopedics, the objective evaluations of gait and of the mechanical performance of bone-implant constructs require costly equipment. There are few sources of sustained funding to support that equipment. The CCAH equipment grant is profoundly important so that our research can continue and can expand.

*Denis Marcellin-Little, DEDV
Professor - Orthopedic Surgery*

RESEARCH PUBLICATIONS

24 Publications from CCAH donor-funded studies FY2022-2023

Anesthesia

Pharmacokinetics of buprenorphine and its metabolite norbuprenorphine in neutered male cats anesthetized with isoflurane

Rebhun RB, York D, De Graaf FMD, Yoon P, Batcher KL, Luker ME, Ryan S, Peyton J, Kent MS, Stern JA, Bannasch DL

Journal of Veterinary Internal Medicine (October 2023)

Pharmacokinetics of buprenorphine and its metabolite norbuprenorphine in neutered male cats anesthetized with isoflurane

Veterinary Anaesthesia and Analgesia (July 2023)
Pypendop BH, Stoddard S, Barter LS

Effects of dopamine, norepinephrine or phenylephrine on the prevention of hypotension in isoflurane-anesthetized cats administered vatinoxan or vatinoxan and dexmedetomidine

Kobluk K, Pypendop BH

Veterinary Anaesthesia and Analgesia (January 2022)

Effects of dopamine, norepinephrine or phenylephrine on the prevention of hypotension in isoflurane-anesthetized cats administered vatinoxan or vatinoxan and dexmedetomidine

Veterinary Anaesthesia and Analgesia (January 2022)
Kobluk K, Pypendop BH

Cancer

A variant in the 5'UTR of ERBB4 is associated with lifespan in Golden Retrievers

Rebhun RB, York D, De Graaf FMD, Yoon P, Batcher KL, Luker ME, Ryan S, Peyton J, Kent MS, Stern JA, Bannasch DL

Geroscience (October 2023)

A variant in the 5'UTR of ERBB4 is associated with lifespan in Golden Retrievers

Geroscience (October 2023)
Rebhun RB, York D, De Graaf FMD, Yoon P, Batcher KL, Luker ME, Ryan S, Peyton J, Kent MS, Stern JA, Bannasch DL

Changes in diet and supplement use in dogs with cancer

Kramer ML, Larsen JA, Kent MS

Journal of Veterinary Internal Medicine (August 2023)

Changes in diet and supplement use in dogs with cancer

Journal of Veterinary Internal Medicine (August 2023)
Kramer ML, Larsen JA, Kent MS

Intra- and Intertumoral Microglia/Macrophage Infiltration and Their Associated Molecular Signature Is Highly Variable in Canine Oligodendroglioma: A Preliminary Evaluation

Toedebusch RG, Wei NW, Simafranca KT, Furth-Jacobus JA, Brust-Mascher I, Stewart SL, Dickinson PJ, Woolard KD, Li CF, Vernau KM, Meyers FJ, Toedebusch CM

PLOS ONE (June 2023)

Intra- and Intertumoral Microglia/Macrophage Infiltration and Their Associated Molecular Signature Is Highly Variable in Canine Oligodendroglioma: A Preliminary Evaluation

PLOS ONE (June 2023)
Toedebusch RG, Wei NW, Simafranca KT, Furth-Jacobus JA, Brust-Mascher I, Stewart SL, Dickinson PJ, Woolard KD, Li CF, Vernau KM, Meyers FJ, Toedebusch CM

Fractionated oral dosing and its effect on cyclophosphamide pharmacokinetics in dogs with high-grade multicentric lymphoma

Veluvolu S, Willcox JL, Skorupski KA, Al-Nadaf S, Rebhun R, Wittenburg L

Veterinary and Comparative Oncology (March 2023)

Fractionated oral dosing and its effect on cyclophosphamide pharmacokinetics in dogs with high-grade multicentric lymphoma

Veterinary and Comparative Oncology (March 2023)
Veluvolu S, Willcox JL, Skorupski KA, Al-Nadaf S, Rebhun R, Wittenburg L

Longevity and mortality in cats: A single institution necropsy study of 3108 cases (1989-2019)

Kent MS, Karchemskiy S, Culp WTN, Lejeune AT, Pesavento PA, Toedebusch C, Brady R, Rebhun R

PLOS ONE (December 2022)

Longevity and mortality in cats: A single institution necropsy study of 3108 cases (1989-2019)

PLOS ONE (December 2022)
Kent MS, Karchemskiy S, Culp WTN, Lejeune AT, Pesavento PA, Toedebusch C, Brady R, Rebhun R

Fluid Therapy

Continuous fluid infusion per rectum compared with intravenous fluid infusion in pigs

Chigerwe M, Blasczynski SJ, Abi-Nader BA, Condy PM, Kretsch CM, Depenbrock SM

Journal of Veterinary Internal Medicine (August 2023)

Continuous fluid infusion per rectum compared with intravenous fluid infusion in pigs

Journal of Veterinary Internal Medicine (August 2023)
Chigerwe M, Blasczynski SJ, Abi-Nader BA, Condy PM, Kretsch CM, Depenbrock SM



Pint Bannasch Genetics

Genetics



FGF4L2 retrogene copy number is associated with intervertebral disc calcification and vertebral geometry in Nova Scotia Duck Tolling Retrievers

American Journal of Veterinary Research (January 2023)
Bianchi CA, Marcellin-Little DJ, Dickinson PJ, Garcia TC, Li CF, Batchner K, Bannasch DL

Infectious Disease



Clinical assessment of a point-of-care assay to determine protective vaccinal antibody titers to canine viral diseases

The Veterinary Journal (September 2023)
Ad Y, Halperin IM, Olstad EC, Gershwin LJ, Sullivan L, Reagan KL



Efficacy of oral Remdesivir compared to GS-441524 for treatment of cats with naturally occurring effusive feline infectious peritonitis: A blinded, non-inferiority study

Viruses (August 2023)
Cosaro E, Pires J, Castillo D, Murphy BG, Reagan KL



Tyzzer disease in 19 preweaned orphaned kittens

Journal of Veterinary Diagnostic Investigation (March 2023)
Fingerhood S, Mendonca FS, Uzal FA, Marks SL, Vernau KM, Navarro MA, Choi EA



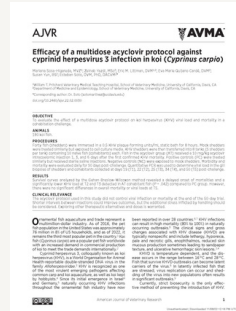
Characteristics of extended-spectrum beta-lactamase producing enterobacteriales isolated from dogs and cats, 2011-2021

Veterinary Sciences (February 2023)
Woerde DJ, Reagan KL, Byrne BA, Weimer BC, Epstein SE, Schlesener C, Huang BC, Sykes JE



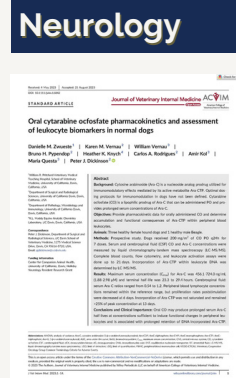
An optimized bioassay for screening combined anticoronaviral compounds for efficacy against feline infectious peritonitis virus with pharmacokinetic analyses of GS-441524, Remdesivir, and Molnupiravir in cats

Viruses (November 2022)
Cook S, Wittenburg L, Yan VC, Theil JH, Castillo D, Reagan KL, Williams S, Pham CD, Li C, Muller FL, Murphy BG



Efficacy of a multidose acyclovir protocol against cyprinid herpesvirus 3 infection in koi (Cyprinus carpio)

American Journal of Veterinary Research (November 2022)
Sosa-Higareda M, Yazdi Z, Littman EM, Quijano Carde EM, Yun S, Soto E



Oral cytarabine ocfosfate pharmacokinetics and assessment of leukocyte biomarkers in normal dogs

Journal of Veterinary Internal Medicine (September 2023)
Zwueste DM, Vernau KM, Vernau W, Pypendop BH, Knych HK, Rodrigues CA, Kol A, Questa M, Dickinson PJ



Tolerability and pharmacokinetics of intravenous allopregnanolone with and without midazolam pretreatment in two healthy dogs

Epilepsia Open (January 2023)
Bruun DA, MA B, Chen YJ, Wu CY, Aleman M, Zolkowska D, Smiley-Jewell SM, Rogawski MA, Lein PJ

RESEARCH PUBLICATIONS

Ophthalmology



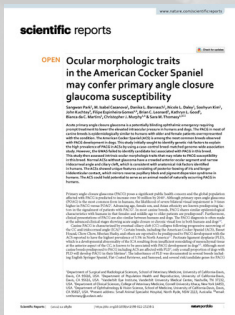
Symblepharon in kittens: a retrospective study of 40 kittens and 54 eyes (2002-2022)

Journal of Feline Medicine and Surgery (February 2023)
 Shiraishi H, Vernau KM, Kim S, Good KL, Hollingsworth SR, Sebbag L, Montgomery E, Surmick JD, Freeman KS, Choi E, Casanova MI, Maggs DJ



The TGM2 inhibitor cysteamine hydrochloride does not impact corneal epithelial and stromal wound healing in vitro and in vivo

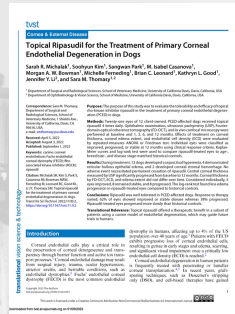
Experimental Eye Research (January 2023)
 Minella AL, Casanova MI, Chokshi TJ, Kang J, Cosert K, Gragg MM, Bowman MA, Mccorkell ME, Daley NL, Leonard BC, Murphy CJ, Raghunathan VK, Thomasy SM



Ocular morphologic traits in the American Cocker Spaniel may confer primary angle closure glaucoma susceptibility

Scientific Reports (November 2022)
 Park S, Casanova MI, Bannasch DL, Daley NL, Kim S, Kuchty J, Gomes FE, Leonard BC, Good KL, Da Costa Martins B, Murphy CJ, Thomasy SM

Lizard & Evie Phenix
 Clinical Trials



Topical Ripasudil for the treatment of primary corneal endothelial degeneration in dogs

Translational Vision Science and Technology (September 2022)
 Michalak SR, Kim S, Park S, Casanova MI, Bowman MAW, Ferneding M, Leonard BC, Good KL, Li JY, Thomasy SM

Pain Management



Twice-daily oral administration of a cannabidiol and cannabidiolic acid-rich hemp extract was well tolerated in orange-winged Amazon parrots (Amazona amazonica) and has a favorable pharmacokinetic profile

American Journal of Veterinary Research (February 2023)
 Sosa-Higareda M, Sanchez-Migallon Guzman D, Knych H, Lyubimov A, Zakharov A, Gomez B, Beaufreere H

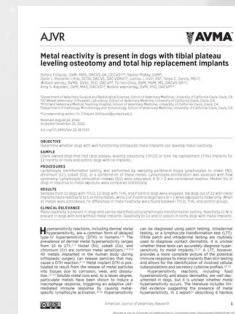
Respiratory



Prospective evaluation of the efficacy of inhaled steroids administered via the AeroDawg spacing chamber in management of dogs with chronic cough

Journal of Veterinary Internal Medicine (March 2023)
 Chan JC, Johnson LR

Surgery / Orthopedics



Metal reactivity is present in dogs with tibial plateau leveling osteotomy and total hip replacement implants

American Journal of Veterinary Research (January 2023)
 Filliquist B, McKay R, Marcellin-Little DJ, Irvin JJ, Garcia TC, Vernau W, Chou PY, Kapatkin AS, Vapniarsky N

“Research is fundamental to making the discoveries and building the knowledge base that will propel advancements in veterinary and human patient care. Through research we may be able to reduce the negative impact of some of the greatest health problems affecting pets and people alike.

Luke A. Wittenburg, D.V.M, Ph.D, DACVCP
 Associate Professor - Clinical Pharmacology



A world of learning brought to shelters by the Maddie's® Million Pet Challenge!

The Learniverse offers unlimited access to online courses and shelter medicine experts to anyone working in an animal shelter- all for free!

The Learniverse team is comprised of veterinarians, animal behaviorists, educators, and experts in online, adult learning. Together they craft learning experiences that meet today's busy shelter workers exactly where they are: in the exam room, on the adoption floor, in the kennel, or going into a surgery suite.

Over **5,300** shelter professionals have accessed **13** learning tracks, dozens of webinars, and one-on-one coaching. And they're not alone! Shelters can join cohorts with other shelters to embark on specialized training or Boot Camps to share ideas.



Launched on Valentine's Day 2022, California for All Animals is a five-year, \$50M program led by UC Davis Koret Shelter Medicine Program that exists to unite and amplify the work of animal shelters in California communities.



Open Grant

Summer of 2022, **66** agencies focused on supporting animals outside the shelter; field support; and positive outcomes received grants totalling **\$5,682,471**

2022 Training and Networking

FOUR 2022 Bootcamps brought **24** California shelter teams together to focus on behavior, training and enrichment; care and population management of animals; and implement change in the shelter to broaden community support. Over **100** California organizations participated in **16** statewide All Calls.



Open Arms

Spring of 2023, we joined arms with 22 national organizations to award over **\$400,000** in funding to shelters adopting practices that encourage deeper engagement with community members by removing barriers to adoption, volunteering, and services.

2022 On-Site Visits

The facility design team participated in 29 consultations, working side by side with animal shelters to reimagine facility use in an effort to support more humane care for every animal. **174** cat and dog portals were installed, transforming single-compartment housing to double-compartment. **3** grants totaling **\$22,000** were awarded to animal shelters to purchase and install portals.

In 2022, members of the KSMP team performed **33** in-person site visits to shelters across the state.

Snipتمبر

Fall of 2022, the spay and neuter crisis was met with **44** grants totaling **\$9,464,501** to perform and/or expand access to surgery.

CAL FOR ALL ANIMALS

2022-2023

Through expert-led training, grants, and a network of shelter teams passionate about implementing best practices, we're working together to keep California pets and their people together.



THANK YOU!

TOGETHER WE ACHIEVE MORE

We value your partnership in our mission to improve the health and well-being of companion animals.

