



Supporting Eye Health

UC Davis is home to one of the largest academic veterinary ophthalmology programs in the world. Faculty members include six veterinary ophthalmologists (including a full time equine ophthalmologist), four residents, two technicians, and a full-time ocular pathologist. The program's research lab numbers more than 30 staff, students, residents and faculty members; and the clinical service offers a wide range of surgical and microsurgical procedures, from the treatment of tumors of the eye and cataract surgery to repair of traumatic injuries and laser retinopathy.

- The program offers a four-year residency, which ensures that residents receive critical training in research and teaching in addition to clinical practice.
- Unique to UC Davis, the veterinary and medical Ophthalmology programs are strongly integrated and the two share a surgical training program for their residents.
- The enormous breadth of species seen by the veterinary team is unparalleled – in addition to all companion animal species, faculty, residents and students provide medical and surgical care to raptors, zoo animals, reptiles and other wildlife.
- Complex ophthalmic problems are tackled using a multi-disciplinary approach in collaboration with specialists in computed tomography, pathology, anesthesia, interventional radiology, internal medicine, neurology, dermatology, and soft-tissue surgery.



Removing deadly foxtails – The barbed seed heads of the foxtail plant, common in California, can work their way into any part of a dog or cat, including inside the nose, ears, eyes, and mouth. An embedded foxtail can lead to serious infection or even death for an animal if left untreated. Clinicians, in collaboration with interventional radiologists and internists, have developed a revolutionary approach to endoscopic assessment and removal of fox tails and stenting of dogs' nasolacrimal ducts.

Returning vision through removal of cataracts – Veterinary ophthalmic surgeons perform cataract surgeries on dogs almost every week of the year. A recent study revealed that 81 percent of clients were so satisfied with the outcome of their dogs' cataract surgery that they would have the procedure done again if a second dog of theirs developed cataracts.

Unlocking the genetic mysteries of feline retinal degeneration - Scientists have identified the gene associated with hereditary retinal degeneration specific to Persian cats. This discovery leads the way towards a genetic test to eradicate the condition from the breeding population. And because hereditary eye diseases of animals serve as excellent models of human ocular disorders, studies like this can assist in the development of gene and drug therapies for inherited forms of human blindness.

Glaucoma: Dogs & People - Because the biophysical properties of the primary drainage pathway from the eye are markedly altered in human eyes with glaucoma, vision researchers are now working to determine if there is a similar relationship in dogs with glaucoma. The study will greatly contribute to the understanding of canine glaucoma; and may also point to new treatment options for this common, blinding and painful disease in dogs and humans.

Gaining ground on Feline herpesvirus-1 – Feline herpesvirus type 1 (FHV-1) is the most common infectious cause of upper-respiratory and ocular disease of cats worldwide. Many cats will be afflicted with this infection during kittenhood; and the infection will, in a proportion of these cats, go on to cause chronic and recurrent ocular and nasal disease throughout their lifespan.

- Researchers, in collaboration with pharmacologists from the School and the University of Melbourne, Australia, have broken new ground in the development of a novel antiviral therapy for cats for the management of FHV-1. It is the first safe and effective oral medication for the disease, and has revolutionized treatment for affected cats. The drug treatment was adopted from a model used for treatment of human herpesvirus, and a safe and effective dose has been determined for cats.
- In collaboration with scientists from Towson University, Maryland, who engineered implantable cylindrical devices made from silicone impregnated with the drug penciclovir, our team has investigated the safety and efficacy of long-term, steady-state delivery of this drug in cats with feline herpesvirus. This cutting-edge study showed that the clinical deployment of these controlled-release devices may allow for long-term treatment of the FHV-1 infection with a single intervention that could last the life of the patient.
- Scientists conducted a groundbreaking pilot study to evaluate the pharmacokinetics of an oral drug (famciclovir) and its antiviral metabolite (penciclovir) in tears following oral administration of famciclovir to cats. The study validated a means of collecting tears from cats, developed an assay for quantifying the substances in the tears, and determined a dosage of famciclovir that is likely to be effective in treating FHV-1 in a majority of cats.

Battling Dry Eye - Keratoconjunctivitis sicca (KCS), or dry eye, is a devastating disease in dogs and humans that causes ocular pain and potential blindness. Scientists are hard at work trying to better understand this disease and seek ways to treat and eradicate it.

- A clinical trial is being conducted to determine if treatment with stem cells will result in local, long-term control of tear gland inflammation and dry eye. The hope is that stem cells injected into the tear-producing glands of dogs with dry eye will result in increased tear production, thereby eliminating the need for life-long topical therapies.
- Researchers are working to identify the genetic components of KCS. They are also better characterizing the disease with examination and testing of the tear film and ocular surface, and by using advanced imaging techniques. A clinical trial is in place focusing on West Highland White Terriers, as the disease is seen more frequently in this breed. Results from the study will allow researchers to better predict the onset and progression of KCS; and if a gene that causes the disease is found, it provides hope that scientists can develop a genetic test to determine which dogs have this disease.

Assessing stem cell therapy for Equine Recurrent Uveitis (ERU)- Working together, Veterinary Ophthalmology and Equine Medicine faculty and residents are investigating the effectiveness of a new stem cell therapy for Equine Recurrent Uveitis, the most common cause of blindness in horses. Currently, diagnosed horses must receive long-term cyclosporine therapy, which involves the surgical embedding of a cyclosporine implant

in the white tissue around the eye that slowly releases the drug over a period of up to five years. Stem cell therapy has the potential for being relatively non-invasive and removing the need for lifelong treatment.

Shedding light on snake anatomy – Few resources exist for veterinarians needing information about the anatomy of snakes' eyes and head. Groundbreaking snake research has resulted in data that will help inform veterinarians in their decision-making, clinical assessment, surgery and treatment of diseases in snakes.

- In collaboration with colleagues specializing in exotic pet medicine, veterinary faculty conducted the first high-frequency ultrasound studies of the eyes of live snakes. The study's goal was to improve snake medical care by producing the first detailed baseline information about the structure of healthy snake eyes.
- In follow-up studies led by senior students, the group then further assessed changes in the snake's spectacle (a transparent covering of the eye) during shedding, and was the first to utilize 3D reconstruction of micro computed tomography (CT) images to provide an accurate anatomical representation of the lacrimal drainage system of snakes.

Treatment for vaccine-induced blindness – Vaccinia virus keratitis (VACVK) is a complication of the smallpox vaccination that can result in blindness. There are no FDA-approved treatments for VACVK. Ophthalmology faculty demonstrated that vaccine-induced blindness in rabbits has a clinical course that parallels that in humans; and discovered that application of topical trifluridine is the preferred treatment for VACVK. This offers hope for a safe and effective therapeutic regimen for VACVK in humans.

New methods for treating corneal disease in elephant seals – Residents and faculty conducted a study to assess tear and plasma concentrations of the drug doxycycline following oral administration to Northern elephant seals. The team proved that the drug provided a practical solution to managing infected corneas, which could lead to improvements in the welfare and management of captive and rehabilitating seals, sea lions and walrus.

Dog DNA: the answer – Ophthalmology faculty are working to identify the region of the dog genome associated with corneal endothelial dystrophy (CED) in Boston Terriers and German Shorthaired Pointers. CED is a devastating disease in dogs that can result in blindness and severe ocular pain from secondary complications. The goal of the study is to develop a genetic test for CED in these breeds and others such as Chihuahuas and Dachshunds with an increased risk of CED. Faculty are also conducting several ongoing clinical trials evaluating medical and surgical interventions to treat CED.

