

Innovations in Companion Animal Health

Introducing dynamic new treatments, developing stronger diagnostic tools, pioneering veterinary disciplines, discovering the roots of disease and establishing a world-renowned genetics testing and research program are hallmarks of the improvements in animal health that school faculty members have achieved.

The vital role of taurine in the feline diet – Veterinary nutritionists collaborating with cardiologists in the clinic first documented the link between a lack of dietary taurine, an amino acid, and feline dilated cardiomyopathy, a fatal heart ailment. Pet food companies now add this essential ingredient to commercial pet food, saving countless lives.

The world's first shelter medicine program – The [UC Davis Koret Shelter Medicine Program](#) and residency have radically changed how communities tackle infectious disease, housing design, behavior and other aspects of the health and welfare of shelter animals throughout the nation. These veterinary scientists determined several causes of disease found in multi-cat facilities, leading to better management tools for breeders, boarding facilities, animal shelters and rescue groups.

One Health discovery – Researchers from the [Comparative Cancer Center](#) were the first to identify a protein that appears to play a key role in the formation of lymphoma. The protein inhibits a tumor-suppressing gene of animals and people; this research is closely tied to future advances in human health.

Pioneers in the disciplines of veterinary medicine – School faculty were instrumental in the early establishment of veterinary urology, exotic animal medicine, behavior, neurology, orthopedics, anesthesiology/pain management, ophthalmology and other disciplines now routinely practiced by specialists throughout the country.

Lethal contaminants in pet food – Toxicology experts found that a combination of [melamine and cyanuric acid](#), detected in samples of pet food recalled in 2007, can cause a lethal kidney failure in cats. The study has helped veterinarians to diagnose kidney problems with greater accuracy in their patients.

Innovations in veterinary dentistry – The school's dental operator is the base for innovative surgical repairs and reconstruction, research collaborations and client education about how dental care affects overall health in companion animals. Remarkable achievements of the dentistry group include:

- Veterinary oral surgeons working with biomedical engineers proved that an experimental reconstructive procedure can [regrow jawbones in dogs](#) that have lost bone to injuries or removal of cancerous tumors. This valuable data is already being translated into biomedical treatments in human and veterinary medicine.
- A surgery on an extremely rare case of cleft palate and bifid nose gave an affected dog a normal nose and removed the risk of aspiration that had led to serious lung infections, allowing the young animal to live a normal life.
- In an [internationally reported case](#), surgeons with expertise in facial surgery grafted tissue to cover severely damaged areas of a dog's face, prevent future infections and enable the pet to breathe more easily.

The first disaster preparedness plans for animals – Veterinarians led the way for California’s Office of Emergency Services to [incorporate animals into disaster preparedness plans](#). As a result, many communities have employed established veterinary protocols for the rescue and treatment of pets and livestock affected by major fires, floods and other emergencies. A clear system to coordinate animal rescue with human evacuation over multiple service jurisdictions has considerably improved disaster response.

Other advances in feline nutrition – Veterinary scientists have identified essential nutrients for cats, identifying optimal requirements, metabolism and toxicity levels:

- Identified folate and Vitamin D as nutritional requirements of kittens
- Learned that a lack of zinc in pregnant queens results in cleft palate of kittens
- Quantified the benefits of vitamins A, B, K, choline and chloride for cats

First companion animal hemodialysis service – [Hemodialysis](#) experts save pets from acute poisoning from toxins such as antifreeze; bridges the healing gap in cases of leptospirosis or other disorders; and improves the quality of life of animals with chronic kidney disease. Clinics in Davis and San Diego serve clients in Northern and Southern California; new blood purification procedures are on the leading edge of disease management.

Foundational research on infectious disease – Faculty research produced foundational discoveries into the relationship of feline husbandry and infectious diseases, including such infections as feline immunodeficiency virus (FIV, also known as feline AIDS), feline coronavirus, feline calicivirus and feline infectious peritonitis.

Extraordinary interventions – The presence of multiple specialists in the William R. Pritchard Veterinary Medical Teaching Hospital has led to extraordinary, life-saving interventions in some of the rarest and most complex cases of cats, dogs, birds and other species. Among them, a cat injured by an arrow through its chest, a dog shot and left for dead by its owner, requiring a 7-month hospital stay; [a hawk hit by a car](#) and partially forced through the grille; a dog born with a cleft palate and nasal deformity; a dog that had stopped breathing and required several weeks on a ventilator; and many more.

Curing a rare swallowing disorder – In a One Health collaboration, a faculty veterinarian and a physician together performed the first laser-assisted surgery to correct a potentially [fatal swallowing disorder](#) in a young dog. Clinicians introduced the procedure into practice and [now perform the surgery](#) on animals with similar problems.

Brain tumor treatment – Veterinary neurologists treated dogs with brain tumors in a One Health study to test the safety of a technique that delivers chemotherapy drugs directly into tumors that lie deep within the skull. Based on the results of the study, collaborators have carried the protocols into human clinical trials, taking the next step toward an established treatment for people.

Cradle of civilization – In a study involving 11,000 cats, genetic researchers concluded that all [ancestral roads for today's domestic cat](#) lead back to the "cradle of civilization" for humans, the Fertile Crescent of the Middle East. Faculty geneticists have also made key contributions to the mapping of the genomes of the dog, cat and horse; data on such species may become valuable models for infectious disease evolution.

Notable genetic milestones – Newly developed tests verify carriers of disease and point the way to potential gene therapies:

- Veterinary geneticists were the first to identify a genetic mutation for polycystic kidney disease in Persian cats; faculty developed a diagnostic test to screen cats as young as eight weeks of age to give breeders important information about breeding decisions
- Veterinary cardiologists identified the gene mutation responsible for hypertrophic cardiomyopathy, the most common cause of heart disease in cats. This inherited disease can also cause sudden death in young human athletes. The discovery marks the first report of a spontaneous genetic mutation causing any type of heart disease in a cat or dog.
- Scholarship in canine genetics has contributed to the understanding of the genetic basis for hyperuricosuria, brachycephaly and glioma susceptibility in dogs, Alaskan Husky encephalopathy, spinal dysraphism in Weimaraners, and autoimmune hypoadrenocorticism in Nova Scotia Duck Tolling Retrievers.
- Studies of dogs with cleft lip and palate or auto-inflammatory disease is shedding light on genetic diseases in children.
- A gene mutation that causes high levels of uric acid in all Dalmatian dogs and bladder stones in some Dalmatians, has been identified by a team of researchers. The discovery equips dog breeders with the tools to eliminate that trait from the Dalmatian breed and yields clues to the cause of similar problems in humans.

The first kidney transplants – Clinical faculty transformed human health technology into companion animal practice, saving the lives of beloved pets with incurable kidney problems; one unique feature involved the commitment of each client to adopt the donor cat.

Assisting law enforcement with animal evidence – The Veterinary Genetics Laboratory Forensic Unit is the first accredited crime laboratory dedicated to [animal DNA profiling](#). The unit provides DNA testing to law enforcement agencies and other members of the public. The laboratory has identified animals involved in or “witnesses” to human crimes, identified the remains of lost pets, confirmed animal thefts, and assisted in situations in which an unrestrained animal caused an accident. The forensic unit provided the first DNA evidence to be successfully used in an animal cruelty prosecution in New York City; the case resulted in two felony convictions. To help national humane organizations prosecute dog-fighting crimes, the unit has also established a DNA database of more than 400 dogs seized in raids.

Innovative services – Faculty have introduced new specialties and continue to meet client demand for oncology, physical rehabilitation, behavior, acupuncture and complementary medicine, parrot and aquatic animal health, community medicine, genetics, transfusion medicine, minimally invasive surgery, community-based blood donation and other services.

An alternative to invasive surgery – The [stereotactic radio surgery program](#) is one of the most accurate and safest cancer treatments available for small animals. At the Center for Companion Animal Health, the process incorporates a specialized head frame to stabilize the patient, advanced imaging, computerized dose planning and the delivery of a single, high dose of precisely targeted radiation. This approach minimizes radiation to healthy surrounding tissue, reduces risks associated with anesthesia, and treats tumors and other abnormalities of the brain or pituitary gland without surgery.

Outreach to Southern California clients – The [UC Veterinary Medical Center-San Diego](#) brings specialized services in nutrition, pharmacy, cardiology, hemodialysis and renal medicine to clients living in Southern California.

Advancing animal health through clinical trials – A 2013 initiative expands the school's [clinical trials program](#) into a national resource for clients who wish to participate in leading-edge studies involving new drugs, minimally invasive surgical procedures, radiation [oncology](#) and other medical advances that may benefit serious ill companion animals.

Eye-opening research – Clinicians in the Ophthalmology and Exotics services gathered the first detailed information recorded about the structure of healthy snake eyes, using high-frequency ultrasound studies of the eyes of 12 live, client-owned snakes.

Service with compassion – Student volunteers provide free veterinary services for dozens of animals each month through the award-winning [Mercer Veterinary Clinic for the Homeless](#), co-founded by an alumna and current faculty member. For more than 20 years, these volunteers have gained practical experience, provided spay-neuter assistance and donated pet food for pets of the homeless in Sacramento. Students have also assisted their professors to spay and neuter hundreds of pets as part of Spay Day, a national effort to reduce pet overpopulation and improve animal welfare.

A surprising glimpse into the global heritage of dogs – Reconciling a decade of controversy about the geographic origins of canines, the school's veterinary geneticists traced the [ancestry of modern dogs](#) back to Southeast Asia. Dogs originated from Europe and the Middle East, but several thousand years later, some moved south with ancient farmers and formed the distinct genetic profile reflected in modern canines. Today's dogs likely arrived from Asia as a result of the silk trade and other international travel.

Connecting pets, their owners and new knowledge – The [Center for Companion Animal Health](#) is one of the few places in the world dedicated to studies benefiting dogs, cats and other small companion animals. Experts in infectious disease and cancer founded the center; they work closely with pet owners and faculty to pinpoint pressing issues in health and well-being, identify funding sources and establish research priorities. A unique facility houses laboratories on the second floor dedicated to translational research on veterinary cancer and genetics, while oncology and other specialized clinical services take place on the first floor.