

## It's in the genes

Understanding genes holds the key to diagnosing and treating many diseases and disorders in companion animals. Research leading to discoveries in genetics has had a significant impact on a wide variety of areas of animal health—from treating cancer to preventing certain genetic diseases that affect some purebred breeds to developing tests for autoimmune diseases.

Internationally recognized for its work in genetics research, the Center for Companion Animal Health is uniquely associated with two other essential programs, the Comparative Cancer Center and the Koret Foundation Center for Veterinary Genetics. The juxtaposition of clinical and research units in oncology and genetics in the same building has resulted in collaborations between clinicians, clinician-scientists, and scientists that have led to a number of recent discoveries of significance to the health of small companion animals. Not surprisingly, these discoveries have involved genes.

### Veterinary Oncology

The Comparative Cancer Center has its clinical facilities, radiation therapy unit, and part of its research laboratories in the CCAH building. Its director, Dr. Xinbin Chen, works closely with Dr. Niels Pedersen at the CCAH in research and fundraising.

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Research funded through the CCAH has led to the identification of a gene mutation that causes bladder stones in some Dalmatians.



Dr. Michael D. Lairmore, an accomplished veterinarian, cancer researcher and top administrator, is the new dean of the UC Davis School of Veterinary Medicine.

## Welcome, Dean Lairmore

Dr. Michael D. Lairmore, veterinarian, cancer researcher, and top administrator, coming from The Ohio State University's College of Veterinary Medicine, has been named the new dean of the School of Veterinary Medicine, following a nationwide search. He joined the UC Davis team on October 24.

"It is an honor to serve as dean of one the premier institutions of its kind in the world," said Dean Lairmore. He points to the school's "extensive history of providing outstanding education for society-ready veterinarians and producing innovative research finds to address important problems, ranging from clinical veterinary medicine to public health."

"I find it incredibly exciting and challenging to be part of the UC Davis veterinary community as we build mission-focused programs, contribute to the health of the animals and people we serve, and remain good stewards of the environment and the economy of California," Dr. Lairmore added.

He is a scientist who bridges multiple disciplines to address basic questions related to viral causes of cancer. His research has provided significant

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## Message from the Director

### Dear Friends:

This fall is an especially exciting time for all of us at the CCAH. We are very pleased to welcome Dean Michael Lairmore, an extraordinarily gifted leader, to UC Davis. Also, as this year marks the CCAH's 20<sup>th</sup> anniversary, we want to take this special opportunity to sincerely thank you for your support of our mission of improving small companion animal health.

Since our center was established, we have funded over 1,300 faculty and resident research proposals. Health studies funded by the CCAH have been instrumental in the development of new strategies to diagnose, treat and prevent health problems of pets. Some of these developments are highlighted in this update.

Our successes would not have been possible without devoted pet owners like you. Your support of the CCAH has helped our school to excel in many ways. Each faculty member of the UC Davis School of Veterinary Medicine publishes twice as often as colleagues at similar institutions. Our school has been ranked second in the world, only to the USDA, in total articles cited and among the top 25 comparable animal health related institutions in the world in terms of research impact.

We are deeply grateful to you and look forward to working with you in the future. With your help, our animal friends are able to live longer and healthier lives.

Yours sincerely,

Niels C. Pedersen, DVM, PhD  
Director, CCAH

*“As we celebrate our 20th anniversary in 2011-12, we especially want to thank our many caring donors for contributing so much to help us advance our mission. Thank you all!”*

– Dr. Niels C. Pedersen

## It's in the genes Continued from page 1

Dr. Chen and his team, working with a large number of dogs that are seen with a type of cancer called lymphoma, have just reported on the discovery of a gene known as RNPC1. Its protein appears to play a key role in the formation of lymphoma and other tumors by inhibiting another gene that suppresses cancer formation. Their findings were reported in the July issue of the journal, *Genes and Development*.

The researchers suggest that the newly identified protein may be a potential target for diagnosing and treating lymphoma in humans and animals. It is hopeful that a test will be made for this particular genetic defect and will be offered to breeders and the public.

### Veterinary genetics

The Koret Foundation Center for Veterinary Genetics, a part of the Veterinary Genetics Laboratory, is housed in the facilities of the CCAH. Dr. Pedersen is also director of the Veterinary Genetics Laboratory. The center has four units within the CCAH involving canine genetics (Dr. Danika Bannasch), feline genetics (Dr. Leslie Lyons), wildlife genetics (Dr. Holly Ernest), and Canid diversity (Dr. Ben Sacks).

### Canine genetics

**Urinary disease in Dalmatians** Dr. Bannasch discovered and reported  
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## Dean Lairmore



Our new dean, Dr. Michael Lairmore, meets with Dr. Pedersen and graduate students at the CCAH.

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breakthroughs in the biology of human retroviruses and the understanding of viral-associated carcinogenesis.

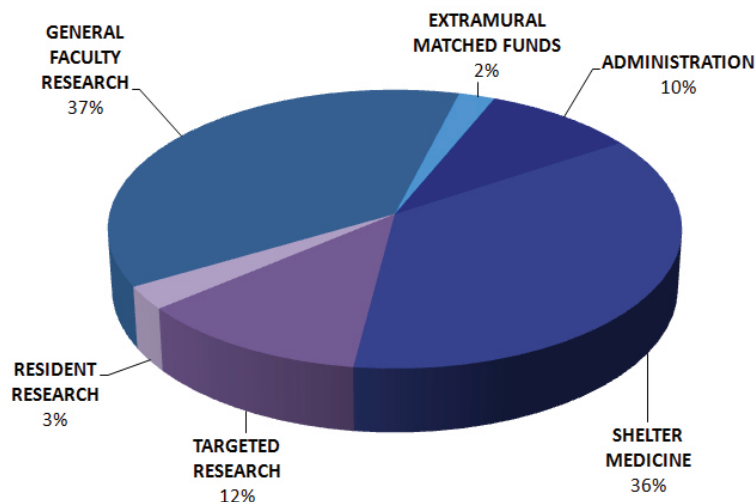
Dr. Lairmore earned his DVM degree from the University of Missouri at Columbia and went on to complete a pathology residency and a PhD in experimental pathology, both at Colorado State University. His career has included success in private practice, research and academia. 🐾

# CCAH by the numbers

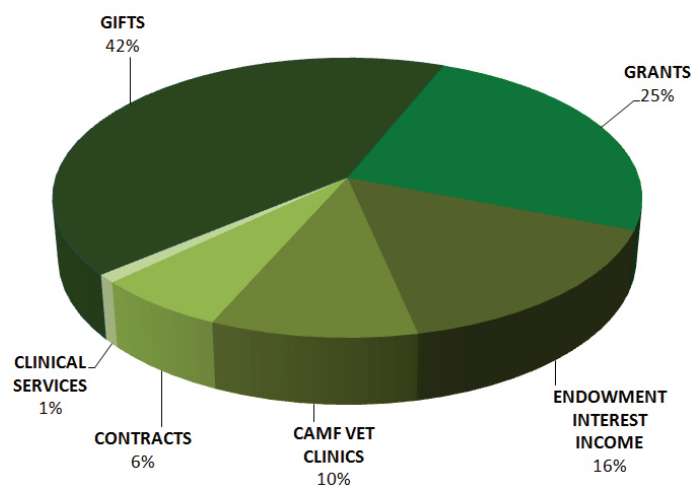
Since 1991 the center has granted more than **\$19 million in support** to the **UC Davis School of Veterinary Medicine** faculty and residents for animal health studies. This includes a matching funds program, which encourages extramural funding from external agencies and organizations. Additionally, from 1997 to 2004, the center worked closely with the school's Development Office on its building campaign—**raising over \$16 million** for the **building** and funding for critical **major equipment**. This remains the only facility on campus to be built entirely from private donations.

The CCAH's primary sources of support are private individual donors and veterinary clinics. Endowment interest income, especially from estates, is increasingly becoming a source of funds. We are extremely grateful for **every** gift and grant in support of our mission to improve the health of our companion animals. **Thank you!**

CCAH Research Support



CCAH Income



## HEALTH TIPS: Winterizing your pet

By Dr. Benjamin Hart

**A winter coat for your dog—a wool one** Just as we winterize ourselves, by bringing out the warmer clothes and staying inside more, we naturally think about winterizing our pets, especially if we live in a colder climate or vacation with our pet to a colder place. For dogs with a thin coat, such as greyhounds or miniature pinschers, a fitted wool coat can be a good idea. Doggie boots can also be helpful for icy walks or where de-icing granules are spread on the walking path. Or, wipe off paws after a walk that has been de-iced so there is no chance your dog will lick off the chemicals.

**Watch that antifreeze** Another way we winterize our lives is to check over the car for winter driving and this may mean topping off the antifreeze. The most common antifreeze is ethylene glycol, which is sweet tasting. The small amount spilled on the floor may attract a pet. But this is highly toxic to pets, even small amounts. So be vigilant and clean up every last drop.

### Less activity means less food

It's not just people that tend to gain weight in winter; often our pets run around less in rainy or snowy days, or we take the dog—and ourselves—on walks less often. Being overweight is becoming common in pets. The answer is to cut back on food. Show your love by more smooching, petting, walks, and playing games, not by the food. Put food in a different category; it is not a way of showing love.

**Arthritis can get worse in winter** The problem is not only that cold floors can make the arthritis a bit more painful, but cutting back on those gentle walks means that the joints are lubricated less. In the winter, or rainy, snowy months, do what you can to follow your veterinarian's advice in keeping those arthritic joints gently lubricated with some mild walking. 🐾





## It's in the genes Continued from page 2

on the genetic defect that causes elevated uric acid levels in the blood and urine in individuals of several dog breeds. The defect in a gene called SLC2A9 is present in all Dalmatians registered up to this time and is a cause of bladder stones. This condition can be particularly troublesome in males which can more easily suffer a urinary blockage.

The discovery was based on research with a previously unregistered bloodline of Dalmatians that was created to be free of the defective gene. This was achieved by first crossing Dalmatians with English Setters, then continually backcrossing to Dalmatians and keeping only those crosses that are free of the defective gene. These dogs eventually became greater than 99% Dalmatian by genetic testing, but were at first not accepted by many Dalmatian breeders for inclusion in the official breed.

Dr. Bannasch and other researchers and breeders worked diligently to convince the AKC registry that these dogs should be officially recognized as Dalmatians and used to hopefully free the breed of this defect. The test for this genetic defect was made available to diagnostic laboratories around the world and is commonly run by the VGL.

### Coat disorder in Standard Poodles

Dr. Pedersen and his assistant Hongwei Liu have been heavily involved in several genetics projects. They are collaborating with a group in the UK headed by Dr. Mike Boursnell in trying to discover the genetic basis for a debilitating coat disorder of the Standard Poodle and several other breeds. This disease, called sebaceous adenitis, causes widespread hair loss, due to what is believed to be an autoimmune destruction of the hair follicles.

### Autoimmune brain disease of Pug dogs

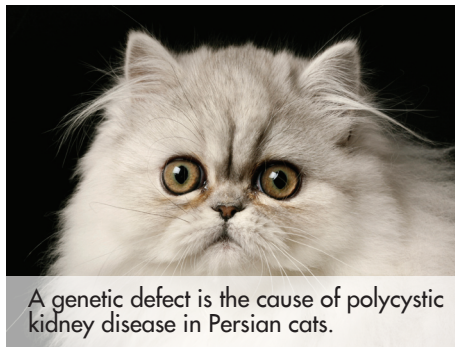
Dr. Pedersen, with a group of collaborators, developed a test for a serious autoimmune brain disease

of Pug dogs called necrotizing meningoencephalitis. The test will allow Pug dog breeders to select mating that will reduce the risk of their puppies dying from NME thirteen fold. This test is now routinely run at the VGL and made accessible at no cost to other laboratories as well.

## Feline genetics

### Kidney disease in Persian cats

Dr. Lyons has identified the genetic basis of many coat colors and patterns in cats, but more importantly has led the way in identifying genes responsible for diseases such as progressive retinal atrophy, blood group



incompatibility (an Rh-like disease), and polycystic kidney disease. PKD was extremely common in Persian cats and breeds with Persian blood. It causes the formation of multiple cysts in kidneys and sometimes the pancreas. These cysts progressively grow and become scarred with time. The ultimate result in those with severe disease is kidney failure.

The genetic defect for PKD was found to be nearly identical to the defect causing type 1 PKD in children. A test has been developed and also licensed to other laboratories, including the VGL. The gene is called PKD1.

### Feline infectious peritonitis (FIP)

Dr. Pedersen and his team have also been involved in a project that involves identifying a gene or genes that appears to greatly enhance the susceptibility of



The Veterinary Genetics Laboratory at UC Davis is the largest animal genetic testing laboratory worldwide.

The VGL offers genetic testing services for cats, dogs, horses, alpacas, llamas, and several primate and wildlife species. Last year over 150,000 samples were tested—determining animal identification, parentage verification, genetic diseases and traits, clinical chromosomal abnormalities, and forensic analysis.

The identification and parentage testing services provided to breed registries and breeders address the industry's needs for parentage verification based on state-of-the-art DNA technologies. Genetic diagnostic testing services provide highly accurate genotype information to guide breeders and breed registries in the decision making processes for evaluating breeding programs.

Integrating solid scientific research, education and programs, the VGL provides services that ultimately benefit the animal breeding industry at large.

For more information on the VGL, visit: [vgl.ucdavis.edu](http://vgl.ucdavis.edu).

young cats to FIP.

This disease is caused by a mutant form of a common intestinal coronavirus and is a cause of death in one to five percent or so of young cats, especially those coming from shelters and pedigreed catteries. They have been working closely on this study with breeders and veterinarians working with Birman cats in Denmark.

They also work with SOCK FIP, a dedicated group of individuals who

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# CCAH Research Studies: Your gifts benefitting animal health

Your gifts provide essential resources to help fund important research studies improving the health of companion animals. These are a few highlights of current research projects at the CCAH.



## Dogs

Developing a test for dog T cell proliferations

Dr. Peter Moore

Identifying the genetic basis for cleft palate in specific dog breeds

Dr. Danika Bannasch

Testing the genetic risk for immune disorders of dog breeds

Dr. Niels Pedersen



## Cats

Assessing nutritional amino acid concentrations in cats consuming commercial diets

Dr. Andrea Fascetti

Evaluation of an analgesic (pain reliever) for osteoarthritis in geriatric cats

Dr. Alonso Guedes

Studying genetic mutations affecting many cat breeds

Dr. Leslie Lyons

Studying the cat's immune system responses to Feline Infectious Peritonitis (FIP) virus

Dr. Ellen Sparger



## Avian and Exotic Pets

Analyzing anesthetics for rabbits

Dr. Linda Barter

Comparing two analgesics for effective use in parrots

Dr. Joanne Paul-Murphy

Is genetic inbreeding of pet ferrets a contributing factor of cancer?

Dr. Holly Ernest

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raise money for FIP research. The hope of research on these autoimmune disorders and FIP is to develop tests to identify individuals that will produce puppies or kittens that are at increased risk for these diseases.

### Ferrets, genetics and cancer

Dr. Ernest and her clinical collaborator Dr. Michelle Hawkins (service chief of the Companion Avian and Exotic Animals service) have had a long interest in ferrets, which have become a popular pet among many families in the U.S. and other countries. However, the lifespan of pet ferrets is greatly shortened by a very high occurrence of several types of cancer.

Drs. Ernest and Hawkins believe that this increased incidence in cancer is associated with severe inbreeding in pet ferrets in the U.S. It seems that pet ferrets originated from a few animals coming out of research colonies, where ferrets were being used to study such diseases as gastric ulcers.

The collaborators have developed a large panel of genetic markers, which will be used to determine the degree pet ferrets are inbred. Preliminary studies confirm that they

are quite inbred and that pet ferret populations from other countries may be more genetically diverse. This leads to the possibility of increasing genetic diversity in the American ferrets by the careful and monitored introduction of new bloodlines.

### Canid diversity

Drs. Pedersen, Ben Sacks, and Sarah Brown have just completed a study of genetic diversity among village dogs in the Middle East and mainland and island Southeast Asia. They discovered that dogs from these two regions have been genetically isolated from each other for 10,000 years.

They also discovered that indigenous dogs in villages throughout these regions have not interbred to a significant degree with modern breed dogs. Therefore, these village dog populations represent genetic repositories for virtually all of the ancient genetic diversity of dogs, much of which is being lost and/or parceled out by modern breed development over the last 100 to 400 years. The genetic diversity in these village dogs may be critically needed someday to correct problems connected to inbreeding in some modern breeds. 🐾

## Mangrove Veterinary Hospital

**M**angrove Veterinary Hospital, dedicated to providing compassionate veterinary care to pets since 1964, is one of the oldest veterinary clinics in Chico, California. The hospital is located in Butte County, about ninety miles north of Sacramento.

Several years ago, veterinarians at Mangrove Veterinary Hospital began supporting the Companion Animal Memorial Fund as a heartfelt way to remember beloved pets who have passed away and to show appreciation to their owners, both regular and walk-in clients. While the hospital offers the convenience of extended hours with no appointment needed, some pet owners come in only on occasion and are actually regular clients at other practices in the area.

“We want all pet owners who visit us to know that even though we may not be their regular veterinarian, we care about them and recognize the relationship they have had with their pet, who is now gone. This is as important for the owners we see one time as it is for the owners who have trusted Mangrove for years,” says Dr. Erin Portillo (DVM Oklahoma State University, ACVIM Iowa State University), the practice’s medical director.

*“We believe that a contribution to the Companion Animal Memorial Fund is a wonderful way to support research that will improve pet health and the human-animal bond.”*

— Dr. Erin Portillo  
Mangrove Veterinary Hospital

Dr. Portillo and associates, Drs. Tori Letner, Lynne Caikoski, Suzanne Hanson, Carol Wrinkle, and Christina Sierra, will be joined in December 2011 by seven other doctors when Mangrove Veterinary Hospital merges with Acacia Veterinary



Hospital, also in Chico. Acacia brings Drs. Jim Esh, Lariann Baretta, Sue Kimbrell and Julia Hutler. Also joining the staff will be Drs. Danny Gebhart and Travis Howarth. The new hospital, Valley Oak Veterinary Center, will be open 24 hours a day, and will offer walk-in convenience, scheduled appointments and specialist services, including internal medicine, surgery, and ophthalmology. The veterinarians and staff will occupy a brand new building, with space to grow.

Practice manager Shelly McNutt says that the hospital’s goals include being able to provide as many services to pets in the Butte County area as possible and to help pet owners avoid having to travel out of town. “We want to make general and advanced care accessible to all clients.”

In their new building, with round-the-clock services, they will see many more new clients and their pets, and expect to be able to continue contributing to the Companion Animal Memorial Fund when pet owners have said goodbye to a beloved family member. 🐾

*Many thanks to the more than 300 caring veterinary clinics who further the CCAH mission by supporting the CAMF.*

*To see a list of participating veterinary clinics, visit:*  
**[vetmed.ucdavis.edu/ccah/donations/companion\\_animal\\_mem\\_fund.cfm](http://vetmed.ucdavis.edu/ccah/donations/companion_animal_mem_fund.cfm)**.

## BEHAVIOR TIPS: Socializing your puppy

By Dr. Melissa Bain

**P**uppies are joyful creatures, but they come with an abundance of responsibility. In addition to housetraining and stopping unruly behaviors, it is very important to adequately socialize your new member of the family. During their early lives, between the ages of about 4 to 14 weeks, puppies are like little sponges, absorbing all that comes at them from their environment. It is important to safely expose them to many different people, places, and things, while making sure that he or she doesn’t become fearful in these situations.

Consult with your veterinarian on places to avoid to decrease the chance of your puppy getting sick from other dogs. Such places may include dog parks, pet stores, and locations that many dogs visit. For more information on how to safely socialize your puppy, as well as other handouts on behavior topics, visit **[behavior.vetmed.ucdavis.edu](http://behavior.vetmed.ucdavis.edu)**. 🐾





# In Tribute

## Legacy of Compassion and Loving Animals

Ms. Maxine Adler of Florida was a very compassionate person and remembered fondly as someone who loved animals. She was especially devoted to her feline companions and to the long-term health and welfare of all cats.

About 10 years ago, Ms. Adler brought her cat, Du Bee, to the William R. Pritchard Veterinary Medical Teaching Hospital, for cancer treatment. Because of the excellent care received, Du Bee's quality of life was significantly improved.

When cancer eventually took the life of her beloved Du Bee, Ms. Adler became determined to find a cure for cancer in companion animals. She became interested in partnering with the Center

for Companion Animal Health in finding answers to the most serious health problems affecting cats, with a special emphasis on cancer. While living, Ms. Adler established an endowed cancer research fund in memory of Du Bee.

When Ms. Adler passed away in 2009, several new endowments were created through her estate: two endowed chairs, one in oncology and the other in genetics; graduate student fellowships; and the UC Davis Koret Shelter Medicine Program. The total value of her gift could reach \$8 million, making it one of the largest single donations in the School of Veterinary Medicine's history.

Although Ms. Adler passed away, her love of felines will always be



A bequest from the estate of Ms. Maxine Adler leaves a lasting legacy that will advance the health and well-being of cats and other companion animals.

remembered and her generous legacy will continue to advance the health and well being of companion animals for generations to come. 🐾

## Missy Ling



Missy Ling, a Chow Chow with a gentle spirit, developed liver cancer at the age of seven. She bravely underwent two major surgeries, received chemotherapy and endured

many trips for treatment within her home country of Canada and the United States.

Determined to seek the very best veterinary care for Missy Ling, devoted owners Paul and Ann Nowak were willing make the long-distance trip from Canada to bring Missy Ling to UC Davis for treatment.

Dedicated veterinarians and staff tried valiantly to save the loved Chow Chow. But sadly the cancer took Missy Ling's life. Despite their loss, the Nowaks were grateful for the efforts of the veterinary team at UC Davis and the added time they gave them to share with Missy Ling. 🐾

*"There are voids in our hearts that so many others share when losing their own pet companions. However, we do believe that we had the privilege of having Missy Ling in our life longer than expected due to those in veterinary science that believed in her and our own commitment to do whatever we could. At the end of her life, they stood alongside us in support of when we bid our final farewell to this gift in our own lives—having forever imprinted her gentle ways upon us."*



Missy Ling and Buster

For more tributes to special pets, visit:  
[vetmed.ucdavis.edu/CCAH/animal\\_stories](http://vetmed.ucdavis.edu/CCAH/animal_stories)

— Paul and Ann Nowak

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For subscription questions, contact the Development Office at (530) 752-7024 or [development@vetmed.ucdavis.edu](mailto:development@vetmed.ucdavis.edu).

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Scout,  
the most loyal  
companion  
and forever  
loved