



School Update and Impacts September 2017

NEW FACULTY



Dr. Barbro Filliquist recently joined the department of surgical and radiological sciences as an assistant professor of Clinical Small Animal Orthopedic Surgery. She earned her DVM here at UC Davis in 2006, and completed a three-year surgical residency in 2010. She is a Diplomate of the American College of Veterinary Surgeons and the European College of Veterinary Surgeons. Filliquist pursued a one-year rotating internship in small animal medicine and surgery at the University of Pennsylvania before her residency, and also worked in private practice in Washington state and Sweden for seven years. Her areas of interest include minimally invasive surgery, joint surgery, and the use of antibiotics in veterinary medicine and prevention of surgical site infections.

Dr. Smita Iyer recently joined the department of pathology, microbiology and immunology; and the Center for Comparative Medicine as an Assistant Professor. She received her MS (2003) from Purdue University, and her PhD (2008) at Emory University where she continued as a post-doctoral scholar (2009-2012). Iyer was appointed as a Research Associate (2012-2016) and then accepted the position of Assistant Professor. Her research focuses on understanding the immunology of HIV vaccine efficacy in non-human primate (NHP) models, exploring immunopathology in HIV models of infection, and delineating mechanisms of HIV susceptibility in humans and NHPs.



Dr. Denis Marcellin-Little joins UC Davis from North Carolina State University, where he was a faculty member for 23 years. He is a Diplomate of the American College of Veterinary Surgeons and a charter Diplomate of the American College of Veterinary Sports Medicine and Rehabilitation. He graduated from veterinary school in Toulouse, France in 1988. He did an internship at Hollywood Animal Hospital in Hollywood, Florida, followed by a small animal surgery residency at North Carolina State University. Marcellin-Little's areas of interest include total joint replacement and the management of limb deformities. His research interests include biomodeling and the fabrication of custom orthopedic implants using metal 3D printing and other methods. He is establishing a medical manufacturing laboratory at UC Davis that will help patients with complex orthopedic problems.

NEW LEADERS

Dr. John Angelos has been appointed as director of the Center for Food Animal Health (CFAH) effective September 1, 2017. He also serves as chair of the department of medicine and epidemiology. A veterinary internist with expertise in livestock medicine and surgery, Angelos has a longstanding interest in understanding the pathogenesis and prevention of infectious bovine keratoconjunctivitis (IBK; 'pinkeye'). His extensive clinical experience and understanding of industry needs will be beneficial in guiding the future



direction of CFAH. In this position, Angelos will assist the administration and faculty in securing resources for conducting research on animal diseases important to our livestock industries, important food- and vector-borne disease problems and zoonoses associated with diseases of livestock critical to the State of California, and sustaining the integrity of the production environment and surrounding ecosystem. Through commodity/industry advisory and scientific advisory committees he will foster collaborative research efforts between Agricultural Experiment Station (AES) and Cooperative Extension (CE) faculty and related UC programs.



Dr. Kent Pinkerton was recently appointed director for the UC Western Center for Agricultural Health and Safety (WCAHS). Pinkerton has served as the associate director of WCAHS for 15 years and is a principal investigator of a current WCAHS research project. He is a specialist in the respiratory, cardiovascular, and neurological effects of inhaled environmental air pollutants. He has conducted a number of studies in the California San Joaquin Valley to better understand how airborne particles in the agricultural setting contribute to the development of lung diseases, such as asthma and COPD. He is currently studying which agricultural practices pose the greatest risk to farmers and farmworkers from inhaling particulate matter. The goal is to establish effective strategies for farmers and workers to better understand their potential

exposure to particulate matter and how best to manage it. Pinkerton is a professor of pediatrics at the UC Davis School of Medicine and professor of anatomy, physiology and cell biology in the School of Veterinary Medicine. He also serves as director of the Center for Health and the Environment and associate director of the Environmental Health Sciences Center, both located at UC Davis.



Dr. Edward Schelegle has recently been appointed as chair of the department of anatomy, physiology and cell biology. Schelegle was identified by his departmental colleagues as the individual within the department who can most competently and compassionately support their academic careers, manage the department, and represent them within the school and beyond. His primary area of research is pulmonary physiology, and within that field he has a sustained record of scholarship in lung physiology. Schelegle teaches physiology to professional students, has contributed substantially to curriculum development, served on curriculum committee, and contributes to graduate education and mentorship of research trainees.

FACULTY RECRUITMENTS

- Professor of Clinical Small Animal Emergency and Critical Care
- Professor of Clinical Microbiology-San Bernardino (CAHFS)
- Professor of Neurology/Neurosurgery
- Professor of Anesthesiology
- Professor of Clinical Neurology/Neurosurgery
- Professor of Dermatology Professor
- Professor (50%)/Professor In-Residence (50%) of Respiratory Biology or Toxicology
- Professor of Clinical Anatomic Pathology-Tulare (CAHFS)
- Specialist in Cooperative Extension-Beef Cattle Herd Health and Production
- Specialist in Cooperative Extension-Dairy Cattle Production Health Management
- Specialist in Cooperative Extension in Antimicrobial Stewardship
- Health Sciences Assistant Clinical Professor in Community Practice
- Assistant Professor of Epidemiology in Climate Adaptation Health

VETERINARY MEDICAL CENTER – LEADING THE WAY



Advancements in medical technology are rapidly driving a new age of diagnostic imaging. The veterinary hospital is leading the way in this capacity, and the team envisions an **All Species Imaging Center (ASIC)** as a hub of the new Veterinary Medical Center. Centrally located in the new facility, ASIC will bring together radiology, ultrasound, nuclear scintigraphy, magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography (PET) under one roof to better serve patients and clients.

These imaging techniques are critical not just for diagnostics, but to guide the precision therapy clinicians provide to patients. Additionally, imaging is becoming more important in assessing how patients are responding to new treatments. Imaging requires cutting-edge equipment and specialized space. Therefore, having a

designated area to house this equipment together will streamline patient care. The ASIC will reduce wait and anesthesia times (thus reducing stress on the animal), allow different imaging tests to be conducted at the same time and, above all, promote integrated care and research of the highest quality.



The future of imaging at UC Davis will embrace PET scan technology to diagnose injuries that may not be visible with other imaging modalities. The ASIC will also expand MRI capabilities and enable space for a second MRI unit to expand clinical operations and enhance research discoveries. Our clinical and research MRI caseload has steadily increased over the past 15 years, nearly tripling since 2002.

UC DAVIS WELCOMES VETERINARY CLASS OF 2021

Families, friends, faculty and staff gathered at the school's new event lawn in mid-August to celebrate and welcome 148 new veterinary students during the annual White Coat Ceremony. With a mixture of excitement and nerves, the Class of 2021 listened to words of encouragement and advice from the speakers before donning their white lab coats, receiving their stethoscopes, and reciting the veterinarian's oath.

Dean Michael Lairmore congratulated the members of the new class, acknowledging their hard work and dedication to the rigorous academic journey that has brought them to this exciting point – a place

where they will learn to “not only treat animals, but to treat humanity.” His brief description of the school’s 70th class included an acknowledgement of their life experiences as athletes, dancers, gymnasts, artists, competitive equestrians, scuba divers, skydivers, and outdoor enthusiasts. Their musical talent features pianists, guitar players, drummers, violinists, ukulele players, and at least five chorale singers. This class has also amassed significant international experience. Collectively, they have visited or worked in 34 countries, which blends well with the veterinary profession’s global health focus.



Keynote speaker Karl Jandrey, associate dean of Admissions and Student Programs, challenged the students to become professionals who solve problems willingly and with bravery.

“There is a continuing expectation that those who wear white coats are granted a certain stature and respect that cannot be forgotten,” said Jandrey. “Own your intentions. Own your impact. Accept the gift of education and enter the profession with bravery and responsibility. Become the servant-leaders of the future.”

MPVM 50TH YEAR ANNIVERSARY



More than 100 alumni, faculty and friends gathered to celebrate 50 years of the Masters in Preventive Veterinary Medicine (MPVM) program in early September. This enthusiastic group shared memories and stories, and “traveled through the decades” with speakers Drs. Bill Pritchard, Dave Hird ('73), Ashley Hill ('99) and others. Profiles and achievements of founding faculty Dr. Calvin W. Schwabe and George West were highlighted.

The MPVM program, established in 1967, has graduated more than 1,000 trained veterinary professionals to investigate and evaluate disease and production problems in animal populations and to design and implement disease control programs. From its beginning the faculty MPVM grads hold top-level governmental, private industry, academic and practice careers in the U.S. and 86 other countries, effectively impacting and improving animal and human health on a global level.

The day's festivities included a keynote address by Dr. Marguerite Pappaioanou, an epidemiologist and veterinarian with over 30 years' experience working toward improving global and U.S. public health most recently as CDC's Liaison to FDA for Food Safety. Over her career she has served 24 ½ years at CDC working on global emerging infectious and zoonotic disease surveillance, prevention and control programs.

Participants also heard from Dr. Stephanie Ostrowski this year's Robert Dyar Labrador Memorial Lectureship in Epidemiology. Ostrowski, an associate professor in the department of Pathobiology in the Auburn University College of Veterinary Medicine. She serves as the lead faculty coordinator for DVM+MPH combined degree program. In 2010, Ostrowski retired from the U.S. Public Health Service (USPHS) as a Commissioned Officer (Veterinary Category), having achieved the rank of Captain following 20 years of service.

Alumni had plenty of opportunity to visit, share experiences, take photos, and tour school facilities. At the evening gathering participants sampled Aggie wines and beer while celebrating the successes of colleagues from this pioneering program. The weekend ended with a continuing education program provided by current and past faculty members.

"This event was a testament to the value of the MPVM educational training and the worldwide impact of its graduates," said Ashley Hill, current MPVM program Director.

STEM CELL TREATMENT FOR SPINA BIFIDA HELPS DOGS AND CHILDREN



A pair of English bulldog puppies born with spina bifida are the first patients to be successfully treated with a unique therapy—a combination of surgery and stem cells—developed at UC Davis by a team of veterinary and human medicine researchers and clinicians.

Dr. Dori Borjesson, professor of pathology, microbiology and immunology and director of the Veterinary Institute for Regenerative Cures (VIRC) at the UC Davis School of Veterinary Medicine, and Dr. Aijun Wang, assistant professor of surgery and co-director of the Surgical Bioengineering Laboratory (SBL) at the UC Davis School of Medicine, collaborate to identify diseases that affect both people and animals in order to pioneer unique regenerative medicine cures for these diseases. In the case of the bulldogs, placental stem cells were developed by the researchers, then characterized and combined with a tissue-engineered scaffolding to optimize treatment by UC Davis veterinary surgeons.

Because dogs born with spina bifida frequently have little control of their hind quarters, they also have little hope for a future. They are typically euthanized as puppies. Thanks to this groundbreaking research, there is now hope for these dogs, as well as a basis to inform human clinical trials for babies with the birth defect.

The surgical techniques, developed by Dr. Diana Farmer, professor and chief of surgery at the UC Davis School of Medicine, combined with the stem cell treatment developed by the research faculty, are progressions toward her goal of curing spina bifida. Dr. Beverly Sturges, professor of neurosurgery at the UC Davis veterinary hospital, wanted to find out if Farmer's surgery-plus-stem-cell approach could give dogs closer-to-normal lives along with better chances of survival and adoption. At 10-weeks old, bulldog siblings Darla and Spanky were transported from the Southern California Bulldog Rescue to UC Davis, where they were the first dogs to receive the treatment.

After a few days of monitoring to see that they were healthy enough for the procedure, Darla underwent surgery on the third day of hospitalization, and Spanky on the fourth. In surgery, a myelomeningocele was identified at the L7 region of both dogs, consistent with the spina bifida identification on their MRIs. The dogs displayed dorsal positions of the lower extremities of their spinal cords, which were tethered. The sites were

dissected and replaced in their spinal canals, with stem cells being surgically placed over the defects. At their 2-month recheck appointment, Darla and Spanky showed off their abilities to walk, run, and play.

“The initial results of the surgery are promising, as far as hind limb control,” said Dr. Sturges. “Both dogs seemed to have improved range of motion and control of their limbs.”

The dogs have since been adopted, and continue to do well at their new home in New Mexico. This “One Health” approach to medicine is best exemplified at universities like UC Davis, where physicians and veterinarians, along with their research counterparts, work side-by-side to develop cures and treatments to diseases and illnesses that affect humans and animals.

PREDICTING CANCER’S SPREAD TO CATCH IT EARLY

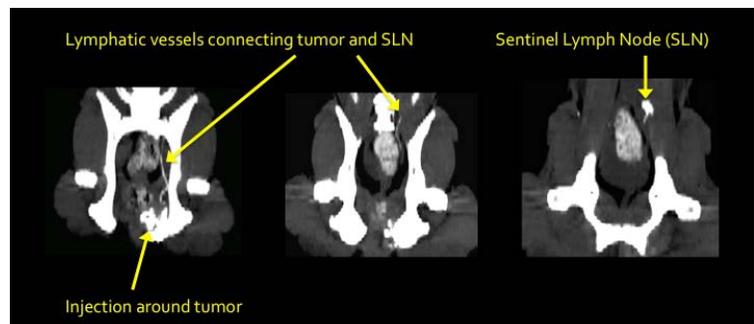
When you hear that cancer has spread to the lymph nodes, it doesn’t matter whether the patient is a dog or a human, you know it can’t be good. Involvement of lymph nodes can be important in the spread of many cancers for both species. Being able to predict which lymph nodes are most likely to be affected by cancer can make a big difference in catching cancer early and directing appropriate treatment.

With donor funding from the Center for Companion Animal Health, veterinary cancer surgeon Michele Steffey has been working to determine the best protocols and techniques for sentinel lymph node mapping - widely used in human cancers - in her canine patients to answer the critical question of which nodes may be involved in cancer’s spread.

“That knowledge will help us make important decisions in choosing which nodes to biopsy and how best to target the disease with the most appropriate treatments,” Dr. Steffey said. “The main point is to identify earlier and more accurately where a particular cancer is going to spread first in the lymphatic system if it is going to metastasize. Our goal is to catch cancer early, and to do it as minimally-invasively as possible, which translates to better outcomes for our animal patients.”

Sentinel lymph node mapping techniques, that identify the first lymph node the cancer is likely to spread to, are now available to a wide variety of cancer patients at the UC Davis veterinary hospital. Steffey and fellow researchers recently published studies in the journals *Veterinary and Comparative Oncology* and *Veterinary Radiology & Ultrasound*

that used ultrasound and computed tomography (CT) in dogs with anal sac gland adenocarcinoma to evaluate the ability of different imaging methods to “see” the lymph nodes of the pelvis, and subsequently to identify the sentinel lymph nodes. A third study evaluating sentinel lymph node mapping in dogs with mast cell tumors is being written up and introduces an exciting new technology with real promise for use in veterinary patients. A fourth study in dogs with oral tumors is ongoing and enrolling patients.



EMERGENCY PREPAREDNESS EFFORTS

The West is on fire, the East is under water, and everywhere emergency responders, including veterinarians, are responding to the disasters hitting our nation. The school’s Western Institute for Food Safety and Security (WIFSS) has more than a decade of experience partnering with FEMA and the Department of Homeland Security to train and prepare emergency responders, veterinarians, food producers, and emergency planners in rural communities for responding to natural disasters and disease outbreaks. WIFSS has developed a number of resources to help the public prepare for big and small animals for evacuation at:

www.wifss.ucdavis.edu/prepare-now-arrival-irma-disasters



For pet owners, one single lifesaving message dwarfs all others: evacuate early and bring your pets with you. To help prepare farm and ranch owners for anticipated flooding, WIFSS developed pamphlets for livestock owners and horse owners (found at above website). Designed as Just-In-Time resources, these pamphlets provide information for farmers and ranchers on how to prepare, respond, and recover from flooding, and include topics such as, how to access your FEMA flood map, evacuation checklists, disaster relief grants, and more.

Recognizing the particular difficulties facing dairy farmers, WIFSS partnered with the California Dairy Quality Assurance Program (CDQAP) to develop the dairy flood web-page which includes disaster plan templates, checklists for the evacuating dairy and the hosting dairy, a step-by-step list for recovering from a flood event, and more: cdrf.org/2017/09/07/cdqap-ruminations-coping-flooding-evacuation

WIFSS has also partnered with state and federal agencies to develop training for veterinarians and first responders related to animals in disasters. For more information: www.wifss.ucdavis.edu/courses

EQUINE RESEARCHERS TACKLING CORONAVIRUS

While there is still much to be known about equine coronavirus (ECoV), researchers at UC Davis are discovering many commonalities among horses infected with the disease and are hopeful to someday find the root cause. Some suspect it may have developed from bovine coronavirus and spread across species. What is known about the spread of ECoV among horses is that respiratory shedding of the disease is unlikely. ECoV is mostly spread feco-orally, according to Dr. Nicola Pusterla, meaning it can be passed from horse-to-horse via exposure to contaminated feces.



Pusterla recently gathered all of the clinical equine veterinarians at UC Davis to update them on the disease, as recent outbreaks have brought patients to the hospital. The school's research showed that most horses with ECoV will present as anorexic (98%) and lethargic (88%), with an elevated rectal temperature ($\geq 101.5^{\circ}\text{F}$; 81%). Less common signs may include diarrhea (23%), colic (16%), and neurologic deficits (4%) such as aimless wondering, headpressing, recumbency or seizures. However, veterinarians should not assume that symptomatic horses have ECoV and asymptomatic horses do not. PCR testing throughout this research confirmed that 10-20 percent of asymptomatic horses involved in outbreaks have detectable ECoV in their feces.

While ECoV was reported in foals more than two decades ago, ECoV in adult horses has only recently been recognized as a new infectious virus. Unfortunately, little research has been performed to better understand the virus and its disease. Pusterla and his team are continuing to discover more of this emerging disease's traits.

Initially, ECoV was only associated with foals, but outbreaks around the world among adult horses confirm that the disease is not age specific. In 2011, a group of adult draft racing horses in Japan contracted the disease, and groups of adult horses at facilities in more than ten U.S. states were infected between 2011-14. Due to the increased awareness of ECoV infection in horses and the availability of testing modalities, outbreaks of ECoV continue to be reported across North America. Faculty work with many of these facilities to help contain the outbreaks and treat the animals by offering diagnostic support in exchange for clinical and biological information on the infected horses. This data helps researchers further their understanding of ECoV and gain valuable epidemiological information.

EDUCATING THE NEXT GENERATION OF SCIENTISTS



Over the course of three weeks at UC Davis this summer, Dr. Rebecca Bellone worked with 12 motivated and enthusiastic high school students in a unique hands-on course designed to help propel them toward college. These students, mostly California residents but some from as far away as Washington, were part of the Pre-College Program offered through UC Davis Extension.

This year, the school's Veterinary Genetics Laboratory (VGL) led one of the educational tracks designed to expose the students to important concepts and techniques in veterinary genetics while also exposing them to the field of veterinary medicine.

With the help of several faculty, staff, and students at the VGL and the veterinary hospital students learned to perform horse parentage-testing experiments and the importance of those tests in population management. They also conducted genetic studies to identify changes in the DNA that are responsible for many different traits in the horse from eye color variation to cancer.

The students took part in observing several different types of clinical examinations and learned how these contribute to scientific discovery. Finally, the students visited both the UC Davis Animal Science horse and goat facilities and learned important animal husbandry practices for several species. This program is one of several that faculty participate in aimed at introducing high school and college level undergraduates to science and math programs with a particular emphasis on veterinary medicine.

USING COMPUTER SOFTWARE TO MAP EQUINE PAIN

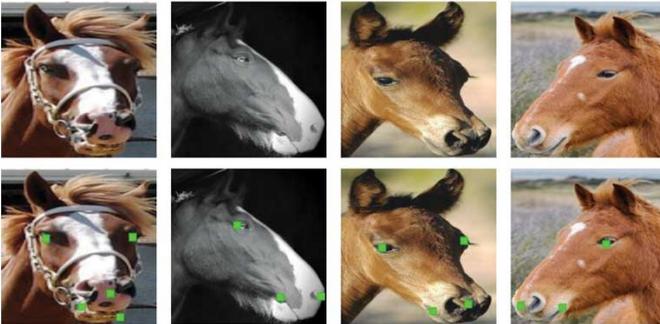
All day every day 50 horses at Davis are under surveillance. The observations are intended to help veterinarians, students, technicians and owners detect expressions of pain on horses' faces. Like humans, horses exhibit involuntary facial expressions to communicate stress, fear and pain. Also like humans, animals can display those expressions in subtle ways, according to Claudia Sonder, DVM, of the UC Davis School of Veterinary Medicine.

"A change in the shape of the eye, the mouth or the nose can tell us whether the animal is in pain," said Sonder. "If we had a way to objectively recognize those changes we could address pain issues better."

Sonder became interested in the connection between a horse's facial expressions and its condition when a team of visiting Scandinavian veterinarians arrived at the university to discuss the project and potential collaborative opportunities. Working with doctoral student Maheen Rashid (pictured) in the department of computer science, the project involves teaching computers to read expressions by creating software that would first map horses faces, then "teach" a computer to read those faces and the expressions they display. She began by first studying what features the faces of humans and horses could share.



"We understand the expressions of human beings, and we can probably figure out what those expressions are," Rashid said. "Then we figure points on the horse's face—noses, mouths, eyes—that correspond with human faces."



The team then used photographs of humans to map key points on human faces, including eyes, mouths and noses. Similarly, they used photographs to map corresponding key points on the faces of horses. Once the key points were established and the animals' faces were mapped, corresponding data was stored in the computer, and the machine was ready to "learn" how to recognize the faces of horses.

Sonder participated in the so-called "machine learning" portion of the study by using 16 horses that already were being used in a study examining how equine-assisted therapy might help humans cope with dementia.

"We took videos of the horses' faces before they interacted with the people, during their interaction and afterward," Sonder said. "Those videos were fed into the computer to help the machine learn."

Coincidentally, the videos also captured signs of stress, fear, boredom and anxiety in the animals' faces. At the same time, video cameras were mounted at strategic points in paddocks where 50 horses in the UC Davis herd regularly roam. The goal was to film the horses as unobtrusively as possible and to record involuntary expressions of pain.

Horses often do not blatantly display pain—especially before their owners or regular handlers. So far, the cameras have recorded hundreds of videos and have run them through the study's computer system. But recording every single involuntary expression will take significant time for this emerging science. Ultimately the combination of technology and experience will be indispensable to veterinarians in caring for their animal patients.

AABP RECOGNIZES VETERINARY STUDENTS WITH SCHOLARSHIP AWARDS

At the recent American Association of Bovine Practitioners (AABP) conference veterinary students Ethan McEnroe, Delaine Quaresma and Bryan Welly were honored.



Bryan Welly
Amstutz Scholarship Recipient



Ethan McEnroe
AABP Foundation/Zoetis
Scholarship Recipient

Senior veterinary student Delaine Quaresma was recognized with two awards: the **AABP Foundation/Zoetis Scholarship Award** and the **AABP Bovine Veterinary Student Recognition Award** which recognizes veterinary students with a career interest in bovine practice.



Quaresma was selected based on her outstanding academic record and deep understanding and commitment to food animal veterinary medicine, especially for dairy cattle. She has been involved in a number of extra-curricular and leadership activities that further enhance her overall skill set. She has also served as a tutor within the school's Office of Academic Programs helping her fellow classmates to achieve academic success.

Quaresma grew up on her family dairy farm in north central California (6,000 cows) and embraces that experience and her desire to grow professionally in veterinary medicine. During her time at UC Davis she has excelled academically and served as a veterinary technician in the food animal barn at the veterinary hospital, worked with a bovine practitioner in the San Joaquin Valley, which included embryo transfer procedures, and participated in an externship in a mixed animal practice in Scotland. She has been a leader in the UC Davis FARM (Food Animal Reproduction & Medicine) Club and the UC Davis Theriogenology Club. She is well respected by her faculty mentors and student colleagues. Quaresma plans to relocate to the Midwest after graduating in 2018 to become involved in rural practice with an emphasis on cattle.



"I'm honored to receive this recognition and support from the AABP," said Delaine. "I feel extremely fortunate for the opportunity to continue developing my veterinary skills and knowledge, and hope to utilize these skills to promote animal health and ensure sustainable and safe food products."

UPCOMING CE EVENTS

October 13-15, 2017 - [Fall Festival](#), UC Davis

February 3, 2018 - Winter Conference | Super Saturday, UC Davis

RECENT FACULTY PUBLICATIONS

Neuroanatomy of the spleen: Mapping the relationship between sympathetic neurons and lymphocytes

Murray K, Godinez DR, Brust-Mascher I, Miller EN, Gareau MG, Reardon C.

[PLoS One](#). 2017 Jul 28;12(7):e0182416. doi: 10.1371/journal.pone.0182416. eCollection 2017.

PMID: 28753658 - www.ncbi.nlm.nih.gov/pubmed/28753658

Morbidity and mortality in infant mountain gorillas (*Gorilla beringei beringei*): A 46-year retrospective review

Hassell JM, Zimmerman D, Cranfield MR, Gilardi K, Mudakikwa A, Ramer J, Nyirakaragire E, Lowenstine LJ.

[Am J Primatol](#). 2017 Oct;79(10). doi: 10.1002/ajp.22686. Epub 2017 Jul 27.

PMID: 28749595 - www.ncbi.nlm.nih.gov/pubmed/28749595

Central and peripheral reservoirs of feline immunodeficiency virus in cats: a review

Eckstrand CD¹, Sparger EE², Murphy BG³.

[J Gen Virol](#). 2017 Aug;98(8):1985-1996. doi: 10.1099/jgv.0.000866. Epub 2017 Aug 28.

PMID: 28749325 - www.ncbi.nlm.nih.gov/pubmed/28749325