Emergency Care: An Extraordinary Case

The night before Thanksgiving, Jack Benenati of Manteca didn’t know where to turn when a fire burned the enclosure of his sulcata and leopard tortoises. More than a dozen pets were severely burned.

Benenati called several veterinarians. Few were open. None specialized in tortoises. Finally, an acquaintance told Benenati to try UC Davis, where third-year resident Ashley Zehnder responded in the Companion Avian and Exotic Pet Service. The service regularly handles emergencies involving birds, reptiles and other exotics.

Senior Veterinarian Marilyn Koski recalls, “When the tortoises were admitted, their burns were so severe that it was difficult to clearly identify their normal anatomy. Up to 40 clinicians, including myself and Dr. Zehnder, students and others from different services—even the Large Animal Treatment Crew—helped to provide the best possible care for these patients.”

“The Boss,” “Baby Huey” and the others, weighing from 15 to more than 150 pounds, received aggressive supportive care: fluids, morphine, antibiotics, wound care and gavage (tube) feeding, says Koski. “Because they were so sick, our first priority was to provide analgesia. We performed only noninvasive testing.”

Continued on page 4

Wildlife and Human Health

Spawning Genetic Diversity, Preserving Coral

“We’re working to help save the last stands of endangered Elkhorn coral in the Caribbean Sea,” says Stuart Meyers, professor in the Department of Anatomy, Physiology and Cell Biology.

The species, which once carpeted the sea floor, is now so depleted (99 percent) that conservationists are attempting to raise the animals in aquacultural systems and aquaria for reintroduction into the Caribbean ecosystem.

Meyers, whose expertise in cryopreservation of sperm has been applied to fertility studies in horses, non-human primates and other animals, joined an international team of scientists in Puerto Rico in 2007 to collect coral gametes. Sexual reproduction will help to ensure not only the quantity of coral, but also its genetic diversity.

Continued on page 3

From left, Smithsonian research scientist Mary Hagedorn, Professor Stuart Meyers and Staff Research Associate Megan McCarthy use liquid nitrogen to preserve zebra fish sperm samples.
FDA FUNDS CREATE WESTERN CENTER FOR FOOD SAFETY

In October 2008, the Food and Drug Administration awarded $1,132,500 in “year-one funding” to establish the Western Center for Food Safety. The funds are part of a five-year federal grant to establish and support a cooperative agreement among the FDA, Western Institute for Food Safety and Security, School of Veterinary Medicine, College of Agricultural and Environmental Sciences and others focused on food safety and food defense.

The grant will allow the school and the institute to expand collaborations with FDA’s many centers and offices—such as its Center for Food Safety and Applied Nutrition and the Office of Regulatory Affairs—and to develop real-world solutions to food safety challenges in partnership with other governmental agencies, private industry and academia.

FUTURE STUDENTS

SCHOLARSHIP ENCOURAGES VET SCHOOL APPLICANTS

Higher education administrators are reaching out to rural students to ease the transition to veterinary school. The College of the Sequoias and the school’s Veterinary Medicine Teaching and Research Center in Tulare will award a $50,000 scholarship as part of the college’s Hispanic-Serving Institutions Education Grants Program. A committee will select a student in the Veterinary Technician Program at the College of the Sequoias with an expressed desire to pursue veterinary medicine at UC Davis.

The scholarship will be for a five-year period starting fall 2009. The applicant must attend College of the Sequoias, complete the transfer prerequisite coursework, and then apply to the School of Veterinary Medicine’s four-year DVM degree program. Prospective students may feel that veterinary school is too expensive or too competitive, and do not apply. Beyond addressing the funding issue, this award assures that a faculty mentor will provide individualized academic assistance and guidance in the application process.

A shortage of rural practitioners exists in areas such as Tulare County. This scholarship and other novel recruitment approaches are helping the school identify prospective veterinary students. Jim Cullor, director of the Veterinary Medicine Teaching and Research Center, says, “Members of the scholarship committee hope to identify that ‘jewel in the rough’ and shepherd him or her through the system.”

BUDGET UPDATE

School Trims Programs and Services

When the School of Veterinary Medicine was established to serve California, it was 100 percent state supported. During the last 60 years, veterinary medicine has evolved and school programs have grown in number and size, yet state funding has not kept pace.

With success in tapping external resources, the school has been able to increase the breadth of services and disciplines that encompass many species. Yet funding from private sources is insufficient to compensate for the declining percentage of state support.

School officials are working to absorb cuts of $2.1 million from the state budget for veterinary medicine at UC Davis in the current fiscal year and are planning for a $1.8 million reduction in the 2009–10 fiscal year.

They and administrators of the William R. Pritchard Veterinary Medical Teaching Hospital are reviewing every program and service to identify potential savings—including restructuring and elimination of positions, programs and services not directly tied to the school’s core teaching mission. In order to maintain the instructional mandate, they have left some faculty positions open and instead hired clinical teaching and service staff using clinical revenue. The hospital is seeking additional referrals to enhance revenue and maintain the quality of teaching.

In accordance with the school’s research mission, Veterinary Medicine III B, an essential step in the long-range facilities plan to maintain accreditation by the American Veterinary Medical Association, continues to be the school’s highest priority. Research affects the school’s ability to recruit, support and educate future veterinary faculty and research scientists. Lack of adequate research facilities slows the development of new therapies and products. Though approved and funded by the California legislature, construction of Veterinary Medicine III B is stalled at the state level due to the current financial crisis.

As the UC Davis School of Veterinary Medicine adapts by tightening and trimming programs and services, your voice in the community and assistance in identifying potential sources of financial support will help to maintain the school’s vitality as a resource serving the animals and people of California.

WILDLIFE HEALTH

Sea Otters’ Diet Is Clue to Slow Recovery

UC Davis researchers trying to understand the sea otter’s slow recovery in California have found an important clue: Some sea otters feed almost exclusively on animals that raise their risk of being infected with potentially deadly parasites.

Abalone is sea otters’ preferred food. But in places where otters have to compete for food, they must eat a variety of prey, such as small crabs, clams, small snails or worms, and they pass those habits to their offspring.

“Higher levels of disease may be an unfortunate consequence of adaptations sea otters have made when preferred food is not available,” says Christine Johnson, veterinary epidemiologist at the school’s Wildlife Health Center.

In a new study led by Johnson, sea otters that ate abalone had the lowest rates of parasitic infection. In contrast, sea otters living along the coast between San Simeon and Cambria that specialized in eating marine snails had the highest rates of infections with Toxoplasma gondii, a parasite that can cause brain infections.

Where they ate also made a difference. Sea otters along the developed shores of southern Monterey Bay near Fisherman’s Wharf and Cannery Row eating mostly clams had very high rates of infection with Sarcocystis neurona, another cause of fatal brain infections in sea otters. Just southwest of this area, near Point Pinos, where the shoreline is undeveloped and sea otters eat mostly abalone, the rate of infections was very low.
Over a few days in August, the Elkhorn coral spawned—at precisely 9:15 p.m.—and tiny packets of egg and sperm rose slowly to the surface of the ocean. “They spawn within a specific time for two to three days each year,” Meyers says. “The eggs and sperm rise like little clouds.” Divers collected the packets, and scientists artificially fertilized the coral.

Also, working in a beachfront laboratory with Dr. Mary Hagedorn of the Smithsonian Institution and National Zoo, Meyers helped successfully freeze coral sperm for shipment to several aquariums raising the species.

In 2008 scientists preserved more gametes using techniques introduced by Meyers and Hagedorn the previous year. A portion of the cryopreserved gametes has been banked for future use.

Hagedorn and Meyers met again last fall to experiment with collecting and cryopreserving the sperm of scientifically important zebra fish, a species used in many models of human disease. Their objective is to optimize the process so that the sperm are not damaged during freezing or thawing, and scientists will be able to reproduce fish that have been genetically altered for research on a specific disease.
Emergency Care
Continued from page 1

Some animals had to be euthanized or died at home, but the rest remained responsive. “They have such personality and strength that it drew us to do everything we could,” Koski says. “The stoicism and apparent will to survive exhibited by these animals was stunning.”

The reptiles’ situation provided staff and students with new insights into treating these unusual creatures, Koski says. “Over the course of the months we cared for the tortoises, we obtained blood samples for hematology and clinical chemistry analysis, placed esophageal feeding tubes to allow nutritional support, and refined our wound care to adjust to the needs of each animal.

“The Ophthalmology Service provided diagnostic and treatment services to correct the eye damage suffered by some of the tortoises. The Radiology Service performed a CT study on the largest tortoise early on, and then a second CT over two months later. This diagnostic imaging afforded us a better understanding of the degree of damage caused by the fire, and the subsequent CT study revealed the long-term effects of fire injuries and the healing abilities of this species.”

Ultimately, five of the 12 burned tortoises survived, including two of the most severely affected animals seen at the hospital. In the Companion Avian and Exotic Pet Service, veterinarians are consulting with surgical and medical companies to devise a protective material to enclose the exposed bone on the damaged shells of the survivors.

In reporting the case, the Modesto Bee underscored its impact: “Koski said treating the reptiles was an invaluable learning experience for her students. ‘It’s a sad story, but because of [Benenati’s] fast work and courageous effort, these animals were alleviated pain and they were given a chance,’ she said. ‘It also allowed us to learn so much to help future reptiles and future patients. [Mr. Benenati] is really to be applauded for all he’s done for reptiles.’”

Benenati spoke highly of students, staff and faculty involved in his case. He also describes a renewed faith in veterinarians. “I have a new vet,” he notes. “Her name is Marilyn Koski.”

A non-medical complication of the case was the treatment cost of more than $5,000. The teaching hospital and client sometimes face tough choices as the hospital cannot absorb all costs, but hospital personnel work with clients on an individual basis. Some help comes from special funds. For example, the Adam Fund, established by a reptile enthusiast, helps to cover some costs of treating sick reptiles whose owners can’t fully afford treatment. To make a donation to keep this and other funds available for extraordinary cases, contact the development office at (530) 752-7024 or online at www.vetmed.ucdavis.edu/development/.

Environmental Health
UNHEALTHY MEALS FOR ORCAS

A new study funded by UC Davis shows how killer whales (orcas) in the Pacific Northwest accumulate contaminants such as PCBs, which can reduce their ability to fight disease and have healthy offspring.

The contaminants are coming from the chinook salmon that are the majority of the whales’ diet, says study lead author Donna Cullon of the Institute of Ocean Sciences, Fisheries and Oceans of Canada. The salmon are acquiring the contaminants while at sea, not while in rivers—a finding that could help conservation efforts. Cullon and colleagues tested young salmon as they headed to sea, and mature salmon as they returned to rivers to spawn. They measured the fishes’ levels of persistent organic pollutants, including flame retardants, industrial by-products and organochlorine pesticides.

A particularly worrisome finding of the study was that the salmon eaten by the southern population of resident whales (off Seattle, Wash., and Vancouver, British Columbia) had much higher concentrations of pollutants than those eaten by the northern resident population (off central and northern British Columbia). While both populations are at risk, the southern population is considered at greater risk and classified as endangered, while the northern is classified as threatened.

The two-year study was conducted by American and Canadian scientists and supported by a competitive grant from the SeaDoc Society, a program of the Wildlife Health Center at the UC Davis School of Veterinary Medicine. The SeaDoc Society has funded nearly $2 million in grants to restore and maintain marine ecosystem health in the North American Pacific region.
PART 4: VETERINARY MEDICINE’S ROLE IN ENVIRONMENTAL HEALTH

UC Davis Centennial: School Marks 60 Years

In the global village, the health of all living things is intertwined—because livestock, wildlife and people share the same precious resources.

From their earliest programs in zoological medicine during the 1960s to today’s advanced ecosystem health projects, School of Veterinary Medicine faculty have responded to society’s concerns about environmental health and conservation.

Initially, studies focused on animal diseases that might affect food safety or limit food production. Then veterinarians interested in zoological medicine began working in the field to gain a broader perspective on wildlife health. Eventually, the role of toxins, behavior, geography, infectious diseases and animals themselves on the health of habitats became part of veterinary research.

One school milestone in environmental health was the inception of the wildlife health education program in the early 1990s. Funded by a grant from the Pew Charitable Trust, this program became a springboard for new approaches to veterinary training and ecosystem health. Several teaching, research and service programs specializing in environmental health have developed and continue to grow.

Faculty research helps measure impacts and provides data to inform public discussion. A cadre of faculty members has contributed to society’s understanding of the impacts of air pollution, airborne allergens, second-hand cigarette smoke, vectorborne diseases and childhood vaccine products. The Aquatic Toxicology Laboratory tests for chemical contamination of many California waterways. Medical ecology studies encompass equine, bovine and wildlife impacts on the transmission of human pathogens.

Wildlife Health Center faculty work with public and private partners to address complex issues in the conservation of free-ranging and captive terrestrial and aquatic wild animals. Some projects focus on a specific area—for example, oil spills or the health of Channel Island foxes. One wildlife health professor has examined how captive breeding, parasites, genetics and other factors affect the survival of endangered bighorn sheep.

Broader issues or regions are covered by programs such as the SeaDoc Society, which emphasizes multiple aspects of ecosystem health in the greater Puget Sound region.

As new challenges arise, the School of Veterinary Medicine will continue working to understand complex interrelations between the needs of humans and animals, and how to conserve the health of the environment.

SCHOOL OF VETERINARY MEDICINE HIGHLIGHTS

1948
The School of Veterinary Medicine opens at UC Davis with 42 male students. The school now admits 131 students per year, about 80 percent of whom are female.

1961
Paramyxovirus yucaipa, which causes respiratory illness in chickens, is identified. It is one of several avian viruses, including an influenza virus that infects turkeys in the San Joaquin Valley, to be identified in the 1950s and 60s.

1966
The first zoological medicine program begins with courses for veterinary students, a longstanding partnership with the Sacramento Zoo, and a residency program for specialists in captive and free-ranging wildlife health.

1972
The California Raptor Center opens to rehabilitate injured birds of prey and educate the public about raptors and environmental aspects of their health.

1980
Pioneering work on the causes, diagnosis and treatment of bovine mastitis leads to development of the patented California Mastitis Test.

1995
Human granulocytic Ehrlichiosis and Ehrlichia equi infection in horses are found to be caused by the same tick-transmitted agent.

1996
The Center for Vectorborne Disease brings together veterinary experts and medical entomologists to study diseases transmitted by vectors such as mosquitoes, ticks and rodents; CVEC faculty identify the West Nile virus as it enters California for the first time in 2003.

1997
The school administers the Oiled Wildlife Care Network with 25 participating organizations and 12 dedicated rescue, treatment and rehabilitation facilities. OWCN research increases understanding of the consequences of oil exposure and improves response technology.

2000
The first shelter medicine program begins to improve the health and adoptability of home-

less companion animals through research, education and services to animal shelters.

2007
The OWCN responds to the largest Northern California oil spill in a decade. Volunteers log more than 13,000 hours of service to handle nearly 3,000 injured or dead sea birds.

2009
The Health and Livelihood Improvement project examines the effects of zoonotic disease and water management on health and livelihoods in Tanzania.

2010 AND BEYOND
The school will work to set new standards of veterinary education and help to meet society’s needs for clinical services and new knowledge in animal, public and ecosystem health.

For the full timeline of school accomplishments, visit www.vetmed.ucdavis.edu/timeline.
NEW FACULTY

Fall 2008–Spring 2009

JENNIFER LARSEN
Assistant professor of clinical nutrition; Veterinary Molecular Biosciences

EDUCATION
PhD, nutritional biology, UC Davis, 2008
Diplomate, American College of Veterinary Nutrition, 2007
DVH, UC Davis, 2004
IMS, animal science, UC Davis, 1998

EXPERIENCE
Associate veterinarian, UC Davis, 2007–08
Consultant, Davis Veterinary Medical Consulting, Inc., 2006–07
Fellow, Veterinary Academic Graduate Program, UC Davis, 2005–06
Veterinarian, private practice, 2004–05

SPECIALTY
Small animal nutrition and biochemistry, amino acid availability

CHRISTOPHER MURPHY
Professor, Veterinary Surgical and Radiological Sciences

EDUCATION
Diplomate, American College of Veterinary Ophthalmologists, 1989
PhD, Cornell University, 1984
DVM, Cornell University, 1983

EXPERIENCE
Professor, surgical sciences, School of Veterinary Medicine, University of Wisconsin, 1999–2009; associate professor, 95–99; asst. prof. 91–95
Director, Comparative Ophthalmic Research Laboratories, U. Wisconsin, 1993–2009
Assitant professor, School of Medicine, UC Davis, 1989–91
Corneal fellow, School of Medicine, UC Davis, 1987–89
Resident, comparative ophthalmology, UC Davis, 1984–87

SPECIALTY
Veterinary ophthalmology, corneal diseases, corneal healing and repair, cellular mechanisms, optics, bioengineering

BART WEIMER
Professor, Population Health and Reproduction

EDUCATION
PhD, nutrition and food sciences/microbiology, Utah State University, 1990
BS (honors), microbiology/immunology, University of Arizona, 1986

EXPERIENCE
Professor, Utah State University, Dept. of Nutrition and Food Sciences, 2002–08
Professor, Xiamen University College of Life Sciences, China, 2007–08
Director, Center for Integrated Biosystems, Utah State University, 2002–08
Director, Center for Microbe Detection & Physiology, Utah State University, 1998–2008
Postdoctoral fellow, biochemistry/genetics, University of Melbourne, Australia, 1990–91

SPECIALTY
Microbial genomics, host/microbe interactions, metabolomics, rapid detection of pathogens, food safety

PAMELA LEIN
Associate professor, Veterinary Molecular Biosciences

EDUCATION
PhD, pharmacology and toxicology, State University of New York, Buffalo, 1990
MS, environmental health, East Tennessee State University, 1983
BS, biology, Cornell University, 1981

EXPERIENCE
Scientist, Center for Research on Occupational and Environmental Toxicology, Oregon Health & Science University (OHsu), 2003–08
Adjunct professor, anesthesiology and perioperative medicine, OHsu, 2007–08
Adjunct professor, cell and developmental biology & physiology and pharmacology, OHsu, 2003–08

SPECIALTY
Anatomic pathology, pathology of exotic avian species, metabolic disease, iron metabolism

MICHELE STEFFEY
Assistant professor of small animal surgery; Surgical and Radiological Sciences

EDUCATION
Diplomate, American College of Veterinary Surgeons, 2004
DVM, UC Davis, 1999
BS, UC Davis, biological sciences, 1995

EXPERIENCE
Faculty member, Neuroscience Graduate Program & Program in Molecular and Cellular Biology, OHsu, 2003–08
Adjunct professor, environmental and molecular toxicology, Oregon State University, 2004–08
Assistant professor of environmental health sciences/toxicology, Johns Hopkins University, Bloomberg School of Public Health, 1999–2003
Assistant professor of biology, Canissus College, Buffalo, New York, 1993–99
Adjunct assistant professor of pharmacology and toxicology, School of Medicine and Biomedical Sciences, State University of New York, Buffalo, 1993–99
Postdoctoral fellow, molecular immunology, Roswell Park Cancer Institute, 1990–92

SPECIALTY
Developmental neurobiology, developmental neurotoxicology and degenerative disorders, in vitro toxicology testing

CARLOS GABRIEL SENTIES-CUE
Assistant professor of clinical diagnostic veterinary medicine; California Animal Health and Food Safety Laboratory System, Population Health and Reproduction

EDUCATION
Diplomate, American College of Poultry Veterinarians, 2004
MS, avian sciences, UC Davis, 1985
FMVZ, poultry medicine and production, National Autonomous University of Mexico, 1983
FMVZ, veterinary medicine and zootechnology, College of Veterinary Medicine, National Autonomous University of Mexico, 1980

EXPERIENCE
Assistant clinical professor of avian medicine, Poultry Research and Diagnostic Laboratory, College of Veterinary Medicine, Mississippi State University, 2004–08
Clinical fellow, California Animal Health and Food Safety (CAHFS) Laboratory System, UC Davis, 2002–04
Resident, avian medicine, CAHFS, UC Davis, 2000–02
Poultry veterinarian consultant, Poultry Producers of the Moralos State Association, Mexico, 1998–2000
Veterinary services coordinator for hatcheries, breeders and boiler breeders, Avicola San Andres & AVGRUPO, Mexico, 1989–97
Chief of poultry medicine and production, Veterinary Medicine and Zootechnology, National Autonomous University of Mexico, 1986–88
Veterinary practitioner, Pfizer Laboratories, 1980–81

SPECIALTY
Pathology, pathogenesis, etiology and diagnosis of avian diseases
K-9 Crime Fighters Honored

Man’s best friend can also be man’s best crime fighter. Police dogs help keep the community safe by joining their human partners on the front lines of crime prevention. They are often sent ahead of officers to search buildings or to capture and detain suspects. Their ability to sniff out drugs or explosives is invaluable in the fight against crime.

K-9 units are together 24/7, and officers can form deep bonds with their highly trained canine partners, who help keep them safe—even when it means the dogs put their own lives on the line to catch a suspect.

The California Police Dog Memorial, *Faithful Partner*, honors those four-legged heroes and their dedication to their human partners and community safety. Originally unveiled in 2002, the bronze plaques hold the names of 34 police dogs who have died in police service since 1960.

In March, the School of Veterinary Medicine, the UC Davis Police Department and the Western States Police Canine Association rededicated the *Faithful Partner* memorial and inducted 11 dogs who died in the line of duty between August 2002 and February 2009. K-9 officers and their partners from a variety of California law enforcement agencies were present to honor their memory. Veterinary students, faculty and staff also attended the ceremony.

Located between the Gladys Valley and Oscar Schalm lecture halls, the life-sized German Shepherd statue by Bay Area sculptor Susan Bahary was commissioned and donated by the late Bill Balaban, a long-time friend of the school. The Western States Police Canine Association is responsible for identifying and adding the names of honorees, while second-year veterinary students clean and polish the monument.

Though retired, Kaneko wanted to continue to promote clinical pathology at the school. He and his wife created the Jerry and Teresa Kaneko Fund for Faculty Development to support the career growth of academic clinical pathology faculty. Their pledge of $10,000 per year for 10 years funds research programs and other scholarly activities that are critical to finding methods for the diagnosis and prevention of animal diseases.

Kaneko has been active in fundraising for the School of Veterinary Medicine for a number of years, most recently helping to launch a fundraising effort for the class of
SPAY DAY 2009

SCHOOL TURNS OUT FOR COMMUNITY SERVICE

One hundred fifty volunteers from the School of Veterinary Medicine carried out 54 spay-neuter procedures for large dogs February 22 as part of Spay Day 2009.

Associate Dean Janet Ilkiw says, “This is an extraordinary community service event to benefit animals and help in the long-term fight against pet overpopulation.” Students, staff and faculty from across the school worked together to make the day a success. Each animal was assigned a guardian and received a physical examination, any needed vaccinations, the surgical procedure and an identifying microchip with lifetime registration. Spay Day takes place at the school’s Ira M. Gourley Clinical Teaching Center, which is used to train UC Davis veterinary students in anesthesia, surgery and other basic clinical skills.

The effort was part of a regional event to help low-income pet owners. The Sacramento Area Animal Coalition coordinated spays and neuters of 1,000 animals in the Sacramento region—the largest one-day spay/neuter event in the country.

CENTER FOR CONTINUING PROFESSIONAL EDUCATION

CE CALENDAR

Annual George H. Muller Veterinary Dermatology Seminar in Hawaii
November 4–11, 2009, Kauai, Hawaii

Annual Veterinary Endocrinology & Internal Medicine Seminar
December 1–8, 2009, Maui, Hawaii

Biennial Adventure Series, Baja California: Among the Great Whales
January 30–February 6, 2010, Baja California/Chihuahua, Mexico

The “Back to School” RVT program is July 18–19 at UC Davis… enroll today!

www.vetmed.ucdavis.edu/ce