

# INSIGHT

Fall 1999

College of Veterinary Medicine and Biomedical Sciences



Ocean Journey  
and the Denizens of the Deep

Feathers and Scales:  
The Challenges of Exotics

Olympic Gold Memories  
and Veterinary School  
Challenges

Colorado  
State  
University

**INSIGHT**

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*On the cover: The steady hands of Dr. Terry Campbell, head of Colorado State's Zoological Medicine Service, work swiftly to remove sutures from a stingray. The ray, a resident at the newly opened Ocean Journey in Denver, was bitten by a shark. Inset photo: Dr. Jonathan Sleeman and Dr. Campbell work with students to move the anesthetized stingray from its holding bin to a treatment table. Cover photos by Betsy Strafach.*

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**W**elcome

Welcome to the Fall 1999 edition of *Insight*. In this edition, you'll get an in-depth look at two up-and-coming programs at the Veterinary Teaching Hospital – the Zoological Medicine Service and the Cardiology Service. Explore with our teaching faculty the depths of Ocean Journey, as we travel between the Colorado and Kampar rivers. See how the treatment of exotic pet animals is changing veterinary medicine.

Then join the cardiology staff as they push the treatment envelope of heart disease beyond the limitations of today's veterinary medicine and into the possibilities of tomorrow's cures. Colorado State is home to one of the leading veterinary cardiology programs in the world, and to the only veterinary teaching hospital in the nation where open-heart surgery is regularly performed.

You'll also find articles on a former Olympic swimmer who is now attending veterinary school, a renowned radiology researcher, transgenic mice that are helping scientists unravel genetic mysteries, and much more.

We welcome your letters and suggestions. If you have ideas you'd like to send our way, comments on articles, or questions, please send them to:

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## Ocean Journey Gives Students Hands-On Experience with Denizens of the Deep

To a stingray, there may be only one thing worse than getting bitten by a shark – getting sutured by a veterinarian. At Ocean Journey, Denver's new aquarium, suturing stingrays is part of the routine for Dr. Terry Campbell and his students from Colorado State University's Professional Veterinary Medical program.

Ocean Journey tells the story of two great rivers – the Colorado River in the United States and Indonesia's Kampar River. The aquarium has 15,000 creatures representing 300 species of fish, birds, mammals, and invertebrates. Mammals include two Sumatran tigers and sea and river otters. The diversity of species at Ocean Journey presents a great challenge in not only maintaining proper environmental conditions, but also in caring for the animals' health needs. The partnership between Ocean Journey and Colorado State helps ensure the health of resident animals while providing a unique teaching laboratory for veterinary students, faculty, and practicing veterinarians.

Dr. Campbell began his association with Ocean Journey when the aquarium was still on the drawing board. He had been working at Sea World in Florida and accepted a position at Colorado State to head up the Zoological Medicine Service. A mutual friend introduced Dr. Campbell to Ocean Journey's life curator Scott Nygren. A partnership between the College and the aquarium blossomed, as evidenced by a recent trip to the aquarium.

Drs. Campbell and Jonathan Sleeman, also with Colorado State's Zoological Medicine Service, along with several students and pharmacist Rick Allen, walk through the aquarium's displays before Ocean Journey opens to the public. As they stop at each exhibit, Dr. Campbell points out fish of medical interest and

helps students develop an appreciation of small abnormalities that can be clues to an individual's health or the overall health of a given habitat's population.

"The cutthroat trout should look sleek and bright-eyed, and the water should be clear," Dr. Campbell tells stu-



*Dr. Terry Campbell, head of the Zoological Medicine Service, and Dr. Jonathan Sleeman work with students to gingerly move an injured stingray from its holding bin to the treatment table. Once the ray was on the table, Dr. Campbell quickly removed its sutures. The ray was sutured several weeks before, after being bitten by a shark.*

dents as they stop in the Colorado River exhibit. "Watch for cloudy eyes, for pipping that may indicate gill damage or a drop in dissolved oxygen, disoriented swimming, excessive opening of the mouth, and check the fishes' conformation. Watch their body language – we want to be on the lookout for any unusual behavior."

Dr. Campbell makes note of one trout that seems to be bloated or unusually fat. He'll bring it up with resident aquarists later, when he reviews his notes on the day's visit. Dr. Campbell continues his way through the aquarium, making observations with the students, answering their questions on behavior, diet, water quality, and treatment options. The students stop to watch the river otters playfully searching out strawberries in their environment and get a quick talk on the importance of dental care, especially as the

otters grow older. He also talks with students about environmental enrichment for the otters and tigers, how training is used not only to stimulate the animals but also to promote husbandry behavior, and how food hide-and-seek and hunting games challenge the animals and encourage behavior normal in the wild.

Where the river meets the sea, Dr. Campbell stops to explain some finer points of shorebirds displayed in the coastal exhibit. Here, he discusses the special needs of the American avocet, killdeer, and black-necked stilt, answers questions about diet, and comments on normal bird behavior. After making rounds through the habitats of the Kampar and Colorado rivers, Dr. Campbell's group heads behind the scenes of Ocean Journey and into the medical facilities, where he will remove stitches from several stingrays. The stingrays have been on the receiving end of nasty bites from sharks and eels, an unfortunate result of the aquarium's residents settling down into their new homes.

"Normally, they cohabit very well without too much injury to anyone," said Dr. Campbell. "But it takes a while for them to get over their jitters, so things are a bit chaotic at first. This ray just happened to be in the wrong place at the wrong time."

Dr. Campbell works with the Ocean Journey aquarists to fish the first big stingray, a pelagic ray, out of its holding facility, where it has been recuperating since getting bitten five weeks ago. Approximately three feet across and four feet long, the ray hugs the bottom of the aquarium. It flies along the walls. It flips over other rays and sharks. Netting the elusive ray takes time, skill, luck, and strength. The ray weighs about 40 pounds, its shape is awkward to handle, and it lifts like dead weight out of the water. Finally, the big

*continued on page 2*

## Ocean Journey

continued from page 1

ray is netted and turned out into a fish gurney, a deep and wide plastic container on wheels. Anesthetic has been put into the gurney's water, and the ray quickly quiets.

The gurney is wheeled to the veterinary care center, where the ray is lifted out, put on the water-filled treatment table, and its stitches are quickly removed. Dr. Campbell explains how rays are particularly difficult to stitch, given their style of locomotion and body type. He used a piece of chamois cloth to protect the stitches and act as a stent suture. The trick seemed to work. The ray's wound is healing nicely.

The ray is returned to a salt-water gurney, and then let loose in a holding area in the main exhibit, where it will finish its recovery. Dr. Campbell then returns for the next ray, and the procedure starts again. Later that day, the team will cap-

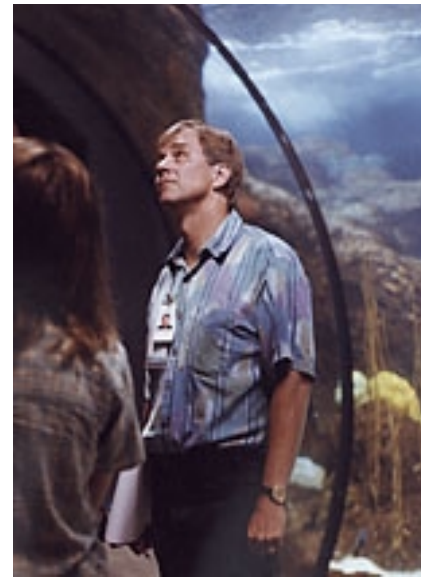
ture a rather large catfish – about 80 pounds – that seems to be exhibiting behaviors that could correlate to medical problems.

**“This is a wonderful example of a partnership that equally benefits both organizations.”**

with Nygren and the aquarium's aquarists by phone, consulting on everything from Napoleon wrasse to nurse sharks. For students in the zoological rotation, Ocean Journey is a virtual cornucopia of exotic animals and learning experiences.

“This is a wonderful example of a partnership that equally benefits both organizations,” said Dr. Campbell. “Ocean Journey receives the finest veterinary care available for the animals in their care, and our students receive an intensive education in zoological medicine not really available anywhere else. It's just wonderful to be a part of this place.” ■

Dr. Campbell typically makes two visits to Ocean Journey each month. He regularly keeps in touch



*Dr. Campbell observes the local inhabitants in one of Ocean Journey's large saltwater aquariums. Moray eels, sharks, angelfish, and snappers are just some of the sea denizens who challenge the professional skills of Colorado State veterinarians. The complexity of animal life at Ocean Journey also provides a rich learning experience for Colorado State veterinary students.*

## F eathers and Scales: Veterinarians Handle Challenges of Exotic Animals



*The iguana is just one of the many exotic species cared for at the Veterinary Teaching Hospital.*

To Dr. Terry Campbell, dogs and cats are exotic species, but you have to understand his point of reference. Most of his patients fly, swim, crawl, or slither. For the director of the Zoological Medicine Service at the Veterinary Teaching Hospital and his colleagues, patients of the feline or canine persuasion are a rarity.

Exotic animals as pets are on the increase in the United States, and veterinary medicine has had to respond by developing a veterinary medical specialty that meets the needs of clients and their pet exotics.

Pet exotics encompass a wide variety of species – fairly representative of the diversity of life on earth. More common pet exotics include ferrets, iguanas, large and small parrots, aquarium fish, numerous species of reptiles, and all the

“pocket” pets such as hamsters and guinea pigs. Less commonly seen species include sugar gliders – a marsupial – hedgehogs, and a variety of animals from zoo and aquarium settings, including tigers, otters, and stingrays.

The challenges of zoological medicine are due largely to this variety in species. Not much data exists on most exotics, so diagnosis and treatment often is based on an educated guess, previous experience, and prior treatment of similar species. As the specialty evolves, veterinarians with an interest in exotics are sharing their experiences and building a base of knowledge that is forming the foundation of zoological medicine.

“Until recently, most veterinarians didn't want to see exotics,” Dr. Campbell said. “They simply didn't have the experi-

ence or confidence to be able to care for these animals. We saw a need and have been working to develop an exotics educational and care program that will help veterinarians, clients, and pet exotics.”

Colorado State’s zoological medicine program has a number of facets. First and foremost is the training of veterinary students so they are better equipped to handle the medical needs of pet exotics. Second is the education of clients and care of client’s pets. Third is the care of zoo and aquarium animals and wildlife. The exotics program provides veterinary care for injured raptors at the Rocky Mountain Raptor Program and residents of Ocean Journey in Denver and the Riverside Zoo in Nebraska. Another important part of the service is the continuing education program for practicing veterinarians.

“We start with our students, helping them to understand exotics medicine and often dealing with their fears about what I call the ‘S’ animals – snakes, sharks, skunks, and spiders,” said Dr. Campbell. “Students typically do a two-week rotation through our clinic to support classroom work. We find that the first week gets them comfortable with the animals, mainly overcoming their fears, and in the second week, they can really start to develop their skills.”

Dr. Campbell noted that the demand for veterinarians with experience in pet exotics is high, and having exotics experience is one way students can better market themselves and veterinarians can better grow their practices.

Working with clients and their pet ex-

**“Until recently, most veterinarians didn’t want to see exotics. They simply didn’t have the experience or confidence to be able to care for these animals.”**

otics comprises the bulk of the work at the Zoological Medicine Service, said Dr. Campbell, and much of that work involves education.

“People often look at exotics as low-maintenance and easy-to-care-for pets,” Dr. Campbell said. “But these species have very special and specific needs. About 90 percent of the health problems we see have to do with diet and environment. Very often, people simply don’t have the knowledge or equipment necessary to keep their animal healthy. We take a very active role in educating clients regarding the dietary and environmental needs of their pets, and it’s amazing what a difference that makes in the quality of life for the animal and the satisfaction of the owner.”

The rest of the Zoological Medicine Service’s caseload comes from organizational clients, such as Ocean Journey aquarium and Riverside Zoo. This type of medicine is more herd management, notes Dr. Campbell, where health often is managed from a distance, simply because of the sheer number of animals and the relative difficulty of hands-on treatment (see related story on page 1). Students go on rounds with Dr. Campbell to the facilities for which he provides veterinary care, exposing them to zoo and aquarium medicine.

For veterinarians who did not receive exotics training in veterinary school, Drs. Campbell, Jeffery Wimsatt, and Jonathan Sleeman, all with the Zoological Medicine Service, offer a variety of continuing education courses. There are numerous publications and associations – such as the Association of Reptile and Amphibian Veterinarians, Association of Avian Veterinarians, and

American Association of Zoo Veterinarians – that provide technical information. Dr. Campbell also makes use of local experts – individuals whose intense interest in certain species has given them valued experience in the care, raising, and treatment of these animals.

“Key to success in zoological veterinary medicine is a willingness to be adventurous, challenged, and very flex-



*This highly endangered Sumatran tiger is one of two Sumatrans at Ocean Journey. Because the tigers are young, they mostly require simple checkups and have had few health problems.*

ible,” Dr. Campbell said. “We are breaking a lot of new ground here, and veterinarians have to be prepared for that.”

Dr. Campbell also is trying to prepare for that new ground at the Veterinary Teaching Hospital. The Zoological Medicine Service is an expanding unit and is rapidly outgrowing its allocated space. Dr. Campbell hopes to continue to cultivate the program, eventually developing facilities for treatment of animals such as koi (a type of ornamental fish), improved reptile amenities, and better aviary caging. He believes the program is set for exciting times.

“The VTH is a great environment for our program – it’s like a huge, multi-person practice where we can call on all manner of specialties to help us help our patients,” Dr. Campbell said. “While some veterinary schools still have a lot of feather-and-scale resistance, staff and faculty here always are eager to help out. It’s a lot of work, but we have a lot of fun, too. There’s just something about a big boa that gets everybody’s attention.” ■

## Healing Hearts Focus of Cardiology Unit at Veterinary Teaching Hospital

In many areas, veterinary medicine has followed closely on the heels of human medicine – sometimes even leading in medical advances. Whether in oncology, dermatology, radiology, or any of a number of other specialties, veterinary doctors have taken treatments found in human medicine and used them as models for improving animal health.

Cardiology is no exception to this rule. Veterinary medicine has long had medical cardiologists who approach heart health using medical techniques such as drug therapy, pacemakers, and catheter procedures. But heart surgery, especially highly invasive surgeries, has been a rarity. The Veterinary Teaching Hospital at Colorado State University is now the only university veterinary hospital in the nation to offer open-heart surgery.

“Six years ago, we didn’t have a cardiology program, and now we have one of the leading programs in the nation,” said Dr. Chris Orton, director of Colorado State’s Cardiology Service. “It’s really exciting to see how far we’ve come and to realize the opportunities available for us to develop and expand our program.”

Dr. Orton began the Cardiology Service at the Veterinary Teaching Hospital five years ago, partially in response to client demand, but also because of his own

interests in cardiac surgery. He did a cardiology clinic every third week with assistance from June Boon, the hospital’s echocardiographer. Eventually, he gave up his career as a veterinary surgeon to specialize in cardiology and cardiac surgery. Last year, the Cardiology Service brought on board Dr. Jan Bright, a medical cardiologist, and now offers a full complement of medical and surgical cardiac services. Dr. Julie Martin, a first-year resident, rounds out the service.

Heart disease, no matter in what species, is a killer. In humans, heart disease is the leading cause of death. Despite years of research, advances in surgery, and development of new medications, heart disease – especially that caused by a thickening of the arteries, or arteriosclerosis – continues to exact a heavy toll. In dogs, heart disease is the second leading cause of death after cancer. But arteriosclerosis is rarely found in dogs; their disease is mostly valvular disease due to degeneration of the valves and aging.

With valvular disease, a valve fails and leaks backward, putting a volume load on the heart. This eventually causes heart failure. In humans, valve replacement is the typical solution, but in dogs, this surgery was not thought possible or prudent.

“The conventional wisdom was that we couldn’t do this in dogs,” said Dr. Orton. “But we are showing that we can. We began doing open-heart surgery in 1991. Over the years, we have developed our skills and learned a lot about what works and what doesn’t. We now are doing one valve replacement a month and having a very high degree of success.”

Dr. Orton began performing valve replacements almost two years ago, showing that it was a feasible treatment. The challenge, Dr. Orton said, is the heavy burden the valve replacements place on

the medical team, which is why the surgeries are limited to one per month.

“The valve replacements are a major effort that require six to eight people, plus the staff in the critical care unit, so we simply can’t do too many,” said Dr. Orton, who sleeps at the hospital the first night after a valve replacement. “What we want to do is expand the program to train veterinarians at other universities so valve replacement is more readily available as a viable treatment option for dogs with valvular disease.”

Dr. Orton likens the progress of the work he is doing to where total hip replacement was in dogs 20 years ago. Many people thought it simply wouldn’t work or was too extravagant, but the procedure is now readily available and vastly improving the lives of thousands of dogs.

Dr. Orton also performs surgeries to correct congenital heart defects and has conducted trials in which a back muscle is used to help the weak heart muscle associated with cardiomyopathy. Cardiac surgery, however, isn’t always necessary to treat and/or cure a heart condition, and that’s where Dr. Bright brings her expertise to bear. Dr. Bright, who came to Colorado State from the University of Tennessee, specializes in catheter techniques that can cure patent ductus arteriosus (PDA), fix electrical disturbances that affect the rhythm of the heart, and open up narrowed valves, as well as enlist catheter technology as a diagnostic tool.

“Surgery sometimes may be the only solution to a severe heart condition, but many times we can do procedures that are less invasive,” said Dr. Bright. “When we use catheters, there is no postoperative pain, as it is a noninvasive or minimally invasive procedure.”

With catheterization, Dr. Bright puts a catheter – a specially designed piece of

“Six years ago, we didn’t have a cardiology program, and now we have one of the leading programs in the nation.”



*Dr. Jan Bright checks the heart rate on an elderly patient. Heart disease is the second leading cause of death in dogs.*

tubing – into the cardiovascular system to treat cardiovascular abnormalities. For example, in a patient born with the narrowing of a valve, a catheter is used to place a balloon across the valve, expanding and forcing the valve to stretch open. With rhythmic disturbances of the heart, another type of catheter is used to deliver a radio-frequency current that destroys excess conduction tissue by thermal heat.

Dr. Bright also has a special interest in feline heart disease and recently has received funding to look at medications

that will improve the muscle function in cats with cardiomyopathy. Cats, she notes, are harder to work on, not only because of their very nature, but also because of the size of their hearts, rapidity of their heartbeat, and the medical challenges presented due to a lack of research work in feline cardiology. She notes that in cats, most cardiology conditions are acquired heart diseases. Diseases of the heart muscle in particular plague cats.

The Cardiology Service is pioneering work in open-heart surgery, catheter

treatment options, and treatment of heart disease in cats. The service provides countless hours of consulting work and has had patients from across the nation. The excitement is building as pet owners realize there are viable treatment options for their pets' heart conditions.

“We are thrilled to be able to offer such a complete cardiology service for our clients' pets,” said Dr. Orton. “This is just the beginning. Our program is growing, and we continue to make progress in the fight against heart disease.” ■

## Artificial Heart Pioneer a Long Way from Dairy Beginnings

Dr. Don Olsen recites the numbers carefully, reflecting on the gravity of the situation. Somewhere between 40,000 and 80,000 Americans each year need heart replacements. Yet, the number of donor hearts is only between 2,000 and 4,000.

“We still bury far too many good hearts,” Dr. Olsen said. “And I really don't see that changing. We need some other way.”

One other way, artificial heart implants, is something Dr. Olsen has been working on for more than 25 years. He is, in fact, one of the pioneers of such “bridge” technology that allows patients extra time to receive a donor heart. But Dr. Olsen, a 1956 graduate of Colorado State's professional veterinary medical program, did not start out with his heart in cardiology research.

Raised on a small farm in central Utah, Dr. Olsen was always interested in veterinary medicine. He received a degree in animal nutrition from Utah State Agricultural College and went on to use his veterinary degree from Colorado State to establish a practice in dairy cattle medicine. After seven years, though, he found himself feeling confined and limited and decided to go back to an academic setting and get involved with research.

He obtained a position at the University of Nevada, then received a National Institutes of Health postdoctoral fellowship at the University of Colorado's Health Sciences Center. In 1972, he joined the University of Utah and the Artificial Heart Research Laboratory. He began his work on blood pumps – both artificial hearts and smaller pumps that help the left ventricle. Since then,



*Dr. Don Olsen*

Dr. Olsen has been an integral part of advances in artificial heart and ventricular assist devices.

Early experiments were conducted in calves and determined that artificial hearts were a viable short-term alternative to heart transplant. Since then, technology has improved the devices and Dr. Olsen believes that new power sources one day may make the hearts viable for up to 15 years. He currently works on a variety of heart and ventricular devices, including a centrifugal heart, with the magnetic motor and impeller suspended on magnetic bearings, and an axial pump that gives patients some freedom from the tethering units required for early models. Dr. Olsen works closely with Dr. Michael DeBakey and has also worked with Colorado State's Dr. Chris Orton. Dr. Orton assisted Dr. Olsen in learning how to harvest skeletal muscle and bring it into the chest to power a ventricular assist pump.

“It really was exciting to be back at Colorado State and see what was happening with the cardiology program,” Dr. Olsen said. “I think it's a reflection of how rapidly we are changing, not only in veterinary medicine, but in human medicine as well. The application of microprocessors and improved electronics is making possible advances in artificial heart and pump technology that we once thought impossible. It's amazing.”

Dr. Olsen sees exciting times ahead. In 1998, he retired from the University of Utah to focus on the Utah Artificial Heart Institute, a non-profit organization dedicated to the research and development of artificial heart and ventricular devices. He hopes that through his work, and other pioneers in the field, cardiology patients may one day have a totally self-contained artificial heart that will enable them to lead an almost normal life.

“We have a tremendous need for this technology,” Dr. Olsen said. “And I think that we will be able to get there – it's just a matter of time.” ■

## College Nears Completion on BioEnvironmental Sciences Building

Having pushed their current facilities to the limit, faculty and staff of the Arthropod-Borne Infectious Diseases Laboratory (AIDL) and the Mycobacteria Research Laboratories Group eagerly are awaiting completion of their new \$6 million BioEnvironmental Sciences Building.

The building, a Biosafety Level 3 (BSL-3) facility, is scheduled for completion in October. Testing of the building's systems then will take between one and three months. The University hopes to have the building fully operational and occupied by January 2000.

"We are thrilled at the prospect of extending our laboratory operations into the new facility," said Dr. Steve Higgs, assistant professor of microbiology. "While we have been able to accomplish a great deal within our current laboratories, we are definitely in need of newer, safer facilities."

The current AIDL building, located on the Foothills Research Campus, was built in 1965. Research here on arthropod-borne diseases began in 1989, when the program had six people and laboratory design was simpler. The program now has 25 people. Similar growth has occurred within the Mycobacteria Group, whose expanding research program has outgrown available lab space in the Microbiology Building and Painter Center.

The BioEnvironmental Sciences Building, located behind the current AIDL Building, enhances the space needs for both groups, as well as offering state-of-the-art laboratory facilities for working with infectious diseases. The new building will allow consolidation and refinement of current BSL-3 facilities located on the main campus.



*Dr. Steven Higgs and Dr. Allan Roberts check out the air exchange system in the new BioEnvironmental Sciences Building.*

"Big things and little things will improve greatly," said Dr. Higgs. "For example, in the old building, we have to take apart the ceiling panels to change a light bulb. The new building has above-ceiling access to all the lighting, air, electrical, and plumbing systems. The new building boasts the newest generation of safety and environmental controls and offers laboratory facilities unparalleled in the nation for a BSL-3."

BSL-3 is the designation given to laboratories qualified to work with certain infectious agents. Biosafety levels range from 1 to 4, depending upon which infectious agents a laboratory is qualified to work with. BSL-1 involves work on well-defined agents not known to cause disease in healthy adult humans. At BSL-4 facilities, of which there are only two in

the nation, scientists conduct research on more deadly agents such as Ebola and Russian Spring-Summer encephalitis.

Colorado State's new BSL-3 facility will house research currently being done at other BSL-3 laboratories on campus. Infectious agents under study include tuberculosis, leprosy, and vector- and rodent-borne diseases such as Dengue fever, Hantavirus, yellow fever virus, and encephalitis viruses. The 12,000 square-foot building, with 7,500 square-feet of laboratory space, will enable the University to more effectively compete for grants and highly qualified faculty to continue its work of excellence in infectious diseases. Both AIDL and the Mycobacteria Group are Programs of Excellence at Colorado State University, reflecting their national and international importance in the fight against infectious diseases.

The Mycobacteria Group focuses on tuberculosis and leprosy. TB is responsible for more human deaths than any other single infectious agent in the world. The disease, once thought conquered in the United States, is on the rise again.

"TB is a huge problem, and we are working in a number of different areas to understand, prevent, and treat the disease," said Dr. Allan Roberts, a research associate in the Department of Microbiology. "We do bulk cultivation of TB, test vaccines, look at the immunology of TB, research it at the molecular level, test drug agents, and much more."

AIDL focuses on arthropod-borne diseases, rearing up to 10,000 mosquitoes per week for research on viruses transmitted from mosquitoes to people. AIDL also has a group that studies the Hantavirus, a rodent-borne virus of par-





ticular concern in the western United States.

“The basis of our work is to understand interactions between mosquitoes, viruses, and people and disrupt the transmission of disease by disrupting the life cycle of the virus,” said Dr. Higgs. “The diseases we work with have national and international consequences, and conventional means of prevention and control

have failed. Much of our work aims to identify the genetic and molecular basis of virus transmission in the hope that we can create transgenic mosquitoes that are incapable of spreading disease.”

Colorado State University and the National Institutes of Health provided funding for construction of the new BioEnvironmental Sciences Building. Funding also is being provided to reno-

vate and upgrade old facilities. The BioEnvironmental Sciences Building is Phase I of a two-phase project. The \$12 million Phase II project will consist of additional insectary space, an environmental toxicology and molecular biology module, Biosafety Level 2 laboratory space, lab animal and other support spaces, and office space. ■

## Transgenic Center Helping Researchers Explore World of Genes

Peering through the lens of her microscope, Michelle Sims deftly manipulates a holding pipette that is keeping in place a day-old mouse embryo. An injection pipette is at the ready to inject the embryo with foreign DNA.

In 21 days, this transgenic mouse will be born to a surrogate mouse mother. At the Transgenic Core Center, that mouse and many others like it are helping researchers better understand what genes do and how they can go awry. The Center provides transgenic mice to scientists conducting research on everything from hormonal genes expressed in the pituitary gland to genes that regulate growth and development.

“Transgenic animals provide us with an incredibly powerful tool for biosciences research,” said Dr. Dick Bowen, an associate professor in physiology at the College of Veterinary Medicine and Biomedical Sciences’ Animal Reproduction and Biotechnology Laboratory. Bowen, along with Drs. Russ Anthony and Colin Clay, and Michelle Sims, operate the Center as a service to researchers at Colorado State. The Center is located at ARBL’s facilities on the Foothills Research Campus.

Bowen said the technology and ex-

pertise required to effectively produce transgenic mice is expensive and tough to set up. Having a transgenic center allows researchers access to the technology without having to put the time, money, and effort into developing it themselves. For researchers, having ready access to transgenic mice means having access to a tool that can shed light on how specific genes work.

The technique necessary to develop transgenic mice is simple in theory but complex in execution. Day-old embryos are removed from a female mouse and brought to a micro-manipulation station. The embryos are injected with DNA and then implanted into a surrogate female mouse. Once the mice are born, they are tested to determine if the DNA is being expressed. When these “founder” mice reproduce, approximately one-half of the offspring will have the new gene.

Bowen said seeing what genes do in a whole animal offers a level of complexity in scientific study that is impossible to duplicate by simpler methods such as studies of cell cultures in test tubes. This is especially important for investigation of how one gene is influenced by the products of other genes. In some cases,

transgenic animals also provide valuable models of human genetic diseases, useful in evaluating effectiveness of therapies and possible prevention of disease through genetic manipulation.

Another technique beginning to be employed at the Transgenic Core Center is production of “knockout” mice. Rather than have genetic material injected, these mice have genetic material removed. Using this technique, researchers can conduct studies on a specific gene and better understand its role in the cell and whole animal. For example, researchers may have a gene they believe to be critical for development. A knockout mouse may show that the gene has no effect on development at all. Sometimes, Bowen said, genes believed to be of little consequence have been shown to have dramatic effects on the cell and individual animals. “Knockout mice definitely have provided a number of surprises, showing just how much more we need to learn,” Bowen said.

Bowen said the long-term goal of transgenic technology is to discover how genes work, understand how mutated DNA can cause problems, and develop ways for researchers to solve these problems. The Transgenic Core Center, building on a successful record of transgenic work that has already been accomplished at Colorado State, is at the forefront of these efforts. ■



*A holding pipette anchors a mouse embryo while DNA is inserted with an injection pipette.*

## Student Leaves Behind Olympics, Looks Forward to Veterinary School

When the Professional Veterinary Medicine Class of 2003 begins its freshman year this fall, very few will be aware that there is an Olympic gold medallist in their midst. It's not that Janie Wagstaff has anything to hide – it's just that she has worked hard to start this new chapter in her life.

"I've always been known as Janie the swimmer," Wagstaff said. "Now I'm forging a new identity for myself and figuring out what it means to be Janie the veterinary student. I do know one thing – it feels great."

The transition to an "ordinary" life after living as a sports star often is difficult, and Janie was no exception to the rule. Swimming had been her world for 20 years. Wagstaff began swimming competitively when she was six years old, growing up in Kansas City, Kansas. It was obvious early on that she had something special. As a wide-eyed 7-year-old, she dreamed of going to the Olympics. There was another dream, too – that of being a veterinarian. But Wagstaff's efforts had to be fully focused on her competitive life, and the dream of being a veterinarian was shelved and forgotten for many years.

As a competitive swimmer, Wagstaff quickly climbed the ranks. At 14, she had her first taste of the Olympics when she competed in the 1988 Olympic trials. For the next four years, she set her sights on the 1992 Summer Olympic Games in Barcelona, Spain. The support of family, friends, and her school was incredible, she said. At the age of 18, she realized her dream and was thrust into all the glory of international competition. Wagstaff competed in the 100- and 200-meter backstroke and took the gold medal in the 400-meter medley relay.

The experience, Wagstaff said, was incredible. But following the Olympics, swimming was beginning to take its toll. She was finding it harder to get motivated for the daily six hours of training. Trying to stay with competitive swimming, Wagstaff enrolled at the University of Florida and swam for its up-and-coming swimming program. But her dedication was beginning to flag, and she also began

and I thought maybe I could finish my degree in sports medicine."

Wagstaff lived out of her Jeep for a while, sleeping on friends' couches and trying to find not only a place to live, but also a place to begin. The best thing, she said, is that people in Fort Collins knew nothing of her swimming life, and she could make a fresh start. She enrolled in Colorado State and soon discovered the

College of Veterinary Medicine and Biomedical Sciences. From a dusty shelf, she pulled out and cleaned off a cobweb-covered dream – that of being a veterinary doctor.

Wagstaff graduated in 1997 and worked for a family friend in his Vail veterinary practice. She applied to veterinary school in August 1998 and was accepted in March 1999. It was just as good if not better, said Wagstaff, as taking home a medal from the Olympics.

"This is Chapter Two in my life, and I can't wait," Wagstaff said. While she's waiting, she's getting practical experience working at the Raintree Animal Hospital close to the Colorado

State campus.

As for swimming, Wagstaff still enjoys watching the sport and is active in her support, but she keeps her distance from pools. "I'll jump in to cool off, but if I take a few strokes, it just feels too strange," she said. And about that gold medal, long kept at her parent's home in Kansas City, Wagstaff has it with her once again. She has reached a point where she'll bring it out and even show it off. Now that she is moving forward, she is able to embrace and celebrate her past, knowing that it taught her perseverance, focus, and the rewards of hard work – all lessons she is sure to use when she hits the books this fall. ■



*Janie Wagstaff exchanges her swim cap for a stethoscope as she begins veterinary school. Here, she is at home with her two dogs, Lucy, the black Labrador retriever, and Simba, the yellow Labrador.*

to realize that a world that she wanted to experience existed outside of swimming. She lasted two and one-half years before leaving Florida to join a swimming program in California. It was here that Wagstaff left swim practice one day and simply never returned.

"I quit swimming at 20, and it was the hardest thing I ever did," Wagstaff said. "I then had to decide what to do with my life and an extra six hours each day. For six or seven months, I really struggled with who I was and what my life was going to be. Then one day, I packed up my Jeep and moved to Fort Collins for no reason, really. I didn't know anything about the city except that the University was here,

## Radiology Professor Selected for International Award

Dr. Joel Bedford, a professor in the Department of Radiological Health Sciences at Colorado State, received the prestigious Failla Award this summer given at the International Congress of Radiation Research in Dublin, Ireland.

The award is given annually to individuals who have shown outstanding service and made significant contributions to the field of radiation research. The award is named for Italian-born scientist Gioacchino Failla (1881-1961), a pioneer in the field of radiation research and the principal founder of the Radiation Research Society.

“Dr. Bedford is very deserving of this award because of his great contributions to the field of radiological health sciences,” said Dr. James Voss, dean of the College of Veterinary Medicine and Biomedical Sciences. “He is an innovative researcher who works tirelessly in both the laboratory and the classroom. He also has been able to achieve much through research partnerships with fellow faculty members. These partnerships are leading to some very exciting discoveries and advancing the base knowledge of radiation and its impact on cells.”

Dr. Bedford, a native of Colorado, came to Colorado State University in 1975 from Vanderbilt University Hospital in Nashville, Tennessee. His research work at Colorado State has focused on the effects of radiation on cells and chromosomes. Radiation is an especially compelling topic for study, said Dr. Bedford, because it has the capacity to harm as well as cure.

“Radiation studies are divided into two main areas: how it can cause cancer and how we can use it for cancer treatment,” Dr. Bedford said. “Either way, the

basic premise is the same. Radiation damages chromosomes and causes changes that prevent cell proliferation or causes the cell to lose control of growth and proliferate unchecked.”

Understanding the effects of radiation on cells is an important part of treating and preventing disease. For example, researchers are looking for ways to make tumor cells more radio-sensitive and normal cells

more radio-resistant, effectively improving the outcome of radiation therapy. Researchers also are studying how varying levels of radiation treatment and dosage over time impacts the death and recovery of normal and tumor cells. Another area of study involves combining radiation with chemotherapy to further weaken and destroy tumor cells.

“Today, we have thousands of cancer survivors who wouldn’t be alive were it not for radiation therapy,” Dr. Bedford said. “But we have much work to do to fully understand the interrelationship between normal cells, tumor cells, and radiation.”

Radiation is in our environment every day, Dr. Bedford said, so humans have evolved to handle a certain amount of exposure with little or no cell damage. It’s obvious that high exposure, like that which occurred at Chernobyl, causes ex-



*Dr. Joel Bedford, shown here in his laboratory, recently received the Failla Award honoring his research in radiological sciences.*

treme cell damage. What isn’t so easily understood is the gray area between normal and extreme.

“We still need to understand the gradient of radiation exposure and look at the cell characteristics that make some people more susceptible to radiation damage and others less so,” Dr. Bedford said. “Today, we are able to do that better than ever before.”

Dr. Bedford said the changes in the field of radiation

research that have taken place over the span of his career have been very exciting, especially technological changes that allow for a closer look at the inner workings of the cell and its chromosomes.

“It’s really amazing. We now can get a better look at chromosome abnormalities and see things we haven’t seen before,” Dr. Bedford said. “We can look at how genetic factors control radiosensitivity and can better detect abnormalities. Cytogenetics is helping us identify breakpoints that can lead to abnormalities. Mapping of the genome is helping us uncover unknown oncogenes that may help predict which people may be more or less susceptible to developing cancer. This information can lead to early detection, and possible prevention of some cancers through informed lifestyle choices.”

To Dr. Bedford, radiation is a double-edged sword that can hurt or heal. His investigations are leading him closer to definitive answers about the impact of radiation on cells. Thanks to his work and that of others, medical researchers can continue to sharpen the healing side of the radiation sword while dulling the edge that hurts. ■

## Colorado State Alumnus Gears Up for Senate Run

Dr. John Ensign recalls with a laugh his days in the U.S. House of Representatives when fellow congressional representatives would seek out his advice on veterinary care.

"I gave my opinion to one congressman who had a questions about his dog's health condition," Dr. Ensign said. "I told him there'd be no charge if he voted for my bill."

As it turns out, the congressman's dog had cancer of the mouth and was successfully treated, thanks to early diagnosis in the congressional chambers. In a sea of lawyers, Dr. Ensign, along with fellow congressman and Colorado State graduate Dr. Wayne Allard, stood out as the "veterinary caucus."

Dr. Ensign, who was elected to Congress in 1994, returned to veterinary practice in 1998 after he was narrowly defeated for the U.S. Senate. He recently decided to re-enter the political fray when he announced his intent to run for the Senate in the 2000 elections. His life now is a mix of campaigning, fund raising, helping his partner manage their veterinary practice, and caring for patients.

Dr. Ensign earned his D.V.M. from Colorado State in 1985. After graduation, he returned to Las Vegas, Nevada, and built his animal practice, which soon became the first 24-hour animal hospital in the city. He sold the practice in 1993, when he ran for the House of Representatives, and then was elected in 1994. He sought out the political life when he decided to run a "common sense" campaign and try to make a difference in the lives of Americans.

"As a small business owner, I could empathize with the flood of regulations and roadblocks thrown against entrepreneurs," Dr. Ensign said. "I also was concerned about the welfare system destroying people, high taxes, and the national



*Dr. John Ensign*

debt. It was exciting to be a part of the political system that brought about meaningful changes in all these areas."

Dr. Ensign said his skills as a veterinarian, especially nonmedical skills, helped him successfully fulfill his goals in the House, where he served on the House Ways and Means Committee.

"I think one of the most important things I

learned was that people don't care how much you know until they know how much you care," Dr. Ensign said. "Colorado State provided me with the finest education I could have attained. It was an incredible experience and one I will treasure my whole life. In addition to all the medical skills, I learned how to listen and how to make people feel important. Washington is all about relationships, and my work in veterinary medicine honed those skills."

When Dr. Ensign left Congress in 1998, he returned to his new practice — built in 1995 — in Las Vegas. He spent time regaining his skill set and practicing veterinary medicine. In February, when Sen. Dick Bryan announced he would not seek re-election, Dr. Ensign threw his hat back

in the ring. His typical day now involves appearances — for example, speaking to four high school classes and attending the Republican governor's convention, seeing clients, and juggling an ever- hectic schedule.

Education is a big part of his 2000 campaign, especially accountability in the public school system. The criminal justice system also is one of his targets, where

**"I think one of the most important things I learned was that people don't care how much you know until they know how much you care."**

he promotes a program calling for criminals to work 50-hour weeks to pay for their "room-and-board" and to compensate victims. His common-sense platform is what he is hoping Americans want to hear. If elected, he'll once again get a chance to practice some pro bono veterinary work in the capital, and maybe even get some bills passed. ■

## Leonhardt Foundation Grant Helps Helping Program

The Frederick H. Leonhardt Foundation recently awarded a \$1,261 grant to Changes: The Support for People and Pets Program at Colorado State University's Veterinary Teaching Hospital.

Changes provides grief education and support to people experiencing the severe illness or death of a companion animal. Staff members also develop and teach course work to veterinary students

on client relations, grief counseling, and bond-centered practice techniques.

The Leonhardt Foundation, located in Albuquerque, N.M., provided funding for needed teaching equipment and facilities upgrades. The Leonhardt Foundation makes grants to nonprofit organizations in the West and Southwest that support families, innovative education, the well-being of animals as well as humans, and preventive health care. ■

## ILM Farm-Based Research: Improving Mastitis Management

Coliform mastitis, an infection of the udder that affects milk production and quality, is one of the most costly diseases in dairy cattle. Now, the Integrated Livestock Management Program at Colorado State has developed a classification system to help producers more effectively manage the disease and improve health outcomes for their dairy herds.

Dr. John Wenz, who just completed the ILM's graduate program, worked with dairy farms in Colorado to develop the severity classification system.

"Accurately evaluating case severity can help determine appropriate treatment and guide sound management decisions," noted Dr. Wenz. "Unfortunately, there has not been a simple on-farm evaluation system to characterize disease severity that relates well to case outcome."

Dr. Wenz's research team classified cows with coliform mastitis as mild, moderate, or severe based on ratings of several factors including rectal temperature, degree of dehydration, rumen contractions, and attitude of the cow. Veterinar-

ian or farm personnel can evaluate these features quickly and easily on the farm. A total score within these ratings determines disease classification and dictates best management practices.

"We have seen from our work on dairy farms that there is a high value in establishing an assessment and monitoring scheme," Dr. Wenz said. "This approach helps establish economically beneficial practices, improves overall herd health, and promotes prudent antibiotic use."

Dr. Frank Garry, director of the ILM program and a professor in clinical sciences, said the coliform mastitis work is a good example of ILM's focus on working together with agricultural producers to develop sensible management practices.

"The purpose of ILM is to focus research, outreach efforts, and teaching activities on issues important to Colorado animal agriculture and work with producers to ensure we are meeting their needs," Dr. Garry said. "A singular element of the program is that we bring our research and graduates students to the farm to fully understand the unique environment in which producers operate. This enables them to develop solid solutions to the problems with which producers struggle."

The ILM program is supported with grants and donations from various organiza-

"The purpose of ILM is to focus research, outreach efforts, and teaching activities on issues important to Colorado animal agriculture and work with producers to ensure we are meeting their needs."

tions and individuals, including the United States Department of Agriculture, Cooperative Extension, numerous producers, and friends of the College of Veterinary Medicine and Biomedical Sciences. A recent gift from Dr. Harry Kingman, an alumnus of the College, provided seed money for the ILM to establish a scholarship fund for ILM graduate students.

"We especially appreciate the support of donors like Dr. Kingman, who not only assist us financially but also act as advocates for the program," Dr. Garry said. "Their gifts and advocacy are key to the long-term success of ILM."

For additional information on the Integrated Livestock Program, or on the coliform mastitis research project, check out the ILM website at [www.cvmb.colostate.edu/ilm](http://www.cvmb.colostate.edu/ilm). ■



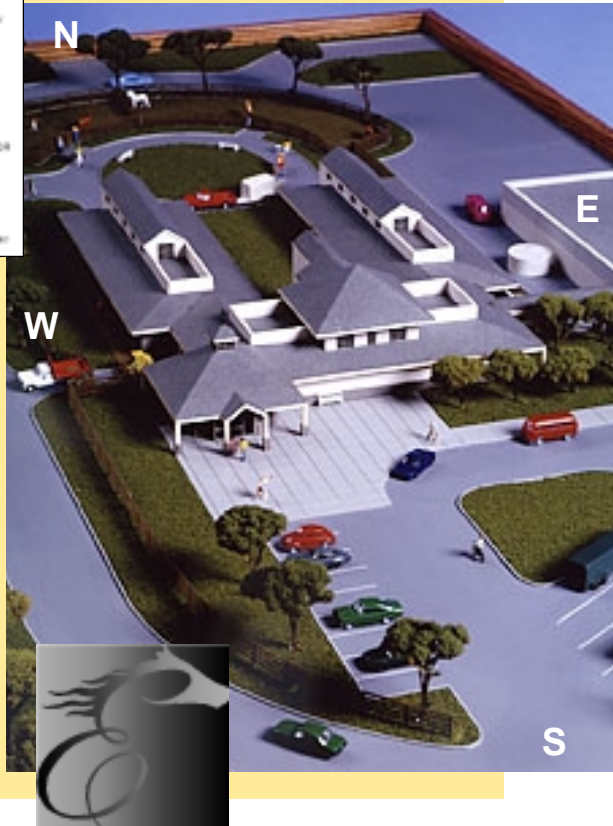
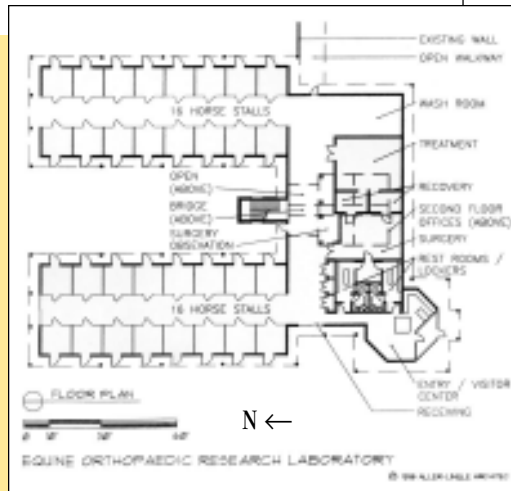
*Dairy cows in for routine inspection.*



**Integrated  
Livestock  
Management**

## New Equine Research Facility Planned

The Equine Orthopaedic Research Program has announced plans to build a new research laboratory at the Veterinary Teaching Hospital campus. The proposed Equine Orthopaedic Research Laboratory, shown in the architectural model at right, will consolidate all research facilities for the program with the exception of the tissue culture laboratory located in the VTH. The new 12,000 square-foot building will house 32 horses, surgical suites, a visitors center, and offices. State-of-the-art stables will be provided for resident horses with indoor horse stalls, an outdoor run, and a separate commons paddock for exercise space. Cost for design, renovation work of existing space in the Dairy Barn, and construction of the new building is estimated at \$1,157,700. A campaign is underway to secure funding for the building, which will be built with private donations from industry, foundations, and individuals. Once funding is in hand, completion of the new building is expected to be one-and-a-half years. Faculty and staff are eager to see the project completed, as it will allow for an enhanced research program in equine orthopaedics. Currently, the program's research efforts are outstripping available space and that is limiting possible growth and development. With the new building, research into equine orthopaedics at Colorado State will continue to flourish. Major areas of research in the Equine Orthopaedic Research Program are: articular cartilage healing, role of microdamage to the subchondral bone in traumatic joint disease, development of synovial fluid and serum markers to detect early damage to articular cartilage and subchondral bone in joint disease, intravenous hyaluronic acid and its mechanism of action, gene therapy, and studies on the effect of conformation and racetrack surface. For additional information on the new Equine Orthopaedic Research Laboratory, contact Paul Maffey, director of development for the College of Veterinary Medicine and Biomedical Sciences, at (970) 491-3932. ■



## Blair Resigns as Head, Smith Takes on Interim Position

Dr. Carol Blair has stepped down from her position as head of the Department of Microbiology and returned to a faculty position that will allow more time for teaching and research. Dr. Ralph Smith has been appointed as the department's interim chair.



Dr. Carol Blair

"The Department of Microbiology is recognized as one of the premiere departments on campus, and Dr. Blair deserves

much of the credit for this accomplishment," said Dr. James Voss, dean of the College of Veterinary Medicine and Biomedical Sciences. "Dr. Blair has provided outstanding leadership during her tenure as head. Research conducted within the department is internationally recognized, and the undergraduate program is held in high esteem."

Dr. Blair joined the University in 1975 and became department head in 1988. She leaves her management position to pursue research interests in the field of virology. Dr. Blair's primary area

of interest is in studying the molecular interactions between arthropods and the viruses they transmit. She will continue to teach the virology courses she had been teaching while department head but with more time now, she noted, to focus on her students and the course work.

Dr. Smith, who took over as interim head on August 1, is a professor in the department and was associate vice president for research. Dr. Smith previously served as head of the Department of Microbiology from 1982 through 1988. ■

## C ontinuing Veterinary Medical Education

Please call the Department of Clinical Sciences at Colorado State University at 1-800-457-9715 or (970) 491-8373 for further information on all course offerings. Courses are sponsored by the Department of Clinical Sciences and the Colorado Veterinary Medical Association.

For Equine Sciences Continuing Education Schedule, contact the Equine Sciences Program, Colorado State University, Fort Collins, CO 80523; (970) 491-8373. Web address: [http://www.colostate.edu/depts/equine/continuing\\_ed/index.html](http://www.colostate.edu/depts/equine/continuing_ed/index.html).

### October 1999

#### October 14, 1999 • Beginning Arthroscopy ‡

**Instructors:** Dr. C. Wayne McIlwraith, Dr. Gayle Trotter

**Cost:** \$425 non-CVMA member; \$385 CVMA member

This course will give thorough instruction in arthroscopic instrumentation and the techniques for its use.

The in-depth use of arthroscopy for diagnosis of disease and surgical treatment of fractures and cartilaginous lesions will be presented in the morning lecture and practiced by course participants in an afternoon laboratory. Instruction will be given primarily in the use of hand instruments, but the use of motorized equipment will be demonstrated. Videotapes, as well as animals, will be used to provide instruction in the surgical treatment of various lesions. A major portion of the time will be given to training participants in carpal and fetlock surgery; instruction also will be given in arthroscopic surgery of the hock and stifle joints.

#### October 15-16, 1999 • Advanced Arthroscopy ‡

**Instructors:** Dr. C. Wayne McIlwraith, Dr. Gayle Trotter

**Cost:** \$450 non-CVMA member; \$405 CVMA member

This will be a two-day course covering all areas of arthroscopic surgery that are considered advanced. The following topics will be included: advanced equipment and instrumentation update, results of arthroscopic surgery of the carpus, management of slab fractures in the carpus, arthroscopic surgery of the palmar and plantar aspect of the fetlock, arthroscopic surgery of the tibiotarsal joints, arthroscopic surgery of the femoropatellar and femorotibial joints, arthroscopic surgery of the shoulder, arthroscopic surgery of the elbow, arthroscopic surgery of the coffin joint and pastern joints, arthroscopic surgery for synovial osteochondroma, arthroscopic surgery of the hip, and arthroscopic surgery of tendon sheaths.

‡ Above two courses may be combined for a cost of \$725 non-CVMA member; \$640 CVMA member

#### October 20-22, 1999 • Current Topics in Feline Medicine

**Instructors:** Dr. Dave Twedt and various Colorado State University faculty

**Cost:** \$450 non-CVMA member; \$405 CVMA member

This course will provide discussion in selected areas currently relevant to feline medicine.

The intent will be to provide clinically useful, practical information in the following subject areas: endocrine and metabolic diseases, dermatology, cardiology, urology, oncology, reproduction, neurology, and infectious diseases.

### November 1999

#### November 10-12, 1999 • Small Animal Cardiology

**Instructors:** Dr. E. Christopher Orton, Dr. Janice Bright, June Boon

**Cost:** \$450.00 non-CVMA member, \$405.00 CVMA member

This course will cover basic and advanced diagnosis and management of cardiac conditions of dogs and cats. Afternoon laboratories will include training in echocardiography, ECG interpretations, and case discussions.

### December 1999

#### December 1-3, 1999 • Management of the Acute Abdomen in the Horse

**Instructors:** Dr. Ted Stashak, Dr. Josie Traub-Dargatz, Dr. Gary Baxter, Dr. Dean Hendrickson, Dr. Ann Wagner

**Cost:** \$600 non-CVMA member; \$540 CVMA member

The clinical evaluation of the acute abdominal patient leading to a decision whether medical treatment or surgical intervention is required will be reviewed. Medical and surgical therapy will be discussed with specific emphasis on selection of drugs, preoperative patient preparation, anesthesia, intraoperative findings, and postoperative care and complications. Indications for the use of surgical stapling will be reviewed and the techniques illustrated. The laboratory will include application of techniques that are used in the clinical evaluation and treatment of an acute abdominal patient. This will be followed by a thorough review of surgical anatomy on a cadaver. The decision for surgical intervention, selecting anesthetic regimens, selection of laparotomy approach, and correction of the intra-abdominal lesions are included. Each participant will have the opportunity to thoroughly explore the abdominal cavity and perform an enterotomy for emptying the large colons, an intestinal resection anastomosis, and other procedures they wish to perform. A demonstration of the use of surgical stapling equipment for resection and anastomosis of the large and small colon will be included.

## Schwarzkopf Hits Front Lines in Support of Colorado State's Animal Cancer Center

Gen. Norman Schwarzkopf, commander of Operation Desert Storm in the Persian Gulf, continues to man the front lines in another war – the war against cancer.

Schwarzkopf has taped a series of public service announcements designed to help raise awareness of the Animal Cancer Center at Colorado State University. In the taped segments, the general appears with Murphy, a 7-year-old, 150-pound female Great Dane owned by Colorado veterinarian Robin Downing. Murphy, who



underwent successful surgery for bone cancer two years ago, is the “poster girl” for the Animal Cancer Center’s capital construction campaign. Schwarzkopf, himself a cancer survivor, had a beloved dog who died of cancer.

The Animal Cancer Center, based in the Oncology Unit at the College of Veterinary Medicine and Biomedical Sciences, has pioneered work in limb-sparing therapy for bone cancer, dietary improvements to amplify cancer treatment, and chemotherapy and radiation therapy and has offered hope to many animal owners who thought they had no hope left. Much of the research and many treatment options developed at the Animal Cancer Center are directly applicable to human medicine and have successfully been used to save human lives and limbs.

Dr. Stephen Withrow, chief of clinical oncology, is the director of the Animal Cancer Center. The Center is staffed by oncology specialists recognized worldwide for their cutting-edge cancer research and treatment expertise. General Schwarzkopf’s public service announcements will focus attention on the work at the Animal Cancer Center and the Center’s need for funding as it escalates its fight against cancer – the Number One killer of our canine friends.

The capital construction campaign, of which the PSA’s are a part, will raise funds to build a new wing at the Veterinary Teaching Hospital that will house the Animal Cancer Center and the Argus Center for Human/Animal Bond Resources. The public service announcements, taped earlier this month in Telluride, Colorado, will begin airing nationally later this year. ■

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