

CENTER FOR EQUINE HEALTH

# HorseReport

SCHOOL OF VETERINARY MEDICINE • UNIVERSITY OF CALIFORNIA, DAVIS

SPRING 2017



**UC DAVIS**  
**VETERINARY MEDICINE**  
Center for Equine Health

**Healing Connections**

— Page 3



# Center for Equine Health Hosts Emergency Response Expert

**W**hat do you do when your horse is caught in an accident? Or needs to be evacuated because of flood or fire? What do you do when your client calls whose horse is trapped?

Advanced training and preparation are essential for first responders, veterinarians and animal owners. To help the community develop a greater capacity to deal with such animal-related emergencies, the CEH is hosting animal rescue specialist Jim Green from the U.K. for a year of collaborative training, planning and community outreach.

Green, a member of the Hampshire Fire and Rescue Service in southern England, and his team developed animal rescue methods and equipment that are now standard throughout the U.K. In 2012, Green founded the British Animal Rescue and Trauma Care Association, which provides advice, direction, training and accreditation to agencies involved in rescuing and providing trauma care for animals.

According to Green, animal-related emergency service plans were first developed to address community needs and develop “community resilience.” He will coordinate with emergency response stakeholders at UC Davis, and at community and state agency levels to help foster standard operating procedures for emergencies that involve animals. He also hopes to learn about community preparedness for larger scale disasters while here in California.

Training opportunities will be developed and made available to meet the needs of various constituents, complementing earlier efforts by veterinary professor John Madigan, who established the [Veterinary Emergency Response Team](#) and the student [Veterinary Emergency and Disaster Preparedness Club](#).

“It’s crucial that we offer training for our students because as veterinarians in a community, they will be expected to participate in emergency preparedness and response,” said Claudia Sonder, CEH director of outreach. [Equine Disaster Preparedness Training Fund](#).

Jim Green (2nd from left) with CEH team members after training session on animal rescue techniques.



## Extra!

In addition to the two printed issues of the CEH *Horse Report* each year, two e-versions are also now available!

To start receiving your copies electronically, visit:

[www.vetmed.ucdavis.edu/go/subscribe](http://www.vetmed.ucdavis.edu/go/subscribe)



# HEALING CONNECTIONS

**A**fter nearly 40 years of marriage, Charlotte Driver is confronting one of life's biggest challenges—losing her connection to her husband, Richard, as he gradually loses his memory. Diagnosed with early onset dementia, it's only a matter of time before he develops Alzheimer's disease.

Determined to stave off the disease for as long as possible, the Drivers enrolled in a unique program aimed at harnessing the healing power of horses to improve the quality of life for people affected by dementia and their care partners. They visited the [Center for Equine Health \(CEH\)](#) at the school last fall, along with six other couples, to participate in a research project that grew out of a collaboration with the UC Davis School of Medicine and the Connected Horse, a nonprofit organization dedicated to improving the lives of all those affected by dementia.

Over the course of three weeks, the Drivers joined the others in five-hour workshops designed to gradually introduce the couples to the horses. For Charlotte, it was an entirely novel experience; she had never touched a horse. But Richard was excited about being around horses again. As a teenager, he helped a neighbor care for his horses.

"They can really read your emotions," Richard said. "Being around them brought back a lot of happy memories. I'm more conscious of my environment and my emotions while with horses."

And that's one of the main goals of the project—helping the patient and caregiver get in touch with themselves and each other.

"This is a journey about relationships," said Paula Hertel, a co-founder of Connected Horse. "It's therapeutic for both of the partners."

Initial study results are promising, Hertel said. Participants report decreased anxiety and depression, better sleep quality and a stronger sense of social support. She and co-founder Nancy Schier Anzelmo have presented their findings at several conferences to date, including the Alzheimer's Association's International Conference.

Not only are the equine experiences healing for people, they provide meaningful work for older horses too, said Claudia Sonder, director of outreach for CEH.

"This work is a great example of the one health initiative to solve problems for animals and humans, and gather significant science along the way," Sonder said. "We plan to monitor the effect of the interaction on the horses as well as the humans, and I suspect it will be a win-win for both."

She explained that horses have evolved over millions of years as prey animals to be highly in tune with their environment. They survive by reading their environment and their herd mates and reacting to cues. That makes them a great social mirror, as they will react to humans and reflect back the energy of the interaction, teaching humans confidence, self-awareness, and self-control.

In addition to gaining a new appreciation for the sensitive nature of horses, Charlotte said they gained something more.

"When we left, we felt a sense of accomplishment and hope. We have hope no matter what happens—we'll never give up," she said. "I look at life a lot differently now and want to give this feeling to other people."



# Unraveling a Common Neurological Disease

*“There is an interaction between genetics and nutrition for this disease to manifest.”*

– Dr. Carrie Finno

Horses with neuroaxonal dystrophy (NAD) exhibit signs similar to humans ‘under the influence.’ They may stand with forelimbs too far apart (or too close), have difficulty navigating curbs or hills, or lack coordination while walking and making tight turns. Manifestations of the disease can vary among horses with some showing mild performance issues, while others are severely debilitated. Although there is no cure yet for NAD, one of most common equine neurological diseases, researchers are closing in on how to prevent the onset of symptoms.

Dr. Carrie Finno, interim director of the [Center for Equine Health](#), said studies show that vitamin E is necessary to prevent degeneration of the neurons and axons throughout the brain and spinal cord during early life in many species. Axons are the part of nerve cells that transmit impulses, so when those cells are damaged, communication breaks down between the brain and the rest of the body, leading to a lack of coordination.

“We still don’t understand the cause of the degeneration, but we do know there is an interaction between genetics and nutrition for this disease to manifest,” Finno said. “You need the perfect storm of genetic susceptibility and a deficiency of vitamin E during the first few years of life.”

Researchers in Finno’s laboratory are working hard to develop a genetic test for NAD in horses, but until one is available, she advises horse owners to supplement pregnant mares with at least 5,000 IU/day of vitamin E, using the “natural” liquid formulation, and the foal with 2000 IU/day as soon as it’s born. The supplement may not entirely eliminate the disease, but it does appear to result in less severe

neurological signs if the foal receives supplementation during the early stages of life.

“While rare, complications from over-supplementing vitamin E can occur,” Finno said, “so we recommend keeping a close eye on the levels. Once we have a genetic test, we can advise people on which of their mares and foals to supplement.”

Finno pointed out the following criteria that clinicians look for in suspected cases of NAD:

- Onset of neurological signs at 6-36 months of age that either stabilize or progress slowly
- History of related horses that appear similarly affected
- History of low vitamin E or poor nutrition during first year of life
- Negative EPM titer (blood and/or spinal fluid)
- Normal neck x-rays +/- normal myelogram
- Negative for West Nile Virus

Horses aren’t the only species affected by neurologic disease due to vitamin E deficiency; humans also suffer. The genetic basis for the disease has been identified in humans, but that same gene has been excluded as a candidate in the horse. NAD appears to equally affect males and females and is present across horse breeds.

Foals with NAD look normal at birth. Neurological abnormalities can be subtle and even be missed for years unless the horse is specifically examined for neurological disease. Unfortunately, a definitive diagnosis of NAD requires examination of a particular section of the spinal cord during post-mortem examination. Without a necropsy, clinicians cannot positively diagnose the disease.

“There may be a lot of missed diagnoses out there, so we’re committed to identifying the genetic mutation responsible and developing a test as soon as we can,” Finno said.



**Dr. Carrie Finno’s lab** received a National Institutes of Health grant to expand its equine NAD studies using horses as comparative models for humans. Research reveals a number of similarities in how vitamin E deficient neurodegeneration takes place in the equine and human systems. Finno hopes the funding will allow her team to establish a basic mechanism for how vitamin E deficiency contributes to neurodegenerative diseases across species.

# Regenerating Equine Athletes with Stem Cells

Tendon and ligament injuries are a common cause of lameness in horses. Treatments vary greatly and are often associated with high expenses and failure to return to a previous level of performance. Non-elastic scar tissue formation is a frequent result of injury. Since scar tissue is not as functional as tendon and ligament tissue, equine researchers and clinicians at the school are exploring the use of stem cells to develop an effective treatment that will improve healing and lessen the amount of scar tissue formation.

While the clinical use of stem cells is still in its early stages, and currently only utilized through clinical trials at UC Davis, the application has shown positive results for many horses. By engaging in standardized clinical trials and collaborating with human medicine teams, the goal of this work is to generate evidence-based recommendations for stem cell therapies.

Dr. Larry Galuppo, chief of the veterinary hospital's [Equine Lameness and Surgery Service](#), is conducting four trials through the [Veterinary Center for Clinical Trials](#). His focus is on mesenchymal stem cells' ability to replicate themselves, regenerate tissue, and repair damaged tissue to treat tendon and ligament injuries, intra-articular lesions, and laminitis in equine athletes. Galuppo is also researching stem cells further with other faculty members of the [Veterinary Institute for Regenerative Cures](#).

These innovative treatment options may improve a horse's healing process during the crucial time of potential scar formation, enhancing the quality and strength of repair. If this is the case, re-injury rates should decline and return to previous level of performance should be more common in horses treated with regenerative medicine. Eventually, these stem cell therapies may become integrated as a routine part of regenerative medicine for sport horses as well as human athletes suffering from similar conditions.



Dr. Larry Galuppo injects stem cells into a horse with joint damage.

## Leave a Legacy While Planning for the Future



You don't have to be wealthy to make a significant gift to the Center for Equine Health. Many philanthropic partners of the center show their commitment to horses through their estate plans.

These gifts create enduring impact, and donors are remembered well after their lifetimes for making a difference in the health of horses. Grateful for their generosity, the school honors these donors through the Heritage Society for Animals. Each spring, new members are welcomed during a reception. Membership in the society now totals more than 700.

Estate preparation does not need to begin late in life—foresight and generosity today can make a significant impact on the well-being of horses in the future. Estate planning options include bequests made through wills, revocable living trusts, and life income agreements such as charitable remainder trusts and gift annuities.

For more information about joining the Heritage Society for Animals and the benefits of planning for an estate gift, contact the [Office of Development](#) at 530-752-7024.

# A Horse Lover's Commitment to Equine Health

**H**eloise Power's love of horses began when her grandmother gave her an untrained pony at age seven. She enjoyed spending time with her equine companion and became an accomplished rider competing in local horse shows in the Santa Barbara area. Since then, horses have been a big part of Power's life, inspiring her commitment to equine health.

She was fortunate to meet someone who also had an interest in horses—her husband Sandy. They bought a ranch in San Diego County during the 1960s and bred Thoroughbred racehorses for 35 years there and in Santa Ynez.

While attending a horse race during the 1990s, the Powers became acquainted with Dr. Gregory Ferraro, then director of the Center for Equine Health (CEH), and learned about the CEH's internationally recognized work to advance the health, welfare, performance and veterinary care of horses through research and education. Over the years, the Powers have found the center to be a helpful resource and appreciated the guidance from its experts.

With her wide-ranging interest in horses, Power participated in numerous disciplines, including racing and jumping. She



continues to have a keen knowledge of Thoroughbred racing pedigrees and is passionate about the health and safety of racehorses, as well as the integrity of the sport.

“I have been inspired to support the [CEH](#) because of its impact on helping horses live healthier and longer lives,” Power said. “The center is at the forefront of improving equine health, with research that translates into real life treatments and therapy. It's always been of comfort to know that the latest and greatest developments in veterinary medicine and technology are just a trailer ride away.”

As a dedicated philanthropic partner, Power helps to ensure the CEH's continued excellence in improving equine health.

“We are deeply grateful to Heloise for her long-time contributions,” said Dr. Claudia Sonder, CEH director of outreach. “Through her generosity, we have been able to fund numerous projects and programs, as well as help with operational costs associated with maintaining our horse herd. Her support has made a difference in our work to improve disaster response and technical rescue of horses.”

For information about making a gift to the CEH, please contact the [Office of Development](#) at 530-752-7024.

## Breathing Easier: Videoendoscopy Helps Diagnose Airway Disorders



**L**ike human athletes, equine athletes are required to be in near-perfect condition to meet the demands of high-intensity activity. The ability to breathe well is one of the most critical functions for race and sport horses, but upper airway obstructions such as laryngeal hemiplegia (more commonly known as “roaring”), hamper the horse's ability to do so. This condition occurs when the left arytenoid cartilage in the horse's larynx loses function and blocks the airway. Fortunately, equine surgeons at the school's veterinary hospital are skilled at performing prosthetic laryngoplasty (“tie-back”) surgery to correct this problem.

To diagnose upper airway obstruction or other upper airway respiratory disorders, UC Davis veterinarians use static and dynamic videoendoscopy

- ◀ Handsome was back to competing better than ever after successful “tie-back” surgery.



# Hemorrhagic Cystitis Characterized in Horses

The diagnosis of cancer in an animal is devastating for an owner. Thankfully, for some owners whose horses have been diagnosed with bladder cancer, equine internal medicine veterinarians have characterized a treatable clinical syndrome that mimics bladder cancer.

A retrospective study of UC Davis veterinary hospital patients over an 11-year period identified hemorrhagic cystitis as a condition that shows similar symptoms and conditions to bladder cancer in horses that presented with hematuria (blood in their urine).

Symptoms in horses with hemorrhagic cystitis or bladder cancer may include painful or uncomfortable urination and unusual consistency of urine—especially blood in the urine.

The study, led by resident veterinarian Dr. Fauna Smith under faculty member Dr. Gary Magdesian's mentorship, identified hemorrhagic cystitis in 10 horses. This type of bladder inflammation has never been described in horses before. All horses had a history of blood in their urine and uncomfortable or frequent urination. Cystoscopy (imaging the inside of the bladder with a tiny camera) revealed bleeding and thickening of the bladder lining. Bladder wall hemorrhage with inflammation was the most common biopsy finding, but some of the cases had findings suggestive of bladder cancer.

All horses were treated with antibiotics, and eight out of the 10 returned for follow-up cystoscopy. They responded rapidly to the medication and showed clinical improvement with

**Dr. Fauna Smith** is a third-year resident in the Equine Internal Medicine Service. She earned her DVM from UC Davis in 2005 and then moved to New Zealand to work in a mixed animal and equine private practice. During this time, Smith worked at Waikato Stud, the largest Thoroughbred stud farm in New Zealand. She presented this cystitis research to veterinarians from around the globe at the 2016 American Association of Equine Practitioners annual convention. As the veterinary school with the most comprehensive advanced training program in the world, UC Davis is able to offer its house officers (residents, interns, fellows) valuable research opportunities not available at other institutions, enhancing the dissemination of information that changes outcomes for horses.



complete resolution of lesions in an average of six weeks. After the lesions and hematuria resolved, all 10 horses returned to their previous functions.

These findings make this an important differential diagnosis to consider when bladder cancer is suspected grossly or histologically in horses with hematuria. Since the conditions can look similar to both a clinician performing a cystoscopy and a pathologist reviewing a tissue sample, hemorrhagic cystitis could certainly be a possibility. Such horses should therefore be rechecked after a period of two to four weeks of treatment, to confirm the diagnosis.

to make an accurate diagnosis. One of the added benefits of utilizing this new technology is being able to exercise the horse in its normal environment, such as a track or an arena rather than on a treadmill, which can be dangerous and frightening for inexperienced horses. The YouTube video “UC Davis Equine Videoendoscopy” shows how horses are instrumented with a dynamic videoendoscopy system and then exercised while a live video feed is transmitted to a monitor for clinicians to view laryngeal function.

Handsome, a 16-year-old Thoroughbred gelding, recently underwent “tie-back” surgery after videoendoscopy was used to diagnose him with left laryngeal hemiplegia. His left arytenoid cartilage was completely paralyzed and was partially (and at maximal effort almost completely) obstructing his airway.

After successful surgery, Handsome was discharged the following day with the expectation of returning to full performance after just a few weeks of convalescence.

“Handsome is breathing and performing much better,” said his owner Nancy. “After surgery, he found he could run and breathe at the same time—we actually couldn’t catch him, he was so excited. When he was conditioned enough after surgery, my daughter had him back to jumping three feet six inches with ease. We cannot thank UC Davis enough for everything the team did for him and my family.”

To see the procedure in action, view the “[UC Davis Equine Videoendoscopy](#)” video on YouTube.



**UC DAVIS**  
**VETERINARY MEDICINE**  
*Center for Equine Health*

Nonprofit Org.  
U.S. Postage  
**PAID**  
UC Davis

[www.vetmed.ucdavis.edu/ceh](http://www.vetmed.ucdavis.edu/ceh)

Mail ID 1415  
Center for Equine Health  
School of Veterinary Medicine  
University of California  
One Shields Avenue  
Davis, CA 95616-8589

The *Horse Report* is published by the University of California, Davis, School of Veterinary Medicine: Michael D. Lairmore, dean; Carrie Finno, interim CEH director; Claudia Sonder, director of CEH outreach; Linda Ybarra, director of SVM communications; Katie Blakewell, Celeste Borelli, Elaine Chan, Don Preisler, Carolyn Sawai, Rob Warren, Trina Wood, contributors. The Center for Equine Health is supported with funds provided by the State of California Pari-Mutuel Fund and contributions from private donors. *The University of California does not discriminate in any of its policies, procedures or practices. The university is an affirmative action/equal opportunity employer.*



**Help us go green!** E-versions of the CEH *Horse Report* are now available twice a year – to start receiving your copies via e-mail (and other SVM electronic publications), visit [www.vetmed.ucdavis.edu/go/subscribe](http://www.vetmed.ucdavis.edu/go/subscribe)

## Show that *You Care...*

Did you know that you can send a heartfelt gesture in celebration or sympathy of loved one or a much beloved horse? With a gift to the **Equine Tribute and Memorial Fund**, your honorees are sent a special letter from the director of the Center for Equine Health, notifying them of your meaningful tribute. Gifts to the Equine Memorial and Tribute Fund benefit equine health studies. For more information, visit: [give.ucdavis.edu/Go/EqTributeMemorial](http://give.ucdavis.edu/Go/EqTributeMemorial) or call 530-752-7024.



## Funded CEH *Research Projects*

### **Determining the Mechanical Properties of Different Arena Surface Types** (Dr. Sue Stover)

The JD Wheat Veterinary Orthopedic Laboratory continues to focus on injury prevention in equine athletes. A recent study compared the fetlock extension of dressage horses on both synthetic and dirt surfaces. Fetlock hyperextension is associated with increased likelihood of soft tissue and joint injury, and engineering surfaces that optimize the biomechanics of the equine limb are likely to decrease injury rates. The goal of this study was to determine the mechanical properties of different dirt and synthetic surfaces. The study revealed greater fetlock hyperextension on the synthetic surfaces tested compared to the dirt, however the study also revealed great variability among synthetic surfaces. Additional research is required to identify the optimal arena surface properties for the various equine disciplines.

These results will influence arena surface designs to improve the safety of equine athletes during training and competition.

### **Investigating the possible association between *Toxoplasma gondii* infection and equine protozoal myeloencephalitis (EPM)** (Dr. Nicola Pusterla)

UC Davis School of Veterinary Medicine's Dr. Patricia Conrad was the first researcher to identify a causative agent for EPM. While the organisms that cause EPM in the horse are known, the reason why many horses can become infected but only some horses develop clinical disease remains unknown. In marine mammals, coinfection with *Sarcocystis neurona* (the main organism known to cause EPM) and *Toxoplasma gondii* has been shown to increase the severity of neurologic disease. The objective of this study is to determine blood antibody levels to *T. gondii* in California horses with and without neurologic signs. From this dataset, risk factors, including breed, age, use and sex will be assessed for *T. gondii* exposure. This work is likely to improve prevention, diagnosis and treatment of EPM.



[www.vetmed.ucdavis.edu](http://www.vetmed.ucdavis.edu)