

Arkeology

News and trends on veterinary medicine and the human-animal bond.



Teaching



Discovering



Healing

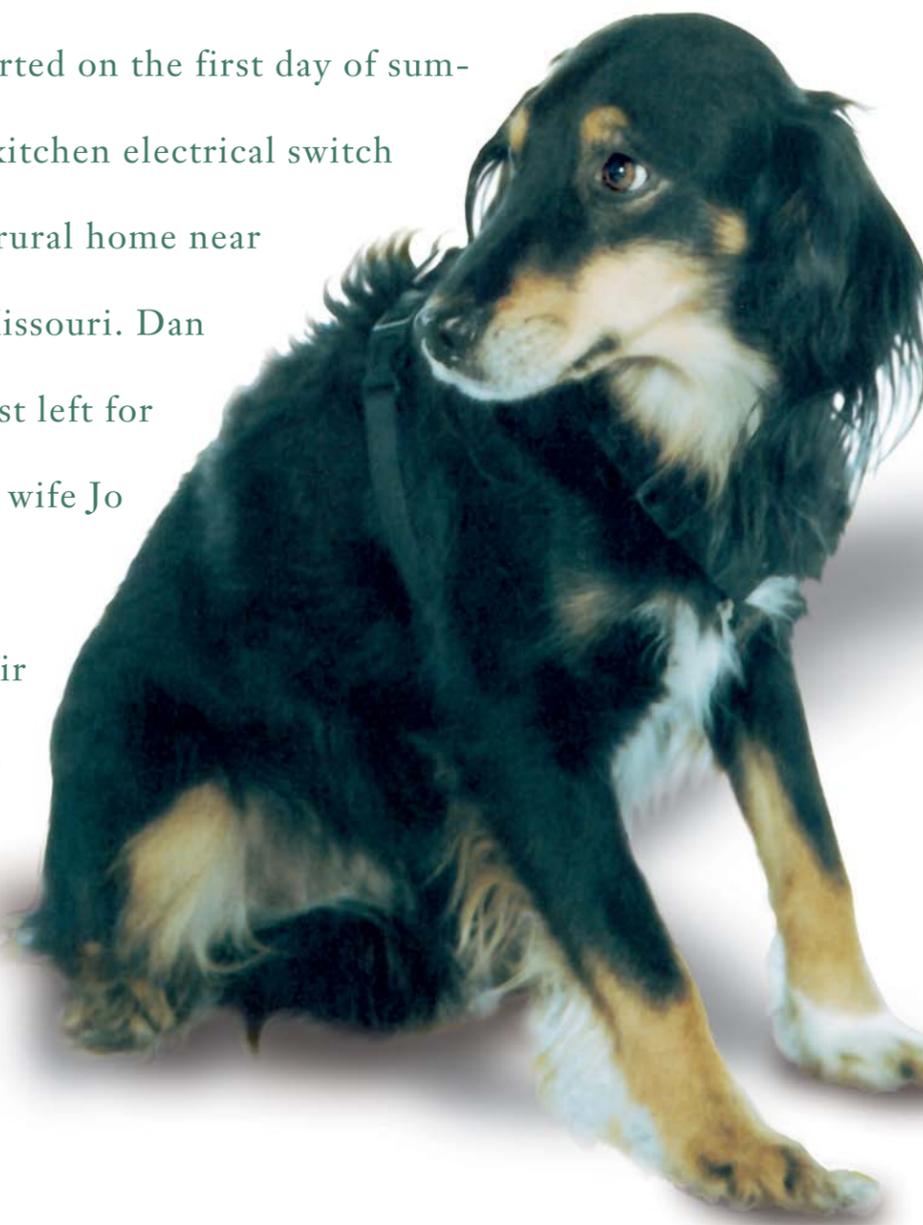
Saving Sarah

Sarah has no pretensions to greatness. She's a mixed-breed dog who loves being petted and greeting



people with a wagging tail. But when Sarah suffered massive smoke inhalation in a house fire, lots of people decided that they would not let her die.

The fire started on the first day of summer when a kitchen electrical switch shorted in a rural home near Hallsville, Missouri. Dan Smith had just left for work and his wife Jo was running errands. Their dogs enjoyed their usual full run of the house.



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BEGINNINGS

Educational institutions have an obligation to study and perfect new concepts that benefit the public. While the concept of wellness has been applied to health care for many years, it is only now being widely utilized in veterinary medicine. With this issue of *Arkeology*, the University of Missouri College of Veterinary Medicine proudly highlights its emerging Center for the Study of Animal Wellness. Our journey into this new frontier holds a myriad of promises and opportunities for discovery.

PREVIEWS

A New Program For Some Old Friends

The human-animal bond has been around for a long time—about 100,000 years, in fact. Yet, we've just recently begun to seek a better understanding of the powers of that bond.

Key Contributions Make a Crucial Difference

It's "Mission Accomplished" for the College's \$10 million endowment campaign with almost \$18 million pledged in total impact.

Exploring A New Frontier

The College sets its sights on a promising new horizon—to better understand the benefits of the human-animal bond and improve the health of both animals and humans.

COMMENTARY: DR. JOE N. KORNEGAY

A New Program For Some Old Friends

The Center for the Study of Animal Wellness strives for a better understanding of the powers of the human-companion animal bond.

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The relationship between humans and animals is not new. Archeologists in northern Israel uncovered a man buried 12,000 years ago who did not die alone. The man's hand, in what appeared to be placed in ageless friendship, was found peacefully resting on the head of a young dog. This case is hardly the oldest evidence of the ancient and mysterious bond between humans and animals. DNA evidence suggests that dogs were first domesticated from wolves almost 100,000 years ago. The inately-more-independent cat began associating with humans more recently—only about 4,000 years ago—when they were probably domesticated from the small African wildcat.

Pets continue to play a key role in our lives. Americans own a total of approximately 500 million dogs, cats, birds, horses, small mammals, reptiles, and fish. We spend more than \$14 billion each year to feed and care for these animals and another \$5 billion for assorted



accessories such as leashes and cages. Our pets are increasingly treated as members of the family. Indeed, that old adage that the dog (or cat, or horse, or....) is "man's best friend" has perhaps never been truer than today. With the complexity of the world's problems and the hectic pace of our lives, we turn more and more to our pets for unconditional companionship—the so-called human-companion animal bond.

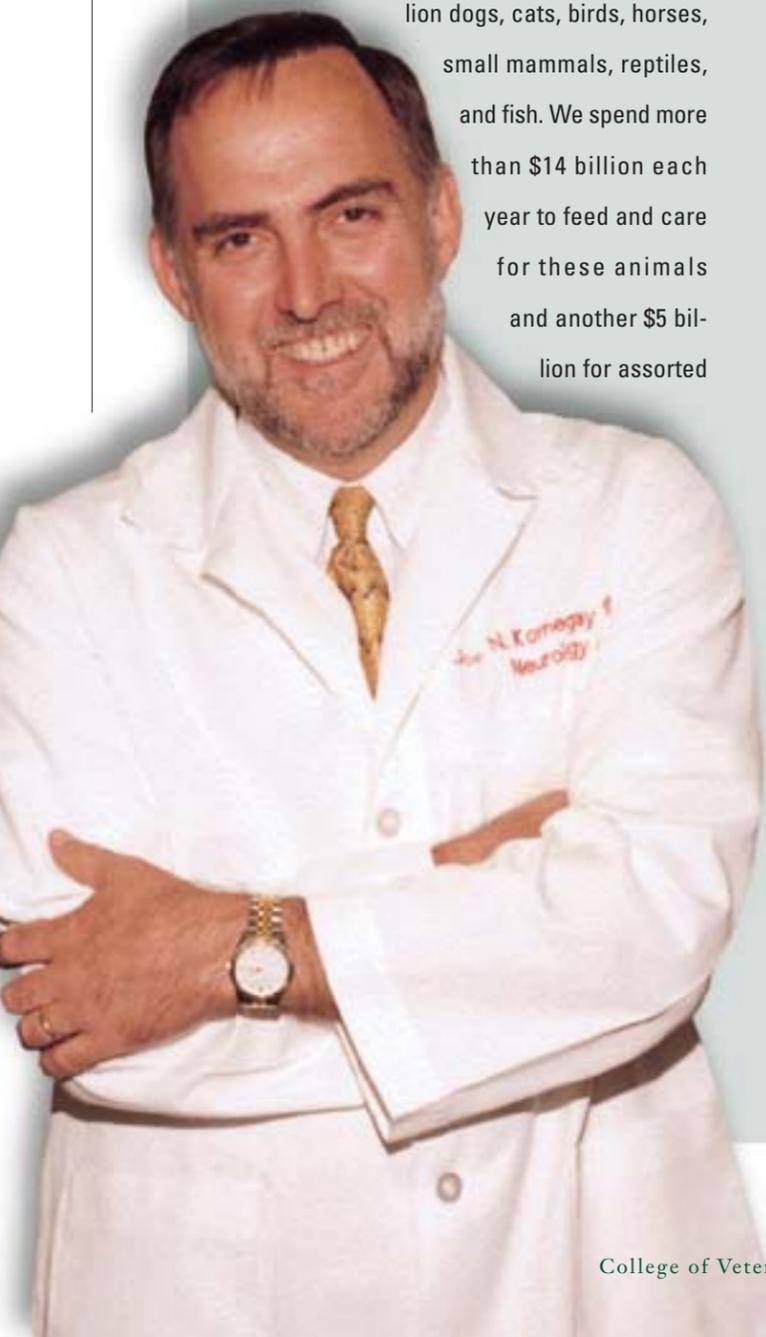
Most importantly, pets offer unconditional friendship—someone who's there for us through thick and thin. They also teach us certain lessons, both in life and death. A child's initial chores are often tied to caring for an animal. And, in some cases, our first exposure to death comes through the loss of a pet. The pluses of pet ownership don't stop there. We now know that caring for pets benefits our health in a number of ways, extending from control of blood pressure to management of complex diseases.

Given all that pets do for us, I sometimes wonder if we are doing enough for them. It's clear that some good-intentioned owners simply don't provide responsible care for their pets. Other

problems face us—particularly the consequences of pet over-population. We obviously have a lot of work ahead of us to address these issues. That's why I'm so excited about the emerging Center for the Study of Animal Wellness here at MU. Working with other professionals, we can really make a difference.

Achieving a better understanding of the powers of the human-companion animal bond and the underlying causes of problems such as irresponsible pet ownership and pet over-population will require a team approach—one that involves veterinarians, key corporations, the humane societies, and other professional groups. In particular, through The Center for the Study of Animal Wellness, the MU College of Veterinary Medicine plans to forge a stronger relationship with practicing veterinarians and humane societies. This will allow our students to interact with a diverse clientele not seen in a major university's teaching hospital, assist with spay/neuter procedures prior to adoptions, and learn first hand about the pet overpopulation problem. In fact, the alliance of veterinary schools, practicing veterinarians, and humane societies could bring innovative, high quality pet care to areas where veterinary care is not now available.

Look for future issues of *Arkeology* to focus on the role our emerging Center for the Study of Animal Wellness will play in addressing these critical issues. We welcome your active involvement and support.



Dr. Joe N. Kornegay
Dean, College of Veterinary Medicine



More than half of U.S. households own a pet.

Key Contributions Make A Crucial Difference

It's "Mission Accomplished" For the College's \$10 Million Endowment Campaign With \$17,913,603 in Total Impact.



Dr. Jack Stephens and Vicki Stephens with friends Skeeter, Raisin, Spunky, Thelma, Jenny, Blue Baby, Lacy, Big Duke, and Bonnie and Clyde.

The College's \$10 million 50th Anniversary Endowment Campaign that began in July 1996 ended June 30, 2000 with committed campaign funds standing at \$11,733,603. This campaign is the most successful, and ambitious, in the College's history and will go far in establishing its future course.

The four-year campaign was designed to parallel the four-year journey that the first graduating class made, entering the College in 1946 and graduating in 1950. The campaign fund figure does not include the value of \$2,750,000 in state matching funds committed through the Missouri Endowed Chairs and Professorships Program, says David Horner, College development officer who directed the campaign. In addition, new bequest intentions are expected to bring the College an additional \$3,430,000 not counted in the campaign total, he said. Thus, the total impact will be \$17,913,603.

The leadership and major gifts portion of the campaign concluded with Mrs. Thelma P. Zalk giving the College \$800,000 to fund two new endowments: \$550,000 to establish a professorship in tumor angiogenesis, and \$250,000 to the College's emerging Center for the Study of Animal Wellness. This amount is in addition to a \$300,000 gift Mrs. Zalk presented to the College last year to establish an endowment for financially-needy veterinary medical students.

The Campaign at a Glance

Total campaign commitments were \$11.7 million. Leadership gifts and pledges to the 50th Anniversary Endowment Campaign include:

- ▶ **Thelma P. Zalk**, St. Louis, three gifts totaling \$1.1 million: \$550,000 to establish a professorship in tumor angiogenesis; \$300,000 to endow the Thelma P. Zalk Scholarship for financially-needy students; and \$250,000 to help establish the MU College of Veterinary Medicine Center for the Study of Animal Wellness.
- ▶ **Anonymous**, St. Louis, two bequest commitments totaling \$1.1 million: \$850,000 for the comparative oncology program and \$250,000 for veterinary medical scholarships.
- ▶ A \$750,000 gift from the **Research Animal Diagnostic and Investigative Laboratory** to establish the Joseph E. Wagner Fellowship in Laboratory Animal Medicine.
- ▶ The estate of **Col. Charles and Charlene McKee**, Hereford, Arizona, \$570,000 to endow the Charles and Charlene McKee Professorship in Microbial Pathogenesis.
- ▶ A \$550,000 endowment from Kansas Citians **Tom and Betty Scott** to establish a professorship in veterinary oncology.
- ▶ A \$550,000 endowment from **Ralston Purina**, St. Louis, to establish a professorship in Small Animal Nutrition.
- ▶ A \$550,000 endowment from **Bill and Nancy Laurie**, Columbia, to begin the E. Paige Laurie Missouri Program in Equine Lameness.
- ▶ **Jack Stephens**, DVM '72, Anaheim, Calif., two gifts totaling \$375,000 from the VPI "Skeeter" Foundation: \$350,000 for the Center for the Study of Animal Wellness and \$25,000 for student scholarships.
- ▶ **Kenneth and Barbra Levy**, St. Louis, endowment to support residency training in veterinary ophthalmology.
- ▶ **Theodore G. Short**, Springfield, Missouri, \$350,000 trust for students in need with high scholastic standing.
- ▶ **Andrew Love**, DVM '64, St. Louis, \$250,000 to endow programs directed by the Associate Dean for Student and Alumni Affairs.
- ▶ **Dennis H. Miller**, Webster Groves, \$220,000 to establish an endowed scholarship fund in memory of his daughter and son-in-law, Ann Miller-Roth, DVM '88 and Jerome E. Roth, DVM '74.
- ▶ **Clara L.D. Jeffrey Charitable Trust**, Summit, New Jersey, \$130,000 for cancer treatment for companion animals.
- ▶ **Richard G. Brooker**, St. Louis, \$100,000 to endow a scholarship in memory of "Needles" and in gratitude for the compassion and generosity of her veterinarians.
- ▶ **The Gentle Doctor Benefit Parents Committee**, Columbia, \$100,000 endowment for student scholarships.

"People take different roads on the path of philanthropy, but they share one thing in common—the desire to make a difference," says Tom Scott, National Volunteer Chair of the campaign.

"We are privileged to partner with each person who participated in this campaign in our mutual quest to combine human compassion with professional competence in veterinary medicine. Every time a surgery heals a hurt or new research advances a breakthrough, these friends of the College have helped make it happen. The work of the College is their work, too. It's good work that is built over the years, and it's work with intrinsic rewards."

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Exploring a N

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In establishing The Center for the Study of Animal Wellness, MU's College of Veterinary Medicine is setting its sights on promising new horizons—and a new kind of healthcare partnership with veterinary medicine at its center.

If it's true that there's nothing new under the sun, how do you explain the University of Missouri's Center for the Study of Animal Wellness?

Throughout its first half-century, the University of Missouri College of Veterinary Medicine worked hard to keep pace with the latest and best practices in animal medicine. And it succeeded. Despite continuous financial pressures, the College was always at or near the forefront of the profession in many areas.

Its willingness to explore new concepts and put them into clinical practice has helped the College become a leader in multiple specialty areas.

More recently, the MU Veterinary Medical Teaching Hospital has helped to pioneer the “one medicine” concept, in which experts in the medical field team with their veterinary medical counterparts to explore new approaches to healing for both humans and animals.

Now by establishing the Center for the Study of Animal Wellness, MU veterinary medical clinicians and researchers are actively defining and exploring another important frontier in veterinary medicine: animal wellness and the human-animal bond. Representative objectives of the new Center include:

- ▶ To push forward our understanding of the benefits of the human-animal bond to improve the health of both animals and humans.
- ▶ To study and model innovative wellness approaches that can make a real difference in animal health care.
- ▶ To combine the resources of leading professionals in veterinary medicine and important organizations recognized as champions of animal welfare to address problems of mutual concern.

Implementing Wellness Concepts and Conducting Research

The Director of the new Center for the Study of Animal Wellness is Richard Meadows, DVM, DABVP.

A practicing veterinarian for much of his 20-year professional career, Dr. Meadows also directs the busy Small Animal Community Practice of the College's Veterinary Medical Teaching Hospital.

Supporting Dr. Meadows in a number of interdisciplinary research areas is Rebecca Johnson, RN,



PhD, and the Millsap Professor of Gerontological Nursing and Public Policy at MU's Sinclair School of Nursing. Dr. Johnson holds an adjunct associate professor position with the CVM's Department of Veterinary Medicine and Surgery. Dr. Meadows holds a similar position at the nursing school.

The Meadows/Johnson team will be responsible for conducting investigations and facilitating interdisciplinary research by other faculty in wellness and the human-animal bond.

“We're very excited about the opportunities for collaboration with other MU colleges and departments,” Dr. Johnson says. “With diverse perspectives, methods of doing research, funding sources, and dissemination routes, the good that can come of the work is limitless.

“Working with others also creates a more powerful

energy level than is possible when an investigator works alone. Collaboration is the way to move mountains!”

The Animal Wellness Perspective

Animal wellness, as defined by the Center, is a comprehensive set of attitudes and practices that focus on proactive, preventive, and health-centered approaches ahead of traditional illness- or injury-centered responses. A continuing partnership between the health care provider and the client maintains wellness throughout an animal's life.

“We want to underscore the profound truthfulness of an old saying,” Dr. Meadows says. “An ounce of prevention really is worth a pound of cure.”

In the animal wellness approach, the veterinarian becomes an advocate for the animal, working with the

ew Frontier



Missions

The Center for the
Study of Animal Wellness
University of Missouri-Columbia
College of Veterinary Medicine

- ▶ **TEACHING:** Educating veterinary students, veterinary medical professionals, industry, and the public about a broad range of critical animal wellness and human-animal bond issues.
- ▶ **HEALING:** Developing, testing, implementing, and modeling innovative wellness approaches which can make a real difference in optimizing health among people and animals, across the veterinary medical environment and in human healthcare as well.
- ▶ **RESEARCH:** Conducting carefully targeted research aimed at defining, validating, understanding, and building on the benefits of the human-animal bond and wellness-centered approaches to animal and human healthcare.
- ▶ **LEADERSHIP:** Bringing together a world-class team of professional, corporate, and academic resource people to create a think-tank for conceptual leadership, to provide effective communications, and to develop working models of wellness programs for widespread application.

owner to structure and monitor a total program of health care. The tools used include client education and coaching, pet acquisition consulting, behavioral counseling, spay and neuter programs, preventive nutrition, dentistry, and bereavement counseling.

The benefit for the animal's owner is a partnership with the veterinarian in which annual "checkups" prevent disease, or at least catch it at an early stage when treatment is more effective, less invasive, and less costly.

For the animal patient, the obvious benefit is a reduction of disease and associated pain and suffering. But this is only the beginning. Without the overriding problem of combating active diseases, quality of life issues can become a primary focus. Doctor and client can devote their time to proactive behaviors that enhance and maintain good mental and physical

health, such as play activities, exercise programs, and preventive dentistry.

"Almost everyone who owns a dog has noticed that they are capable of unbridled and infectious joy," Dr. Meadows says. "They also instill joy in their owners. And there is a growing body of evidence that feeling joy, and receiving positive attention is not only pleasant, but a valid *need* of humans and animals that is directly beneficial to the immune system. We want to greatly expand and widely publicize this body of knowledge."

Not sufficiently discussed in public forums today is a pervasive—and darker—side of the way people relate to their animals.

"The number one reason for young companion animals to die today is not from illness or injury but from euthanasia as a result of behavioral problems,"

Dr. Meadows says. All too often, pets are abandoned or turned over to humane organizations and ultimately euthanized simply because they have been improperly trained and cared for and exhibit behaviors with which owners aren't prepared to cope.

"Veterinarians can feel a dramatic sense of personal failure in these cases even though the 'problems' actually represent a combined failure of adequate training of the pet when young and a lack of recognition by owners of what is normal animal behavior.

"Many of these pet losses can be prevented through behavioral counseling by veterinarians, thus keeping the animal alive, keeping the owner happy, and preventing the loss of a patient for the veterinarian. It's a clear win/win/win situation."

A New Territory: the Human-Animal Bond

Wellness also sets the stage for serious exploration of a new area in veterinary and human medicine—the complex and little-understood relationship between people and creatures known as the human-animal bond.

Scientific studies in this area strongly suggest that relationships between humans and animals can create tangible physical and psychological benefits for both.

Among the subjects being studied are pet-facilitated therapy, delaying the problems of aging, enhancing exercise physiology (at both ends of the leash), and the prevention of zoonoses (diseases communicable to both animals and people).

Numerous studies have documented benefits of pet ownership. A report in the *Harvard Health Letter* concluded that unconditional affection from companion animals induces a psychological calming effect, lowering blood pressure, heart rate, and anxiety.

The *American Journal of Cardiology* reported that patients who own pets were less likely to die in the year following a heart attack than patients who did not own animals.

A British study in the *Journal of the Royal Society of Medicine* showed that both the physical health and the psychological well being of people measurably improved when a dog or cat was introduced into the household. Dog ownership also led to more exercise.

Of 1,000 Medicare patients studied in an article published in the *Journal of Personality and Social Psychology*, pet owners required fewer doctor visits.

An Australian study showed that pet owners have lower blood pressure and cholesterol levels than non-

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Frontier continued from page 5

owners. Merely petting an animal was found to lower blood pressure.

This study led to a larger survey to see if pet ownership can positively impact public funds spent on healthcare (Australia spends almost 10 percent of its gross domestic product on its national health care system). The survey found that the 60 percent of the population who own companion animals required less medication and fewer doctor visits, had fewer sleeping difficulties and heart problems, and exhibited better mental and physical health. Pets were projected to have helped save \$1.8 billion in annual medical costs—about five percent of the country's total health expenditure.

Pioneering work by South African Dr. J.S.J. Odendaal measured levels of five different chemicals in the brain during human-animal interactions. The chemicals monitored included phenylethylamine (connected to human attraction), endorphins (which produce feelings of warmth and security), prolactin (involved in social bonding and reducing stress), oxytocin (the hormone that assists relationship bonds), and dopamine (a signaling chemical that regulates many body processes). Dr. Odendaal found that all five hormones peaked in both humans and dogs when they interacted. The same chemical changes seen in the humans were also seen in their dogs.

The MU team wants to expand on Dr. Odendaal's research to find practical ways to benefit both human and animal patients suffering from depression, anxiety, loneliness, and even certain types of physical disease.

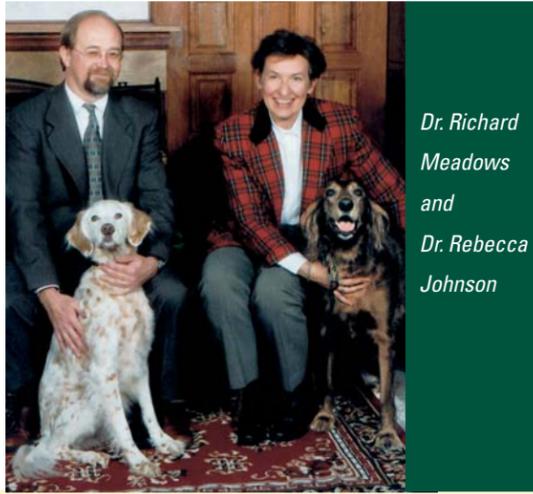
"I'm hoping that in the long run this area of study will change the way that a lot of chronic diseases are treated, adding more valuable tools to the toolbox," Dr. Meadows observes.

The Veterinarian's Role

"As a lifelong pet owner, it is abundantly clear to me that the health of my animals directly affects my own well-being," Dr. Rebecca Johnson agrees. "If pet owners can become partners in an ongoing effort to prevent illness and maintain the wellness of their animals, not only is the human-animal bond strengthened, but the veterinarian-client bond grows stronger as well."

One of the greatest of all assets of veterinarians is their willingness to devote a substantial amount of unhurried time to "listening to" and interacting with animal patients and their owners.

"Veterinarians are already viewed by the public as knowledgeable, compassionate professionals. Their clients recognize what human medicine continues to be slow to understand, namely that the cost of preventing illness is far, far less than the



Dr. Richard Meadows and Dr. Rebecca Johnson

What Others Are Saying

Dr. James Nave, President American Veterinary Medical Association

"As a profession we're going to have to move to wellness-oriented approaches in order to survive. I believe that the human-animal bond can be our best friend. It has been our best friend up to now. But if we don't work at this, it could turn around and become our worst enemy. The whole system for delivering veterinary medicine needs change. I don't think that most veterinarians understand the urgency of that. Solving the problems of this profession must start in the schools. The Wellness Center could play a significant part in this kind of change. It could provide critical information, it could conduct studies, it could be a model. All the problems of our profession require the veterinary college at the table in some kind of leadership role."

Dr. Jack Stephens, President Veterinary Pet Insurance

"If you're ever going to move the veterinary medical profession, you're going to have to start with the students. The fact is that pets are playing a bigger and bigger role in people's lives, and this means that we must practice the very best kind of medicine at all times without thinking we should make value judgements for the owner. You have to go directly to the consumer with this message, because often veterinarians just don't get it. I believe very much that pet owners should be prepared, through insurance and every other means, to always say yes to the very best care."

Dr. Frank Booth, Professor Department of Veterinary Medical Biomedical Sciences University of Missouri College of Veterinary Medicine

"My personal opinion is that wellness or prevention is more likely to work in a veterinary school than in a medical school. I think that veterinarians are more interested in prevention because of the way that they approach animals."

Dr. Cecil Moore, Director MU Veterinary Medical Teaching Hospital

"I continue to be amazed at how slow the profession has been in acknowledging its own strengths. We have not always admitted to ourselves that there is value in this bond, and we have a hesitancy to step forward and truly value what we do. In the system as it's evolved we have to a large extent thrived on diagnosing and treating disease. That has been the paradigm. The change of that mindset is the whole revolution we're talking about. Focusing on wellness and prevention issues like nutrition and exercise should be at least as central to the veterinary medical profession as treating illness and injury."

cost of treating illness—not only in money, but in suffering."

"The conventional illness-centered protocols that veterinarians are taught in college actually serve to limit the range of health care options and minimize the veterinarian's role in the healthcare process," Dr. Meadows observes. And because modern medicine is eliminating many animal illnesses, the ability of traditional illness-centered veterinary medicine to sustain a healthy practice is already imperiled.

Wellness and preventive medicine approaches, on the other hand, actually encourage a broader range of innovative health care approaches. As a result, they enable veterinarians to get back to why they became veterinarians in the first place. And with a full involvement in proactive well-animal care, wellness-centered practices can look to a future of economic growth and expansion.

Wellness, the Human-Animal Bond

One professional and pet owner who needs no convincing of the benefits of the human-animal bond is veterinarian Dr. Jack Stephens, 1972 MU graduate and now president of Veterinary Pet Insurance, Inc. in California. In 1989, Dr. Stephens was diagnosed with cancer of the throat and tongue and was given less than a year to live.

When conventional therapies proved unproductive, Dr. Stephens sought more sophisticated care to stem the spread of the cancer—including an approach suggested by a veterinary oncologist. While that procedure ultimately worked, Dr. Stephens is convinced that the bond that he enjoyed with his two dogs enhanced its effectiveness and contributed to his full recovery.

"The dogs distracted my wife and me from my misfortune," he says. "They entertained me no end, and stopped me from feeling sorry for myself."

When he heard about the establishment of the Center for the Study of Animal Wellness, Dr. Stephens' interest was immediate, and before long he was on a plane to Missouri to present a check as the initial installment on a quarter-million dollar commitment to help start the Center.

"As a cancer survivor, I know first-hand the powerful, positive effects of the human-animal bond and how it can truly impact your health and well being," he says. "That's why this endowment for the Center for the Study of Animal Wellness to study and promote the human-animal bond is a personal joy for me."

With Dr. Stephens to present the check was Skeeter, a Miniature Pinscher, who was instrumental during the long recovery. Skeeter's paw print joined Dr. Stephens signature on the bottom line.

Ark



Saving Sarah *continued from page 1*

The fire quickly became intense. When vinyl wall coverings and laminate cupboards ignited, black smoke and toxic fumes billowed toward the ceiling. As the fire developed, smoke settled towards the floor and dogs. The Smiths' dogs, Mickey, Suzy, Stomper, and Sarah could only watch the flames and bark, hoping someone outside would notice. As the heat and smoke intensified, they retreated.

Alerted by a motorist, Boone County firefighters and Hallsville police rushed to the house to rescue any occupants. In a small town everyone knows when a family has dogs. So arriving with the emergency response team was Dr. Michelle Schmidt, the Smiths' veterinarian and a 1991 graduate of the University of Missouri College of Veterinary Medicine.

Rescuers soon found the four dogs, all unconscious and huddled together.

Firefighter Brenda Zimmer remembers the dogs being brought out of the house. "They were all having a hard time breathing, and one was hardly breathing at all." Mickey and Suzy were so close to the fire that steam rolled off their fur when firefighters cooled them down with water.

In most such cases, this would have been the end of the rescue efforts.

But Dr. Schmidt, Zimmer, and the other firefighters all had companion animals of their own. For each of them, the animal was not a possession, but a loved family member. In seconds, and with virtually no discussion, the rescuers had formed a team to help each dog. Dr. Schmidt directed their emergency medical efforts.

Desperate Measures for Temporary Stabilization

Brenda Zimmer got Sarah, a black and brown Australian shepherd and border collie mix who was in the worst shape.



Sarah was closely monitored in the MU Small Animal ICU.

With Dr. Schmidt's CPR directions, she began mouth-to-mouth resuscitation on Sarah, who was barely breathing. "I breathed into her mouth and nose and thumped on her chest trying to stimulate her," Zimmer says. "There was a lot of soot and hair in her mouth." Sarah's heart stopped three times. "I'm not going to give up on you," Zimmer remembers thinking. She continued the CPR.

Then with a twitch of her body, Sarah began to breathe on her own. But each breath was labored and ineffective. Zimmer used her firefighter's mask to administer oxygen. Briefly, Sarah lifted her head, looked at Zimmer, and wagged her tail. "A house can be replaced, but a dog is pretty special," Zimmer says.

Nearby, Hallsville Police Chief Pete Herring was using the same technique on Stomper, an 11-year-old beagle mix. "I've got pets too," Herring said. "Some people consider them part of the family. I'm not going to stand there and watch someone that important die."

A Commitment of the Smiths

Jo Smith was the first family member home. Her first thought was about the dogs. She ran past the burned house, not even looking at it, to find the firefighters trying to save the dogs' lives.

"I could feel everyone's spirit," she said. "It was a straight-from-the-heart kind of thing. Our animals are the closest thing we have to children. For all of the bad that you hear about in the world, it's a nice feeling to find people who care."

The Smiths, who have for years adopted stray dogs,

cats, and horses, were not looking for more animals in 1995 when they saw a pickup truck with the sign "Free Puppies." Out of the litter of mixed-breed animals, the Smiths fell in love with and adopted two, Sarah and Stomper. Some time later, Mickey and Suzy, not-quite-weaned puppies, were dumped in Hallsville in winter weather. The Smiths found them, took them in, and nursed them with baby bottles.

All four dogs quickly became part of the family. For Jo, the unconditional love was a release from the stresses of teaching fourth graders. The dogs were always happy, says Dan, and their happiness made him happy.

The Medical Context

Smoke inhalation is the primary killer of fire victims. It deprives the victim's brain of vital oxygen and fills the blood with deadly toxins that attack the cardiac and respiratory systems. Though all four dogs were breathing, Dr. Schmidt knew they weren't out of danger and would require specialized care if they were to survive.

Especially Sarah.

While firefighters were still carrying the dogs from the smoke-filled house, Dr. Schmidt had called the Veterinary Medical Teaching Hospital's Intensive Care Unit for guidance on the next step.

On duty at the ICU, staffed 24 hours a day, was a new intern, small-animal veterinarian Dr. Mary Brown. The call was fortuitous because Dr. Brown, at the College for only three weeks, had researched emergency medicine for small animal smoke inhalation. Such occurrences are so rare that there's little data in the veterinary medical literature.

Dr. Brown knew through research on humans that smoke inhalation does much of its damage through secondary complications such as poisoning and pneumonia. Traditional therapies, including antibiotics to prevent infection and steroids to stop inflammation, could actually be harmful by



Jo and Don Smith

interfering with lung function and shutting down the immune system.

Early oxygen therapy was critical to cleanse the body of poisons and prevent subsequent brain damage, said Dr. Brown, Sarah's first attending veterinarian (and later attended by resident Dr. Paige Langdon and clinical assistant professor Dr. Marie Kerl). Early oxygenation also helps minimize the effects of a little-known condition called Delayed Neurologic Syndrome (DNS). Here, the myelin sheath, a material that ensheathes nerve fibers in the brain, begins to chemically break down from exposure to the smoke's poisons, Dr. Brown said.

Resulting symptoms occur from 24 hours to three weeks after the smoke exposure, with up to two years needed for the victim to heal. "It takes time and supportive care to help heal the neurons in the brain," Dr. Brown said. "The biggest risk is that DNS can be mistaken for permanent damage, causing the animal to be euthanized."

Stomper and Sarah, given continuous oxygen from the firefighter's equipment, were transported in Dr. Schmidt's pickup. Mickey and Suzy rode in Chief Herring's new police car. When they arrived at the MU ICU, a team of faculty and students was ready for each animal.

Upon arrival at the ICU, Sarah was blind, agitated, and confused—all typical symptoms of severe smoke inhalation. She was put on a ventilator and sedated while the oxygen purged her body of toxins. Meanwhile veterinarians initiated treatment for the secondary problem of smoke inhalation—pneumonia.

Mickey and Suzy quickly responded to treatment (and would be released within 24 hours). Stomper stayed two days.

Sarah's case was critical. She stayed on a ventilator for 11 hours and would suffer through pneumonia and DNS for weeks. Sarah wasn't alone,

however. Veterinary medical faculty and students closely monitored her case, and the Smiths visited her every day.

The Long Road to Recovery

It would be a month after leaving the ICU before Sarah could crawl, then stand. She began to walk in a wobbly way, unable to control her direction. Soon she was responding to verbal—but not visual—clues. Sarah was blind, a common aftereffect of severe smoke inhalation. "Vision is a touchy thing in these cases," Dr. Brown says. "We did visual exams and learned that Sarah's eyes and nerves were normal but her brain's higher activities were still hindered by neurological damage due to low blood oxygen." Sarah also remained mentally confused, a remnant of the DNS.

Jo and Dan Smith were happy that Sarah had survived, they would welcome her home in whatever condition.

"Dan and Jo's visits every day had a positive impact," Dr. Brown said. "With this level of trauma, the process of healing is long and slow. The patient suffers depression. Sarah's joy in seeing Jo and Dan was something that we couldn't give her."

Just as the research indicated, Sarah began to improve.

Her distance vision began to come back and her decision-making processes started returning to normal as well. Veterinary medical students included Sarah in some of their duties and participated in Sarah's gleeful reunions with the Smiths.



Sarah on the road to recovery.

Going Home

On the first day of autumn, Sarah was ready to go home.

But too many friends had been made on her journey to let the event pass unnoticed. On hand for the send-off were the and faculty who treated her, the 11 veterinary medical students who had assisted, firefighter Brenda Zimmer, and others.

By this time Sarah was a lot more than another case history.

With everyone gathered in the hospital's lobby, Sarah entered the room. Not knowing who to greet first, she ran over to Zimmer to plant a kiss, then to the clinicians, and then into the arms of the Smiths.

It was time to go home at last. **Ark**

*Editor's Note: Sarah's remaining sight problems resolved within a few months of being home. The Smiths report that Sarah is back to her old self. To help defray the costs of Sarah's hospital care, a fund has been set up in her name at the Veterinary Medical Teaching Hospital. Donations may be sent to the **Saving Sarah Fund**, Veterinary Medicine Development Office, MU College of Veterinary Medicine, Columbia, Missouri 65211. **Make donations payable to: MU College of Veterinary Medicine.***

Arkeology Because animals are more important today than ever before in our history, the MU College of Veterinary Medicine is dedicated to preserving, protecting, and strengthening the human-animal bond. *Arkeology*, as its name implies, is a medium for bridging between the role of the college as a protector of the animal kingdom (a kind of modern ark) and as a place where science, medicine, learning, and teaching can flourish (*logia* is the old Latin and Greek word for study or discipline). Continuously embarking on voyages of teaching, healing, and discovery, the College invites you on board this vessel to journey with us.



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