

Veterinary **VISION**

A Publication of the University of Tennessee College of Veterinary Medicine Volume 5/Number 1

fall 2006

Obesity and Disease: The Growing Epidemic Among Animals and the Integrated Role of Nutrition

Success Story: Dog Licks Weight Problem. Swears Off Table Scraps (See Trudy's Tale on Page 5)

Artherosclerosis: Paving the Way for New Prevention and Treatment Approaches

UTCVM Mounts National Response: Helping Communities Prevent and Deter Threats to the Agriculture and Food Sectors

'Trudy'

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Envisioning the Future of Veterinary Medicine

To meet the health challenges of the 21st century, colleges of veterinary medicine will need to be flexible and open to change. The strength of the profession, heretofore based on the breadth of clinical training provided veterinary students, now resides in a willing-

ness to abandon old models of licensing veterinarians along with the concept of the universal veterinarian. A new model of veterinary education will emerge from the challenges currently before us. These include the breadth of veterinary medicine's standard curricula, rural

veterinary practice, public health and biomedical workforce shortages, and society's changing views of animals and their roles in our lives.

While discussion in the profession swirls around concepts such as 'tracking' students into specialties earlier in their veterinary education, here at UT's College of Veterinary Medicine we are increasingly focusing the work of our clinician-scientists in collaborative, synergistic ways. An example is the breadth and depth of the expertise UTCVM has amassed in the fields of oncology, genomics, immunology, orthopedics, physical therapy and rehabilitation, urology, metabolic disease, and nutrition. Our efforts are substantially directed toward research on geriatric medicine and aging. After all, our companion animals are living longer and suffering from the same diseases associated with aging as people. In this issue, you will read more about leading clinical and translational research initiatives, which are geared to move basic research into clinical applications. These include collaborations and partnerships to improve the

diagnosis, treatment, and prevention of metabolic disease. You will also discover that UTCVM is home to one of only a handful of veterinary nutrition centers. I think you will find the reading stimulating and amazing.

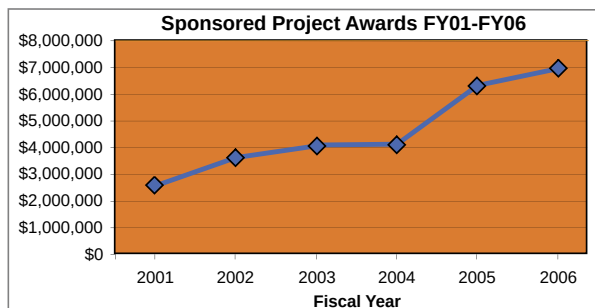


Dean Blackwell currently serves on the National Commission on Industrial Farm Animal Production (NCIFAP). The Commission, a two-year collaboration between the Johns Hopkins School of Public Health and the Pew Charitable Trusts, is studying the public health, environmental, rural sociological, and animal welfare effects of concentrated animal feeding operations. The Commission's membership is comprised of notable U.S. citizens representing the public health, veterinary, food producers, and food industry sectors, along with current and former elected officials.

Also featured in this issue of Veterinary Vision:

Our basic research feature recognizes the outstanding work of Dr. Mei-Zhen Cui, a molecular biologist who received the 2006 Chancellor's Award for Research and Creative Achievement for her and her research team's work on the vascular pathophysiology of atherosclerosis. The importance of research in this area is highlighted by the fact that atherosclerosis, a disease of the large and medium-sized muscular arteries, is the leading cause of human deaths in the developed world. In the United States alone, yearly mortality of persons from myocardial infarction and strokes stands at 500,000 and 170,000, respectively. The annual cost of death and long-term disability attributable to atherosclerosis in the United States runs in the hundreds of billions of dollars. Dr. Cui and her team's research findings have been pivotal in revealing the subcellular mechanisms of atherogenesis and the development of procoagulant activities in plaque.

To all of UTCVM's supporters: thank you for your voluntary and monetary gifts and commitments toward building our programs and services in veterinary medicine, animal and human health. Your contributions indeed make a real difference in what we're able to provide your animals and others'! ▀



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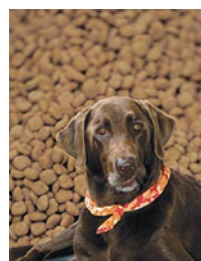
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ON THE COVER:
'Trudy' Armstrong
Photo: Greg Hirshoren

The Fat Factor

Research to improve the health of overweight pets is also paving the way for breakthroughs in understanding human obesity.



Dr. Joe Bartges holds the Acree Family Chair of Small Animal Research

"He that takes medicine and neglects diet, wastes the skill of the physician."
- Chinese Proverb

Trudy's defined waist is just about perfect in the world of canine body shapes. But that wasn't always the case.. In February 2006, the 5 year old chocolate lab pushed the needle on the scales to 122 pounds. By Labor Day, she had lost about 40 pounds and gained two years of her life. (see sidebar)

Among humans, obesity is a growing epidemic in the United States. The most recent figures from the Centers for Disease Control and Prevention show two-thirds of adults in the United States are either overweight or obese. The pet population reflects that rising trend. Between 30 and 50 percent of all dogs and cats are overweight to obese. More than half the small animals between the ages of five and nine tip the scales as overweight to obese.

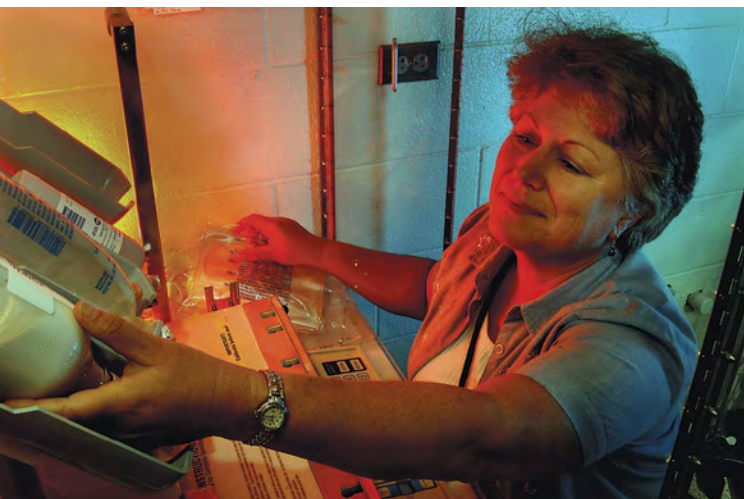
Dr. Susan Lauten, a Veterinary Nutritionist at UTCVM, says, "Overweight pets are so common that we fail to recognize this disease in its early stages.

As a result, obesity is not diagnosed or treated before other health complications occur. Everyone should be more aware of the effect obesity has on health, and how it shortens the lives of our beloved pets."

Health risks of obesity in dogs and human beings are similar in many respects. Metabolic alterations include hyperlipidemia, glucose intolerance, insulin resistance, lower urinary tract disease, cancer, hypertension, and diabetes mellitus.[1,2]. Obesity is associated with osteoarthritis, respiratory problems, cardiovascular disease, an increased incidence of cancer, and decreased longevity.[3,4].

UTCVM has always placed an emphasis on, and resources behind, research. In the last few years the investment has placed the Veterinary Nutrition Service in the company of only a handful of veterinary nutrition centers in the country..

"What does nutrition bring to the table? Three squares a day," Dr. Joe Bartges deadpans. A professor in the Department of Small Animal Clinical Sciences, Dr. Bartges is double board certified in veterinary internal medicine and veterinary nutrition and holds the Acree Chair of Small Animal Research. He says the nutrition service is a multi-dimensional, cross-



Dr. Claudia Kirk mixing TPN. TPN (total parenteral nutrition) is for patients who cannot or should not have nutrients provided into their intestinal tract.

disciplinary entity. Within the college, the service works with oncology, orthopedics, endocrinology, urology and neurology to name just a few. In doing so, the service brings an integrated approach to the management of patients and a situation conducive to

transitional studies, comparing nutrition and metabolism between animal species and humans. "The college is building two-way bridges, with regard to education and research in nutrition, not only within the various services of our college, but also with others such as the UT Graduate School of Medicine, the UT Center for Food Safety, and the Department of Animal Science."

Nutrition is an important part of preventative healthcare and managing illnesses. Through consultation with doctors in the clinic and with referring veterinarians, the nutrition service provides recommendations for better care of pets.

PET for Pets

Veterinary nutrition's roots are in increasing milk production, meat yield, and determining minimal requirements for an adult dog. In the early 1940's, Dr. Mark Morris, founder of Hill's Pet Nutrition, the makers of Science Diet and Prescription, developed a theory that certain diseases in pets

"Overweight pets are so common that we fail to recognize this disease in its early stages. As a result, obesity is not diagnosed or treated before other health complications occur. Everyone should be more aware of the effect obesity has on health, and how it shortens the lives of our beloved pets."

TRUDY'S TALE

Whatever her owners ate, Trudy ate. At the drive-through, Trudy, got a hamburger. Biscuits and gravy on camping trips. Scraps from everyone at cookouts. Table food in addition to her dog food. She'd meet her owner at the door with a ball, chase it once or twice, and head back to the house.

By the time she was three years old, Trudy had undergone two knee surgeries and a total hip replacement. Last February, she was at UTCVM to be evaluated for surgery to replace her other hip. She weighed 122 pounds, walked with a limp, and had to use her front legs to pull herself to a sitting or standing position. Orthopedic surgeon Dr. Joseph Weigel told owners David Williams and Karen Armstrong he didn't recommend surgery until she had lost some weight. "In my opinion, we should not operate on seriously obese animals presented for surgical treatment of arthritis for two reasons: it makes recovery more prolonged, and it increases the risks for complications," Dr. Weigel says. He referred Trudy to Veterinary Nutrition Services.

Veterinary Nutritionist Dr. Susan Lauten gave Trudy's owners a good incentive to lose the weight. "She told me getting that extra weight off would add two years to Trudy's life," Williams says. Although it was tough, their love for Trudy helped them ignore her soulful brown eyes begging for food. She lost 40 pounds in seven months.

"Occasionally, some of the dogs who have weight reduction end up feeling better," Dr. Weigel says. "The lameness resolves and the animals don't come back for hip replacement surgery." That was Trudy's case. Now when the five-year-old meets Williams at the door with her ball, he's the one ready to head to the house after throwing it 30 times. "We've had to condition everybody—Trudy's on a diet," Williams says. "It was all our fault, not hers. They'll eat what you give them. We didn't realize we were killing our dog."





Indoor living, sedentary lifestyles and higher fat content in pet foods contribute to the problem of obesity in dogs and cats. The UTCVM Veterinary Nutrition Service works to combat the weighty issue with its obesity management program. Overweight animals can be treated on an outpatient basis or as inpatients at the veterinary teaching hospital. The patients' diet and exercise is monitored by veterinary nutrition specialists to help the animals achieve their optimum weight. For more information call 974-8387.

PUDGY PETS FAT CAMP

could be managed through carefully formulated nutrition. He created the first clinical diet to manage and control disease. Dr. Claudia Kirk, professor in the Department of Small Animal Clinical Sciences and double board certified in veterinary nutrition and internal medicine, says the discipline of veterinary nutrition continues to grow in importance. "We're leading the way and rather than copy what was done in human clinical nutrition we are now leading the way in certain areas."

Positron Emission Tomography (PET) is one of those areas. UTCVM's radiology and oncology services were already collaborating with the UT Graduate School of Medicine, using PET to study naturally occurring tumors in animals, when the nutrition service came to the table. PET scans are most often used to detect cancer and to examine the effects of certain therapies by showing biochemical changes in the cancer. The nutrition service is concentrating their efforts on the possible uses PET has in exploring metabolic diseases, and the resulting research could ultimately impact human health.

One of the biggest health risks facing the Sher Pei dog breed is amyloidosis. It occurs when amyloid, a hard waxy substance derived from proteins, builds up both within and outside cell walls, eventually causing the cell to malfunction or die. In humans, amyloid is also associated with Alzheimer's disease, diabetes mellitus, and familial Mediterranean fever. In Sher Peis, the kidney is often affected. Unfortunately, kidney cells can't regenerate so amyloidosis usually results in kidney failure. Amyloidosis in dogs is somewhat similar to familial

Mediterranean fever, a genetic problem that leads to early death in children. Working with the Human Immunology and Cancer Program at the UT Graduate School of Medicine and collaborating with researchers in England, UTCVM Resident Dr. Scott Rizzo is using Positron Emission Tomography (PET) to look at a unique "label" for the amyloid that can be used as a sensitive and non-invasive method for detection of amyloid in the tissues of affected patients. Other research using PET scan technology includes studying glucose uptake by tissues and the development of novel labels to measure metabolic activity and metabolic diseases.

Oxidative stress, or damage to animal cells and thereby organs and tissues, is another topic of research involving the Veterinary Nutrition Service. "Dr. Jo Smith is looking at oxidative stress in diabetic dogs and cats," says Dr. Kirk. The metabolic complications associated with diabetes mellitus increase oxidative stress in people. "If we can first demonstrate the degree of oxidative stress and then come up with nutritional strategies to stop it, then our goal would be improved management and treatment of animals with diabetes. Renal damage, hindlimb weakness and cataracts are all examples of diabetic complications associated with high oxidative stress in diabetic people, and possibly dogs and cats."

Dr. Bartges leaves no stone unturned in his research. "All Dalmatians are at risk for forming

Veterinary Nutrition Service offers:

- Diet optimization for disease management
- Weight management clinic
- Feeding tube placement
- Nutritional referrals and consultations
- Parenteral nutrition formulations and preparation
- Computerized diet evaluation and nutrient profiles for homemade diets, commercial foods and treats
- Formulation of balanced diets optimized to individual patient needs
- Diet balancing

urinary stones because of their unique metabolism of uric acid,” he explains. Yet only a small percentage actually form stones. Prevention of urate stones involves feeding a special diet and sometimes administering allopurinol. Success in managing urate stones is variable. Most urinary stones in Dalmatians occur in the urinary bladder. Some believe, however, that many Dalmatians form kidney stones. Urate stones may go undetected because they are not easily seen by standard x-ray techniques. Furthermore, the kidneys may not be evaluated even if an autopsy is performed. “If kidney stones go undetected, they may induce disease such as kidney failure, recurrent bladder stones, discomfort, and bacterial urinary tract infections.” Dr. Bartges’ research evaluates the prevalence of urate kidney stones in Dalmatians.

An Integrative Approach

The nutrition service works closely with surgical services, in cases like Trudy’s, but also in other areas of novel research. Dr. Karen Tobias, for example, a surgeon at UTCVM, is known internationally for her work on liver shunts. A liver shunt is congenital abnormality in some dogs in which a blood vessel that normally carries blood through the liver instead carries blood around the liver. This can cause toxins to build up in the bloodstream or kidneys. Through the nutrition service, research is being done to evaluate glucose regulation, metabolic abnormality, and endocrine changes caused by liver shunts.

If there is a “poster child” disease highlighting the link between nutrition and metabolic diseases, it’s diabetes. “Cats are models for human diabetes. They develop insulin resistance and type II diabetes mellitus very similar to people,” says Dr. Kirk. Some cats have a propensity to develop insulin resistant diabetes as they become obese, yet some studies show it can also be found in lean cats. Dr. Angela Lusby, UTCVM, ’04, the college’s first Nutrition Resident, is evaluating factors associated obesity and insulin



“Bob” is the latest colleague to join the Veterinary Nutrition Service. He’s the pater familias of the college’s purpose-bred cat colony, started with private support to UTCVM’s Center for the Study of Diabetes, Metabolic Disease and Oncology Fund. The cat colony will help clinicians to better understand factors associated with insulin resistance by using non-invasive techniques to study food and medications.

resistance that lead to diabetes in cats. Dr. Kirk says, “We want to identify at-risk cats early before they develop obesity so we can prevent diabetes. For obese cats with signs of insulin resistance, we want to help them lose weight and hope to prevent and possibly reverse amyloid in the pancreas.” Amyloid in the pancreas leads to death of the insulin secreting cells; the pancreas then begins to wear down and is unable to regulate glucose levels in the body. That condition is relatively unique to cats and humans.

The immediate impacts of the Veterinary Nutrition Service are the clinical trials, the weight loss reduction service, and consultation service provided both regionally and nationally. The long-term effects of investing in the service include developing different foods, seeking better diagnostic approaches, and establishing integrative treatments for specific diseases. “Our goal is to change and improve the management of diseases in animals,” says Dr. Bartges. “At the same time, some of the things we do are directly applicable to human health.” ■

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See “cut-out” Body Condition Charts for dogs and cats on the back inside cover of this issue.

Cricket Goes to Fat Camp

Pudgy campers like Peggy Taylor's Cricket yield important information in the quest to prevent and control obesity, laminitis, and other complex conditions.

If she could, Cricket would crawl right into your lap. Of course, not many laps could accommodate the 1,100 pound horse. It could be worse—Cricket could still be weighing in at a bulky 1,322 pounds.

Until she was 14 years old, the Morgan horse competed in Combined Training events with her owner Peggy Taylor. Even at peak form, pulling a carriage in 3-day competitive events designed to test a horse's training, endurance, and ability to maneuver hazards, at 1,040 lbs Cricket was not a svelte filly.

When Peggy suffered an untimely back injury, competitions were put on hold. Turned out onto a lush green pasture with little exercise, Cricket gained close to 300 pounds. "It came on so slowly, I never really noticed," Peggy recalls. Cricket began suffering from sporadic episodes of lameness. "When I was able to start working her again, I thought it was the tendons, but we just couldn't pinpoint the problem." At the time, Peggy was managing a quarter horse farm and UT veterinarian Dr. Robin McClamroch was on an ambulatory call at the farm. "She examined Cricket and mentioned a new study that was underway at the college."

Managing the Whole Horse

That study, conducted by Dr. Nicholas Frank, an Associate Professor from the Department of Large Animal Clinical Sciences, may have saved Cricket's

life. "It's not uncommon for us to have these horses present to us for a foot problem, and we perform an endocrine workup," Dr. Frank says. "We then try to manage the systemic disease as well as the local disease." Dr. Frank enrolled Cricket in the Equine Obesity and Insulin Resistance Study, UTCVM's original "Fat Camp." The purpose of the study was to look at obese horses and try to define what aspects of the equine obese condition compares to humans and how obesity affects the health of horses.

Cricket was also diagnosed with laminitis, commonly called founder. Laminitis is a severe form of foot soreness, an inflammation of the foot and in worse case scenarios it can cause the coffin bone to become detached from the hoof wall and rotate, sometimes through the sole. Pasture associated laminitis is one of the leading diseases in horses and accounts for tremendous loss of revenue for the horse industry. Dr. Frank says, "We're looking at obesity in horses as an issue in terms of what it does to their health and how it relates to laminitis. There's no question the two conditions are related; we are trying to put the pieces of the puzzle together." Research indicates that insulin resistant or pre-diabetic horses are predisposed to laminitis.

The results of the research at UTCVM, which were published in the May issue of the Journal of



Cricket Before



Cricket After



Dr. Nick Frank

American Veterinary Medical Association, are already making a difference in the field. Dr. Frank and Sarah Elliott, senior research technician for the Department of Large Animal Clinical Sciences, concluded that measurements of neck circumference and resting insulin and leptin concentrations can be used to screen obese horses for insulin resistance—tests for insulin resistance that are useful for practitioners in the field.

Others instrumental in various insulin resistant and obesity studies in the Department of Large Animal Clinical Sciences (LACS) include Drs. Frank Andrews, Carla Sommardahl, and Ferenc Toth. Drs. Hugo Eiler, Jack Oliver, and Kellie Fecteau from the Department of Comparative Medicine collaborated with LACS to develop a glucose tolerance test.

Dr. Frank is also working with Dr. Ray Geor, a researcher at the Middleburg Agricultural Research and Extension Center of Virginia Tech, whose work focuses on examining the effects of pasture on laminitis. In Tennessee, the lush green high-glucose grasses in pastures can be a key factor in the number of laminitis cases. According to Dr. Frank, the UTCVM Equine Surgery service and on-site farrier Dudley Hurst are not only providing excellent care for horses that have already been diagnosed with



laminitis, but also UT is developing new ways of identifying and managing horses that are at higher risk for pasture-associated laminitis. “Because laminitis is so devastating, we must try to identify the animals that are at risk and use preventive approaches,” Dr. Frank says.

Insights into Insulin Resistance

The horse model parallels human medicine—identifying the at-risk population and modifying risk factors. “For instance, simply taking high-carb, high-fat items out of vending machines in schools is a start. By the same token, taking the insulin resistant, pre-diabetic horse off sweet feed and out of a lush high-sugar pasture can make the same sort of difference,” Says Dr. Frank. It did with Cricket. Changing her diet, restricting her access to pasture, and placing her on a short course of thyroid medication at a high dosage helped Cricket to trim down and overcome her laminitis.

Investigating thyroid medications is the second part of the one-two punch in dealing with equine insulin resistance and obesity. The college is now in its fourth study evaluating the use of levothyroxine to induce weight loss and improve insulin sensitivity in horses. Horses do not suffer from a thyroid



Dr. Madhu Dhar



Michaud, E. ORNL

and define genetic abnormalities associated with a disease. She tries to figure out, at the cellular and subcellular levels, what causes certain things to happen or not happen. Her background is studying obesity and insulin resistance in a mouse model that she identified at the Oak Ridge National Laboratory. Gene expression is tissue specific. Genes involved in basic metabolic functions of the body are present in fat and muscle. In a “diseased” state specific genes may not be expressed or if expressed might do so erroneously; as a result they may not make functional proteins. These proteins then will not be able to carry out their normal function in the cell. Obesity is one such example of a “diseased” state which can affect gene (s) and protein (s) expression. The important question is then what does the drug

being evaluated in horses do to those genes? Could the obesity problem rest in a tiny gene? While at Oak Ridge National Laboratory, Dr. Dhar discovered an obesity-related gene in mice that appears to maintain the integrity of a fat cell, by preserving its membrane structure. On a high fat diet the mice show pre-diabetic signs of insulin resistance and obesity. They show symptoms of insulin resistance associated with adult-onset obesity in humans. “My hypothesis is that mice are showing these symptoms because they are missing this particular gene. As they age and are fed a high fat diet, they develop

hormone deficiency (hypothyroidism), but the drug is a metabolic stimulant when given at high dosages. This medication was used as a treatment for human obesity in the 1950’s before being discontinued due to side effects. Negative side effects have not been identified so far in horses, even when the drug was given on a daily basis for 12 months. Studies performed at the UTCVM have confirmed that levothyroxine is a safe and effective treatment for obesity and insulin resistance in horses. “I now prescribe a six month course of this drug when diet and exercise measures are not working fast enough and the horse is threatened by laminitis. I’m receiving telephone calls and emails from around the country and internationally. People are using it much more now, and it is a good treatment when used in the right circumstances,” Dr. Frank says.

Is it in the Genes? The 1,300 Pound Question

Studies are currently underway to try to determine the specific mechanism by which levothyroxine affects glucose metabolism in horses. That’s where Dr. Madhu Dhar’s research comes into the picture. Dr. Dhar, a research associate professor at UTCVM, is a molecular geneticist. She uses molecular biology techniques to examine cellular DNA

How to Tell if Your Horse is Obese and at Risk for Laminitis?

- “Easy keeper” that remains overweight even when only hay is fed
- Simply too large for his or her body frame (obese)
- Thick cresty neck
- Fat pads over the rump near the tailhead
- Swollen sheath
- Fatty swellings under the skin
- Noticeable growth rings on the feet (“founder lines”)
- Occasionally foot sore when coming in from pasture

obesity and diabetes,” says Dr. Dhar, whose ongoing work is to characterize this gene further and be able to identify a step in the metabolic pathway where this gene may be affecting the expression of other genes or proteins and ultimately find a drug for this novel target.

While at UTCVM, she and Dr. Frank have shown the drug levothyroxine increases the expression of a gene within the fat tissues of horses. Says Dr. Frank, “If we can identify how this drug works in horses at the gene level, then that would be a target area for other drugs that could possibly be used in humans without the side effects.”

Dr. Frank says Dr. Dhar’s research on the mouse model is useful to equine insulin resistant studies because hers is a combination of genetic susceptibility, in her case, an actual deleted gene and then an environmental issue such as the high fat diet in the mouse that is equivalent to the lush green pasture.

Dr. Dhar is hoping to take advantage of the UTCVM’s researchers studying cancer. “I would like to look for a probable link between diabetes and cancer. “There are so many unknowns still,” she says. “With this mouse model and the novel gene we have the unique ability to address these questions. It’s adding more to the science.”

No Magic Bullet

Other research involving laminitis and insulin resistance is underway at UTCVM. Is the glucose metabolism disturbed when a horse becomes sick? Does an insulin resistant horse have a harder time handling this disturbance when it gets sick? Dr. Frank says early results indicate glucose metabolism is important in determining the threshold for laminitis to develop. An insulin resistant horse has a lower threshold, so laminitis can be triggered more easily when the systemic illness develops.

“We want referring veterinarians and clients to know our department is making a conscious effort to research these important conditions,” Dr. Frank says. While it may not be the magic bullet for obesity and insulin resistance in humans, he adds, “I think any contribution to understanding obesity and insulin resistance in any species is a contribution to science.”

Peggy Taylor, for one, is happy the studies are underway. “When we got Cricket’s weight off, her insulin levels dropped, and her energy level rose,” says Peggy. “Making sure she eats the right type of hay and keeping the weight off is tough, but I’d do it 100 times over. She’s my baby.” 

BEAR FACTS

Bears are remarkable in their ability to go for many weeks without food. American black bears don’t hibernate like other bears but go through a period of dormancy when food is scarce. Wild bears become obese in the fall, but lose this additional weight during winter dormancy.

Dr. Nicholas Frank, associate professor of Large Animal Medicine, and Sarah Elliot, senior research technician, both from the Department of Large Animal Clinical Sciences, and Dr. Ed Ramsay, a professor of Avian and Zoological Medicine, have conducted a small study to examine blood lipids in American black bears. They compared blood lipids in captive and wild bears to determine whether bears in captivity have higher blood lipid levels because they are prone to obesity. The study showed that blood lipid concentrations are generally higher in captive bears. In addition, captive bears that are encouraged to go through winter dormancy are less likely to become obese, and they also have blood lipid levels closer to those of wild bears. Captive American black bears may therefore benefit from the weight loss associated with winter dormancy.

Following this study, Dr. Ramsay sought the help of Dr. Susan Lauten, veterinary nutritionist with the Department of Small Animal Clinical Sciences, to help manage the diet of the four black bears at the Knoxville Zoological Gardens. The bears’ diet has been changed to more closely reflect what it would be in the wild: less meat and more fruits and vegetables. The four bears have lost a combined total of 334 pounds since the weight management program began in fall 2004. Dr. Lauten’s preliminary data indicates bears’ weight gain and loss throughout the year is regulated by hormones.



Understanding the Basic Mechanisms of Atherosclerosis Paves the Way for New Prevention and Treatment Approaches

By Mei-Zhen Cui, Ph.D.

Cardiovascular disease is the number one cause of death and disability in the United States, according to the American Heart Association's 2006 Annual Report. More than 71 million American adults have at least one type of cardiovascular disease; more than 910,000 Americans die of this disease each year, and the annual cost from deaths and long-term disabilities runs into the hundreds of billions of dollars.[1].

When people refer to cardiovascular disease, they usually mean atherosclerosis, one type of hardening of the arteries and a major cause of heart attacks and stroke. It is the single most important contributor to the growing burden of cardiovascular disease in the United States,

Atherosclerosis is characterized by the accumulation of lipids, cells, and fibrous tissue in the innermost layer of large and medium-sized arteries. These arteries have three layers. The intima, the layer closest to the bloodstream, consists of endothelial cells that line the wall, and under that is loose connective tissue called the extracellular matrix. The media is the middle layer consisting of smooth muscle cells. The outer layer, the adventitia, is made of fibroblasts and loose connective tissue (Figure 1).

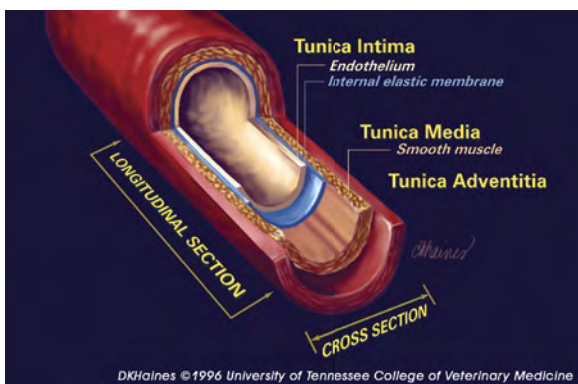
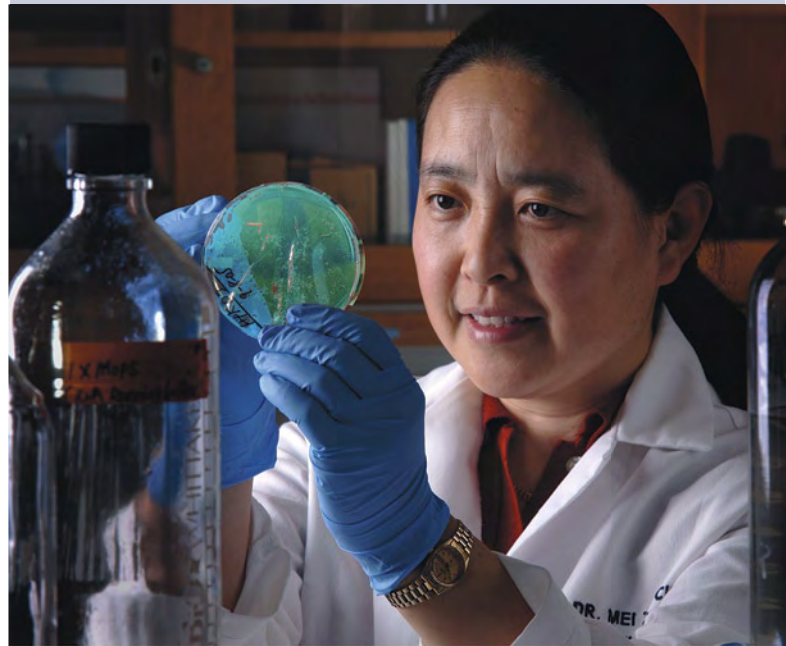


Figure 1, Schematic Diagram of a Healthy Artery



Dr. Mei-Zhen Cui

Many risk factors such as elevated levels of low-density lipoproteins (LDL), especially the oxidized low density lipoproteins (oxidized LDL), cigarette smoking, high blood pressure, diabetes, and genetic factors contribute to the development of atherosclerotic lesions. Among these risk factors, elevated levels of LDL are the most important in initiating and perpetuating the inflammation that leads to the development and progression of atherosclerosis.

Cascading Events

Development of the lesions of atherosclerosis involves a sequence of cellular and molecular events. First, excess LDL particles, which contain fatty molecules (lipids) and proteins, accumulate in the intima, where the lipids undergo oxidation. Oxidized LDL activates the endothelial cells that line the blood vessels and induce these cells to produce adhesion molecules on their surfaces. Oxidized LDL also activates endothelial and smooth muscle cells to secrete protein signals, called chemokines that signal cells to move in a specific direction.

These adhesion molecules attach to one type of white blood cell, the monocyte, circulating in the blood, and the monocyte then invades the intima with the help of chemokines. In the intima, these monocytes mature into active macrophages, cells that ingest debris and foreign material. This is followed by proliferation of smooth muscle cells in the media, which then migrate to the adjacent intima. The macrophages in the intima, which ingest the fat-laden LDLs, develop a foamy appearance and so are called "foam cells" (Figure 2).

The smooth muscle cells that have migrated to the intima form a fibrous matrix, and a cap of this covers the lesion, called a plaque, and walls it off. The foam cells may later secrete inflammatory substances that damage and weaken the cap to the point that the plaque may rupture, exposing the foam cells and a type of protein molecule called tissue factor to the blood. Tissue factor is a powerful clotting initiator, and when it interacts with other factors in the bloodstream, it forms a blood clot or thrombus. If the thrombus is big enough in a coronary artery, it obstructs the flow of blood to the heart, producing a heart attack, or myocardial infarction. Cerebral infarcts can also be caused by the rupture of plaques in a cerebral vessel or by fragmentation of a plaque, for example in a carotid artery. The dislodged blood clot, or embolus, that is formed can then travel through the blood vessel and cause infarction of an area of the brain. Thus, understanding the mechanisms of atherosclerosis is critical for preventing and treating heart attack and stroke.

The Tissue Factor

Recently, in vitro and in vivo studies have shown that tissue factor itself induces migration of vascular smooth muscle cells and is thus a major culprit in

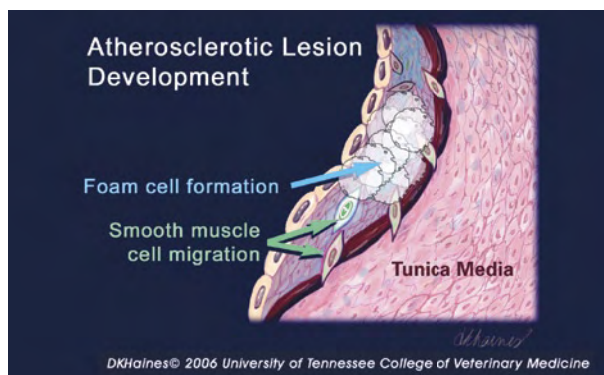


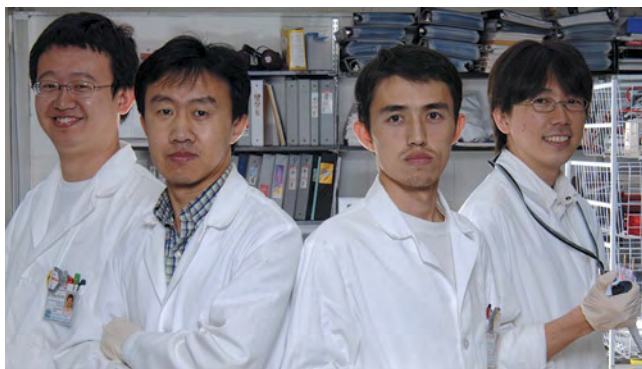
Figure 2, Schematic Diagram of the Development of an Atherosclerotic Lesion

New Lab Findings Guide Future Studies in Animal Models

Oxidized LDL particles are composed of many kinds of oxidized lipids and modified proteins. In the process of determining which components of oxidized LDL account for its pathogenic effect, our research group recently discovered that phospholipid, lysophosphatidic acid (LPA), which is formed during LDL oxidation [5], is the most bioactive component of oxidized LDL to increase the expression of tissue factor in vascular smooth muscle cells [6]. Furthermore, while investigating how LPA regulates tissue factor expression, our studies revealed that transcription factor Egr-1 is the key regulator mediating tissue factor expression in response to LPA, lipoproteins, and growth factors [4, 6, 7]. To further pursue the intracellular molecules, which control Egr-1 expression, we recently identified transcription factors, namely serum response factor and cAMP response factor, that are key regulators for Egr-1 activation [8]. Based on these results, we hypothesize that LPA plays an important role in the development of atherosclerosis. Our hypothesis is also supported by the fact that LPA is the major bioactive component of oxidized LDL and the fact that LPA induces inflammatory action of other vascular cells including endothelial cells and monocytes [9][10]. The role of LPA and tissue factor in the development of atherosclerosis was proposed by us in a recent invited commentary, which is published at: <http://www.athero.org> [13] for the International Atherosclerosis Society.

Activation of smooth muscle cell is the initial step towards smooth muscle cell proliferation and migration from the media to the intima. In a recent study, we discovered that intracellular protein kinase D phosphorylation and activation are involved in the early step of vascular smooth muscle cell activation. Specifically, our data revealed a novel finding that protein kinase C delta is the controlling upstream kinase, which mediates protein kinase D activation in smooth muscle cells. Thus, these findings not only reveal a new regulator for the new kinase, protein kinase D, but also suggest a potential biological role for protein kinase D in smooth muscle cell activation and in the development of atherosclerosis [11][12].

To further develop our study, we recently established an in vivo mouse model to test our hypothesis that LPA plays an important role in the development of atherosclerosis. We expect that the findings from experiments using an animal model will not only provide new insight into the molecular mechanism of atherosclerosis, but also identify new targets for the developments of drugs and treatment for atherosclerosis.



Members of the research team (LtoR): Dong Wei Wu, Dr. Mingqi Tan, Dr. Feng Hao, and Dr. Takuya Iyoda.

the development of cardiovascular disease [2, 3]. The fundamental mechanisms of atherosclerosis involve the proliferation of smooth muscle cells followed by migration of the cells from the vascular media to the intima. Tissue factor is also the key initiator of the cascade of coagulation and plays a major role in the development of a clot, or thrombus, once an atherosclerotic plaque ruptures.

In experiments to explore how elevated levels of LDL influence the production, or expression, of tissue factor, we found that LDL, especially oxidized LDL, significantly stimulated the production of tissue factor in vascular smooth muscle cells.

We further determined, for the first time, how LDL and oxidized LDL induce the expression of tissue factor. Our results revealed that nuclear transcription factors mediate the expression of tissue factor in smooth muscle cells, in response to native and oxidized LDL [4]. Our studies suggest that the major risk factors, excessively high levels of LDL and oxidized LDL, promote the progression of atherosclerotic lesions, at least in part, by up-regulating the expression of tissue factor, which in turn increases smooth muscle cell migration. These findings are also very important in understanding how LDL and oxidized LDL develop procoagulant activities in atherosclerotic plaques. ■

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Mounting a National Response to Threats

UTCVM responds to national concerns on the threat of terrorism to U.S. agriculture and the food supply.

In October 2005, the Department of Homeland Security (DHS) awarded the College of Veterinary Medicine a \$2 million grant to develop and deliver a DHS certified training program. The goal of the program is to help communities prevent and deter terrorist acts that target the agriculture and food sectors.

To that end, Dr. Thompson, Director of Partnership Programs at the College has led efforts to develop The Agriculture and Food Vulnerability Assessment Training Program to provide industry and officials at the state, county, and local levels with performance and planning-based tools to assess vulnerabilities for all agricultural and food facilities. Facilities and operations considered vulnerable can reduce or eliminate risk through appropriate planning and training. The program will prepare communities and industry to evaluate agriculture and food systems and facilities for vulnerabilities, to identify critical nodes, and to discuss potential

mitigation measures that can be implemented to reduce vulnerabilities. The primary assessment methodology used in the program, CARVER plus Shock, has been adapted from use by the military for use in the agriculture and food sectors. CARVER is an acronym for the following attributes: Criticality, Accessibility, Recuperability, Vulnerability, Effect, and Recognizability. The Shock component assesses the overall health, economic, and psychological effects from an attack on a particular target. Scheduled to become available in fall 2006, the training program will use CARVER in case studies and interactive exercises and will specifically cover animal agriculture, crops, and food processing.

Because of the importance of this program and other homeland security activities in which the College is involved, the UTCVM has formed The Center for Agriculture and Food Security and Preparedness (CAFSP). This new Center will be led by Dr. Sharon Thompson, who is currently Project Director for the DHS training grant and other homeland security-related grants and contracts. Other UTCVM faculty and partnering institutions will also be involved in the Center activities. CAFSP will provide a readily accessible web portal to facilitate registration for the DHS training program as well as showcase other College homeland security-related activities. The College is committed to helping the nation protect its critical infrastructure, including agriculture and the food supply.

The College also plans to host the second Foreign Animal and Emerging Diseases Course in Knoxville in summer 2007. 



*Dr. Sharon Thompson,
Director of UTCVM
Partnership Programs and
The Center for Agriculture
and Food Security
and Preparedness*



*Photos: Fruit and Cattle - Phil Snow,
Crop field - Kelly Hamilton.*

Veterinary Faculty and Staff

New Employees, Awards, Promotions, Appointments, and Retirements

UTCVM's 2006 Dr. Dennis Coughlin Professor is **Dr. Diane Mawby**, Small Animal Clinical Sciences emergency clinician.



Dr. Diane Mawby

Director of the UTCVM pharmacy, **Bruce McNeil**, registered pharmacist, was named president of the Society of Veterinary Hospital Pharmacists. With the college since 1978, McNeil, a Fellow of the SVHP and diplomate of the International College of Veterinary Pharmacy, was instrumental in developing the curriculum for a clinical rotation in the veterinary teaching hospital for pharmacy students at the UT Health Science Center in Memphis. Almost a dozen students have completed the rotation since the program's inception.



Bruce McNeil

UTCVM faculty and staff recognized at the UTCVM 2006 Honors Convocation were: **Dr. Patricia Sura** received the Brandy Memorial



Dr. Patricia Sura

Award, generously provided by Mr. and Mrs. Jerry Garrett of Chattanooga; **Dr. Darryl Millis** received the Pfizer Health Award for Excellence in Research; **Janet Jones** received the Dr. Charles Reed Outstanding Service Award, generously provided by Mrs. Christine Reed; **Dr. Robert Reed**, received the Dr. Carl J. Norden, Jr. – Pfizer Distinguished Teacher Award; **Dr. Casey LeBlanc**, received the Tennessee SCAVMA Outstanding Educator Award, and the following CVM staff members received the Bayer Animal Health Staff Awards: **Doris Millsaps, Jamie Stuffle, Karen Catlett, Bill Gogar, and Beth Lynn.**



Dr. Darryl Millis



Janet Jones



Dr. Robert Reed



Dr. Casey LeBlanc

Dr. Malcolm McCracken, recently retired from UTCVM, will return to on a part-time basis for a year in Pathobiology's necropsy and biopsy service. Dr. Danielle Reel '04 has joined the faculty as a Clinical Instructor in Anatomic Pathology while completing a residency in anatomic pathology at UTCVM. As a UTCVM student, Dr. Reel received the Dr. Robert L. Michel Pathology Award

(2004) and recently was presented the C. L. Davis award at the American College of Veterinary Pathologists annual meeting.

As of July 1, 2006, **Drs. David Brian and Barry Rouse** will join UTCVM's Pathobiology department from UT's Microbiology department (College of Arts and Sciences).



Dr. David Brian



Dr. Barry Rouse

Drs. Amy Plummer and Dr. Gal Kelmer have joined the Large Animal Clinical Science department as Clinical Assistant Professors/Emergency Duty Clinicians. Dr. Plummer completed a residency at Texas A&M, and Dr. Kelmer (DVM, Hebrew University of Jerusalem; MS, U. Missouri-Columbia) received his ACVS Board Certification in 2006.

Four new anatomic pathology residents are joining the Pathobiology department: **Dr. Jeremiah (Jerry) Lyons** from Ireland, **Dr. Marcia Ilha** from Brazil, **Dr. Noel Harrington** from the University of Guelph, and **Dr. Leslie McPherson** from Virginia Tech. University.

New post docs in the Pathobiology department include: **Drs. Kyou-Nam Cho, Cheryl Cross, Guozhang Mao, Nalin Siriwardhana, and Guojun Zhao.**

The American College of Veterinary Microbiologists (ACVM) recently elected **Dr. David Bemis** (Comparative Medicine department) an honorary diplomate.



Dr. David Bemis

New American College of Veterinary Surgeons (ACVS) diplomates include UTCVM's **Dr. Mark Bohling**, Small Animal Clinical Sciences.

Dr. Greg Daniel, Professor and Director of Radiological Services, Small Animal Clinical Sciences, received the Tennessee Veterinary Medical Association Educator of the Year award.



Dr. Greg Daniel

The Pigs as Pets Association presented an Award of Excellence to UT's College of Veterinary Medicine at the 7th annual Pet Pig Symposium – with special recognition to **Dr. Sarel van Amstel**.

Dr. Barton Rohrbach, Associate Professor, has moved to the Comparative Medicine department from Large Animal Clinical Sciences, and **Dr. Nancy Howell** has joined the Large Animal Clinical Sciences department as Research Assistant Professor from the Comparative Medicine department.

Dr. Tarah Hadley, resident in Avian and Zoologic Medicine, has achieved Board Certification in Avian Medicine, having passed the American Board of Veterinary Practitioners (ABVP) examination. Several other Small Animal Clinical Sciences clinicians - **Drs. Kate Stenske, Amy Holford, Avril Arendse, and Jo**

Smith have passed their certifying or general exams for the American College of Veterinary Internal Medicine (ACVIM).

Dr. Melissa Kennedy (Comparative Medicine) has been elected to the Board of Governors of the American College of Veterinary Medicine.

Drs. Natalie Coffer and Jerry Roberson have passed the American College of Veterinary Internal Medicine (ACVIM) Boards, becoming Board Certified in Large Animal Internal Medicine.

The Hal and Alma Reagan Residency in Large Animal Internal Medicine was awarded to **Dr. Teresa M. Buchheit** (DVM, Purdue). Dr. Buchheit recently completed an internship in equine medicine and surgery at Mississippi State University's Animal Health Care Center.

Dr. Ferenc Toth (LACS) has returned to UTCVM as a Graduate Research Assistant working with Dr. Nick Frank and to do a surgery residency. **Dr. Jose Castro** (DVM, Central University of Ecuador), a 2004 Large Animal Intern at UTCVM, has returned to do a Large Animal Surgical Residency. He was formerly with the Brazos Valley Equine Hospital in Navasota, TX.,

The Association of American Veterinary Medical Colleges (AAVMC) has approved the first proposal for outreach projects involving UTCVM's partnership with the College of Veterinary Medicine at the China Agricultural University in Beijing.

Dr. Robert Wang (Pathobiology) and faculty in Comparative Medicine prepared the successful proposal.



Dr. Robert Wang

Dr. Mike Fry is now Section Chief for Clinical Pathology (Pathobiology).

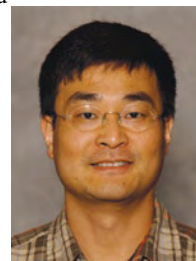
Dr. Rebecca L. Pierce (BVM, The Royal Veterinary College, London, England) has arrived to do an equine surgical residency; she recently completed an equine surgical residency at the Chino Valley Equine Hospital in California.

Dr. Mohammad Reza Seddighi joined the Large Animal Clinical Sciences department as a Clinical Instructor I Anesthesiology and will be an anesthesia resident in Small Animal Clinical Sciences.

The 2006 Pfizer Award for Research Excellence was presented to **Dr. Xuemin Xu**, Pathobiology.

Dr. William Hill has joined the Office of Laboratory Animal Care (OLAC) as Assistant Director/Clinical Veterinarian, having completed a residency at UT Memphis.

Dr. Seung Joon Baek, Assistant Professor, Pathobiology, has received his first full-sized NIH grant along with another grant from the American Cancer Society. Dr. Baek's research focuses on compounds found in some plants (green tea, garlic, cabbage) and certain kinds of pain relievers (such as aspirin and other NSAIDs), trying to isolate them and find out their effects on cancer.



Dr. Seung Joon Baek

The 2006 Mark. L. Morris, Sr. Lifetime Achievement Award was presented to UTCVM's **Dr. Alfred M. Legendre**, diplomate of the American College of Veterinary Internal Medicine. The prestigious award is presented annually to a veterinarian who has made a lifetime commitment

to improving the health and well-being of companion animals.

At this year's American College of Veterinary Internal Medicine



Dr. Alfred M. Legendre

(ACVIM) meeting, Dr. Legendre also received the 2006 Robert W. Kirk Award for Professional Excellence for achievements and dedicated service to the veterinary profession. Dr. Legendre and his wife, Carol, initiated the Journal of Veterinary Internal Medicine in their home.

Dr. Matt Welborn, Large Animal Clinical Sciences, has received diploma status in the American College of Veterinary Preventative Medicine.

Recently recognized for their 25 years of service to the college and UT were staff members **Barbara Campbell** (CVM Administration), **Debbie Hampstead** (CVM Research Administration), and **Catheryn Hance** (Large Animal Clinical Sciences administration).

New Veterinary Social Work interns include Clinical Interns **Erin Allen** and **Teresa Nolen Pratt** along with management and community practice intern, **Bethanie Poe** (BS, MTSU). Ph.D. Fellows, **Janelle Rimer**, Salt Lake City, UT, and **Jan Yorke**, Barrie, Ontario, Canada, will pursue doctoral degrees in Social Work at UT specializing in animal assisted therapy.

In December 2005, the following UTCVM employees were recognized: 25 years of service – **Carolyn Wilson** (Large Animal Clinical Sciences). 30 years of service - **Dr. D.J. Krahwinkel** (Small Animal Clinical Sciences), **Dr. Alfred Legendre** (Small Animal Clinical Sciences), and **Dr. Jack Oliver** (Comparative Medicine)

New Staffers:

Hospital Operations/Client Services
Terri Lyrock, Sr. Narcotics Technician, **Kristen Sowder**, Patient Representative, **Cindy Trentham**, Patient Representative, **Sharon Dennis**, Central Sterilization, **John Spears**, Central Sterilization, and **Josh Cooper**, Client Services

Office of Laboratory Animal Care (OLAC): **Shelley Gentry**, Accounting Specialist III

UTCVM Administration:

Partnership Programs:

Linda Beets, Administrative Support Assistant, **David Smelser**, Research Specialist, **Ann L. White**, Program Administrator

Research Administration:

Misty Bailey, Communications Coordinator

Instructional Resources:

Dustin Hurt, Web Master

Comparative Medicine:

Karen Armsey, Program Administrator, H.A.B.I.T., **Teresa Jennings**, Program Administrator, C.A.I.T.

Pathobiology:

Virginia (Ginny) Bleazey, Administrative Specialist I, **Regina Dalton**, Medical Administration Specialist I, **Diane Dodson**, Senior Medical Records Clerk, **Michael Hance**, Graduate Research Assistant, **Nichelle Whitlock**, Graduate Research Assistant, **Dong Wei Wu**, Graduate Research Assistant, **Mugdha Sukhthankar**,

Graduate Research Assistant, **Mingqi Tan**, Research Associate

Staff receiving CPS rating:

Regina Dalton, Medical Administrative Specialist I, **Colleen Ailor**, Medical Administrative Assistant II, **Emily Dyke**, Accounting Specialist III

Small Animal Clinical Sciences:

Leslie Wereszczak, ICU Supervisor

Large Animal Clinical Sciences:

Dr. John Gray, CVM '06, Rotating Intern, **Dr. Gretchen Laws** (NCSU), Field Service Intern Veterinary, **Amanda Peretich**, Graduate Research Assistant, **Dawn Phillips**, Clinical Specialist III, **Phil Creasman**, Assistant (transfer from Hospital Operations) **Lea Valentine**, Veterinary Technician, **Rose Giroux**, Veterinary Technician, **Mary English**, Veterinary Technician

Faculty Promotions and Tenure:

Dr. Madhu Dahr, Research Associate Professor, LACS, **Dr. James Schumacher**, Professor with tenure LACS, **Dr. Nicholas Frank**, Associate Professor with tenure LACS

Staff Promotions:

Janet Paquette, Senior Veterinary Technician I, Radiology SACS

Retirements:

M. L. Dotson, Program Administrator, H.A.B.I.T. Comparative Medicine **Carey Sharpe**, Coordinator II, Hospital Operation



L to R: Drs. J. Oliver, D. J. Krahwinkel, A. Legendre, with Dean Michael Blackwell and C. Wilson.

Grants and Contracts

July 2005-June 2006

PI; CO-PI	DEPARTMENT	AWARD	AGENCY
Sharon Thompson	CVM Administration	2,022,287	US Dept. of Homeland Security
Robert Moore	CVM Administration	988,566	US Army
Amy LeBlanc	Small Animal Clinical Sciences	8,700	National Institutes of Health
David Brian	Pathobiology	298,458	National Institutes of Health
Hildegard Schuller	Pathobiology	282,794	*National Institutes of Health
Seung Joon Baek	Pathobiology	212,803	National Institutes of Health
Barry Rouse	Pathobiology	359,350	National Institutes of Health
Mei-Zhen Cui	Pathobiology	247,446	National Institutes of Health
Seung Joon Baek	Pathobiology	108,000	National Institutes of Health
Barry Rouse	Pathobiology	355,940	National Institutes of Health
John New	Comparative Medicine	24,400	North Carolina State University
Madhu Dhar	Large Animal Clinical Sciences	55,000	American Heart Association
Joe Bartges	Small Animal Clinical Sciences	21,540	Lloyd, Incorporated
Joe Bartges	Small Animal Clinical Sciences	36,204	Lloyd, Incorporated
Patricia Sura; Karen Tobias	Small Animal Clinical Sciences	12,960	AKC Canine Health Foundation
Ed Ramsay	Small Animal Clinical Sciences	8,100	Morris Animal Foundation
Rita Echandi	Small Animal Clinical Sciences	8,694	AKC Canine Health Foundation
Silke Hecht	Small Animal Clinical Sciences	12,500	Other industry non-specified
Claudia Kirk	Small Animal Clinical Sciences	10,000	MERCK & CO., INC.
Linda Frank	Small Animal Clinical Sciences	9,936	AKC Canine Health Foundation
Jennifer Stokes	Small Animal Clinical Sciences	35,564	Hills Pet Nutrition
Jennifer Stokes	Small Animal Clinical Sciences	35,964	Hills Pet Nutrition
Amy LeBlanc	Small Animal Clinical Sciences	12,922	AKC Canine Health Foundation
Claudia Kirk	Small Animal Clinical Sciences	30,375	Pfizer Animal Health
Xuemin Xu	Pathobiology	80,000	Other foundations non-specified
Howard Plumber	Pathobiology	249,903	Philip Morris
Mei-Zhen Cui	Pathobiology	182,462	Philip Morris
Hwa-Chain Wang	Pathobiology	239,449	Philip Morris
Steve Kania; Rebecca Wilkes	Comparative Medicine	10,863	WINN FELINE FOUNDATION
Kellie Fecteau; Jack Oliver	Comparative Medicine	21,708	AKC Canine Health Foundation
Rita Echandi	Small Animal Clinical Sciences	5,000	American College of Vet Radiology
Diane Hendrix	Small Animal Clinical Sciences	5,724	AKC Canine Health Foundation
Linda Frank	Small Animal Clinical Sciences	100	Other industry non-specified
Claudia Kirk	Small Animal Clinical Sciences	58,872	Hills Pet Nutrition
Darryl Millis	Small Animal Clinical Sciences	156,048	Other industry non-specified
Nancy McLean	Small Animal Clinical Sciences	5,000	American College of Vet Opth
Joe Bartges	Small Animal Clinical Sciences	5,385	Lloyd, Incorporated
Nicholas Frank	Large Animal Clinical Sciences	36,331	American Quarter Horse Found.
Sharon Thompson	Partnership Programs	17,700	Knox County Government
Sharon Thompson	Partnership Programs	38,000	Knox County Government
Sharon Thompson	Partnership Programs	38,000	Knox County Government
Sharon Thompson	Partnership Programs	35,000	Knox County Government
	CVM	526,000	UT Center of Excellence
	TOTAL:	6,910,048	

*Combines several grants

Learning the Ropes

What do ropes have to do with veterinary medicine education? The ropes course is part of the orientation for students entering their first year at UTCVM.

The ropes orientation course is the first of many opportunities the students will have during their veterinary college experience to learn the importance of self awareness, communication, teamwork, and conflict resolution. Students' non-technical skills are paramount in helping them become successful veterinarians, and UTCVM continues to develop ways to help students learn those ropes. In order to better understand how they will conduct themselves in times of peace and in times of conflict, each student also completes a Strengths Deployment Inventory (SDI®).

The Office of Educational Enhancement, working closely with Veterinary Social Work, continues to fold communication education into as many facets of veterinary education as possible. Perfecting communication skills increases the students' ability to succeed in school and beyond. For first, second, and third year students, client communication skills have been incorporated into the Application Based Learning Exercises (ABLE). Using the Bayer Animal Health Communication project education modules,

students utilize their medical knowledge but also gain essential non-technical skills, such as how to glean details from clients, read non-verbal communication, and break bad news.

Last year, Nan Lillard, our Client Services Manager in the veterinary teaching hospital, served as a demanding "client" for the students, calling for updates and forcing students to organize their thoughts and respond to her concerns by phone. In the future, simulated "clients" will visit selected ABLE classes.

In addition, since the face of the nation is becoming more diverse, cultural competence can help a veterinarian be more successful in implementing effective medical care. In August 2006, more than two dozen faculty, staff, and students participated in Cultural Competence Express, a four-hour workshop designed to help the participants handle differences in cultures among their human clients. ■



UTCVM teams up with National Cancer Institute's Center for Cancer Research

UTCVM is one of only four veterinary colleges participating in the first canine clinical trials on naturally occurring tumors. The college is part of the Comparative Oncology Trials Consortium (COTC) formed in 2005 by the Comparative Oncology Program at the National Cancer Institute's Center for Cancer Research. One of the main goals of the consortium is to better understand the environmental risk factors for cancer, and in doing so, examine genetic determinants for predispositions to cancer in some dog breeds. The results from these canine cancer trials will be used to design phase I and phase II human clinical trials. The teamwork between clinical and basic cancer researchers and the effective oncology program and client base at UTCVM continue to help the college qualify for pioneer experiences such as this one.



In Memoriam

Dr. W. W. Armistead, 89, of Knoxville, Tennessee, April 18, 2006. Dr. Armistead was the founding Dean of UT's College of Veterinary Medicine and a former Vice President of UT's Institute for Agriculture. UTCVM recently named its veterinary teaching hospital the W. W. Armistead Veterinary Teaching Hospital in honor of Dr. Armistead.

Summer program update

The college's annual summer program for African-American students was held in June and July, with 10 students who competed for the program. Students work with local veterinarians in their hometowns for seven weeks, then attend rotations and laboratories at the college during the eighth week.

In May 2006, Dr. Brandi Bailey, a 1997 and 1998 participant in the summer program, became the second UTCVM graduate from the program. Other past participants have gone on to other undergraduate and graduate programs in animal science, social work, engineering and other majors. In 2005, the college hosted a dinner for several current UT undergraduates on the Knoxville campus, which totaled more than 16 students for the 05-06 academic year. The college welcomes Dr. William Hill, as-

sistant director of the Office of Laboratory Animal Care to the faculty; Dr. Hill is assuming leadership of the summer program in 2007.

Veterinarians participating in this year's program were: Dr. Louis Graham, Graham Animal Clinic, Hendersonville; Dr. Stephen Tower, Memphis Animal Clinic, Memphis; Dr. Gwen Jackson, All Paws Clinic, Knoxville; Dr. Tomas Bihl, Volunteer Veterinary Hospital, Knoxville; Dr. James Jarman, Murfreesboro Animal Clinic, Murfreesboro; Dr. Susanne Heartsill, Downtown Animal Hospital, Memphis; Dr. John Kruckeberg, Animal Medical Clinic, Columbia; and Dr. Jim Phillips, Southside Animal Hospital, Nashville. The college sincerely thanks those veterinarians who provided education opportunities for students to learn about the veterinary profession. ■



Those participating in the 2006 Veterinary Experience for Tennessee African-American High School Students this summer were: (front row from left): Demetria Lyons, Murfreesboro; Telece Davis, Antioch; Marissa Amos, Madison; Candice Johnson, Lewisburg; Jameica Johnson, Knoxville; and Jordon Caldwell, Knoxville; (back row, from left): Frank Brown, Memphis; Everett Sims, Antioch; Rodney Ray, Memphis; and Joseph Scribner, Columbia.



Two of the 2006 UTK Chancellor's Professional Promise Awards went to UTCVM students Kara Watson '06 and Stacey Leonatti '06, here pictured with Dean Michael Blackwell.

CONGRATULATIONS!

The BioCommunications Association (BCA) has recognized the work of three members of UTCVM's Instructional Resource Team:

Phil Snow – Still Media: Citation for Merit

Still Media: General Illustrative Award of Excellence

Babbet Harbison – Award of Excellence and the BCA Teaching Award for her project with Novartis entitled: "An Illustrated Guide to Orthopedic Conditions."

Deb Haines – Graphics Media – Poster: Award of Excellence

Five of six UTCVM entries were also selected to be shown in the BCA gallery.

A Technology Buffet at the Veterinary Education Table

Virtual Microscope. Tablet PCs. Student response systems. VetNet. CDs with images and class notes. Videoconferencing. Web casting. This is only a partial offering on the UTCVM buffet of technology used to serve the college's teaching needs.

Thanks to that buffet, the college has been named one of 16 national "Campus Technology Innovators" by Campus Technology magazine, the only monthly publication focusing exclusively on the use of technology across all areas of higher education.

Approximately 500 colleges and universities competed for inclusion in the magazine's August issue, which named the college an "Innovator" in the "Technology Area: Rich Media." The Campus Technology website describes what it takes to be a winner: "The institutions we highlight here have pursued their technology challenges with the kind of doggedness that should serve as a model to other institutions wondering just how far they can push their own envelope."

The college's Instructional Resources (IR) team has certainly pushed that envelope. Dr. Mickey

Sims, Professor and Director of IR, says without that teamwork, the college would not be able to maximize the use of technology in teaching.

"It takes a team of people to successfully integrate technology throughout the college, and IR really is a team effort—always has been. We are fortunate to have a group of creative people who work well together and make things happen."

While today's students are increasingly tech-savvy, Dr. Sims says the faculty is also willing to try new technologies. When introducing something new, IR provides a general description of what the technology can accomplish in the classroom. Rather than rest on its laurels, IR is constantly exploring new avenues to enrich the teaching and learning environment at UTCVM. ■



Movers and Shakers in Veterinary Medical Education

- ◆ Faculty members at UTCVM take their role in advancing veterinary medical education seriously. The Educational Enhancement Fund sponsors many of these activities. [To give, go to www.vet.utk.edu/giving/]
- ◆ Dr. Elizabeth Strand's article "Enhanced Communication by Developing a Non-anxious Presence: A Key Attribute for the Successful Veterinarian" appeared in the Journal of Veterinary Medical Education 33(1) 06.
- ◆ Dr. Mickey Sims presented "Virtual Microscopy: A New Way of Looking at Things" at the 2006 Educom Conference in Orlando.
- ◆ In July, a poster was presented at the 10th Annual Meeting of the International Association of Medical Science Educators in San Juan, Puerto Rico. Drs. India Lane, Strand, Sims, and Robert Donnell created the poster titled "A college-wide approach to promote professionalism in a veterinary college."
- ◆ Seven faculty members attended the Teaching Professors Conference in Nashville, Tn. Those attending were Drs. Lane, Nancy Howell, Joseph Weigel, Chris Egger, Sharon Patton, Agricola Odoi, and Charmi Mendis-Handagama.
- ◆ Dr. India Lane attended the American Association of Medical Colleges conference.
- ◆ Drs. John Henton and Amy Leblanc have been trained through the Bayer Animal Health Communication project to teach modules on communication skills.
- ◆ Dr. Elizabeth Strand attended the International Conference in Communication in Veterinary Medicine in Ontario, Canada. Dr. Strand presented the poster "Veterinary Social Work," a presentation titled "Initializing a College of Veterinary Medicine Communication Program: Permeation of College Organizational Culture," and conducted a two-hour workshop on "Developing a Non-anxious Presence," (see above reference to JVME article).

Congratulations!



Dr. Randy Hammon '82 of Chattanooga received the 2006 Distinguished Service Award and **Dr. Kristi Lively '99** of Knoxville received the 2006 Young Veterinarian of the Year Award from the Tennessee Veterinary Medical Association. Dr. Hammon currently serves as TVMA President, and Dr. Lively is a diplomate of the American Board of Veterinary Practitioners (ABVP). Pictured with Dr. Lively is UTCVM Board of Advisors member Dr. Mili Bass, CVM'81.



UTCVM's Class of 1986 recognized Drs. Al Legendre and Dennis Geiser as the faculty members having the most significant impact on their professional careers.

Dr. Teresa K. (Terri) Knowles '96 received the NOAA Center for Marine Animal Health Employee of the Year Award.

In memoriam:

Dr. Melissa L. Payne, CVM '97, 35, of Murfreesboro, TN, formerly of Knoxville, passed away on July 16, 2006 in Hermitage, TN.

Don't Touch That Dial!

Tune into 100.3 WNOX radio in Knoxville, Tennessee on Sunday mornings and you'll hear dogs barking, cats meowing, frogs ribbiting (croaking?), horses neighing, and the announcer saying "Ladies and gentlemen, Ask the Vet Radio is on the air." Dr. Tracy (Rodeheaver) Dewhirst, UTCVM Class of 2000, is the host of "Ask the Vet Radio," a call-in talk show, which hit the airwaves this past May. If you had asked her about this a year ago, it wouldn't have registered on the radar screen. "I was having dinner with a large group of people, as soon as they learned I was a veterinarian everyone began asking me questions about their pets. Larson Jay, a Knoxville producer and promoter was at the table, he turned to me and said 'Have you ever thought about doing a radio show?'" Larson Jay and Dr. Dewhirst took the idea to WNOX representatives who were on board as soon as they saw the programming package.

The "do ability" of the show is the biggest surprise for Dr. Dewhirst who says, "I was a little scared going into the show. Wondering what kind of questions I would get and hoping I could answer them all." She's found she can handle most of the questions with ease and is able to lead the callers to the right resources on the rare occasion she's stumped. "There are times I'll look at the monitor, which displays information about the next caller, and I think to myself 'what in the world'.... and sometimes we take them for the entertainment value. Even then, we are usually able to share useful information with listeners."

In addition to the ever-popular topics of nutrition, behavior, and dermatology, Dr. Dewhirst covers such diverse topics as legal aspects of dog bites, special needs of sporting dogs, avian influenza and bio-terrorism. "I want to show the versatility of veterinary medicine and help people realize they can use their veterinarian for more than Fluffy's annual shots. Veterinarians are a great resource with many issues, including public health."



Dr. Dewhirst lives on a farm in Knoxville with her husband, David, and two children: four year old Addie and two year old Wilder. "I was one of those children who chased stray cats and brought them home to my mother. My children seem to be following that same path."

While syndication is a goal for the show, Dr. Dewhirst says hosting the show on the local level is fulfilling because it allows her to focus on her education and share that knowledge with others. "I love it when people say 'Wow, I didn't know that.' To see the light bulb come on for a pet owner—that's exciting."



Dr. Tracy Dewhirst, UTCVM '00
www.askthevetradio.com

What About Your House?

Do you have plans for your house? Not the blueprints that carpenters use, nor a plan for remodeling, but plans for final disposition. As you look to the future and consider various ways you might transfer ownership of your house, you may want to contemplate a plan that lets you stay in your home and at the same time create an endowment at the University of Tennessee for the benefit of the College of Veterinary Medicine.

For many of us, our home represents the single most valuable asset in our estates. This is true not only in a monetary sense, but in other respects as well. Perhaps you raised your family here, and it has become a storehouse of precious memories. The walls have witnessed sorrows and joys, trials and successes, friendships, and other personal experiences. It has been a place of refuge and comfort, a shelter from the clamor and stresses of life. Yet someday, new owners will walk through the front door, claim every nook and cranny as their own, and begin making their own memories.

There are three charitable plans that allow you to stay in your home as long as you wish while leaving a lasting gift to the college.

Give and Stay

First, you can give your home to UTCVM and continue to live there as long as you want. The advantage is that you receive an income tax charitable deduction to apply against taxes for up to six years.



You also relieve yourself from the worry of selling or disposing of your home later when you may be distracted by health issues or other concerns. This gift arrangement is called the life-reserved plan and may fit your particular needs.

Give and Receive

A second gift option is to transfer ownership of your home, or vacation home, to the college in exchange for a lifetime income stream. This could mean, in most cases, a charitable trust arrangement. Such a plan could work well should you decide to down-size or move into a senior community or other retirement setting. In addition to income, this plan also provides an income tax charitable deduction.

Give and Sell

A third plan involves a combination of giving and selling your house. For example, as a homeowner you may be ready to move into a retirement village and need to dispose of your house. You want to use part of the proceeds from the sale to create an endowment at UTCVM, but you also need an infusion of cash to enhance your investment income.

To achieve your goal, you give a 50 percent undivided interest to UTCVM and retain the other half for yourself. Then, working with the college, the property is sold and proceeds divided. By including the college, you not only receive an income tax charitable deduction, but also obtain assistance in the selling process.

If you want to learn more about using your home to meet your personal needs and accomplish your charitable goals, our director of planned giving, Dennis Jones, is available to talk with you and explain these and other options and opportunities available to you. You will find him not only knowledgeable, but also careful to honor your wishes and protect your confidences. His services, of course, are completely complimentary, and you are under no obligation to proceed with any house plan after talking with him. In fact, he will strongly urge you to consult with your own professional advisor before making any major charitable decision.

For further information, please contact Dennis Jones at (865) 974-7423 or at djones@utk.edu. ■

VolBrenda Puts Her Time, and Money, Where Her Heart Is

Her veterinarian knows her as Munchkin's mother. Football and basketball fans know her as VolBrenda. The UT College of Veterinary Medicine knows her as a board member who embodies the volunteer spirit.

Animal-loving, Tullahoma, Tennessee native Brenda Baxter MA, MT (ASCP) is an avid Vols fan, but her heart is truly engaged with the health and welfare of animals. The UT Memphis alumna majored and continues to work professionally in the field of medical technology. Brenda came to the UTCVM Board of Advisors through her long-time client relationship with the veterinary teaching hospital on behalf of her family of, at last count, five cats. "I take my position as a board member seriously. To me, to be asked to represent an institution like this is overwhelming," she says. "They want me to represent them, as good as they are—these world class people? It's a huge compliment and a vote of trust." Brenda also serves the university through her membership in UT's Alliance for Women Philanthropists, UT's Benefactors Society, and numerous roles with UT's Alumni Association.

As a member of the UTCVM Board of Advisors, Brenda has made very generous estate gift plans for the college's future through the Brenda Baxter Veter-

"You get used to being amazed,... Even with all the credentials people have and the international recognition, I feel I can pop my head in the door and say hi. They are real people."

inary Medical Endowment. Years ago, she decided to include the veterinary college in her will, primarily because of her love of animals.

"Giving to the vet

school allows greater benefit to more organizations. The vet school helps all those other organizations such as shelters and rescues," she says. "They all benefit from the vet school's strength. If the vet school doesn't remain strong and keep its stellar reputation, it will hurt the community and the region."

To ensure her gift remains useful, Brenda didn't make it too specific. While she wants the money to aid programs where students learn the value and benefit of humane issues in practice, she leaves it up to the college how to do that. In her role on the UTCVM



UTCVM Board of Advisors Member, Brenda Baxter

Board, she serves as a special volunteer advocate to the larger community, particularly on behalf of the college's newest public service program, the Companion Animal Initiative in Tennessee (CAIT). CAIT's mission is to end Tennessee's surplus of homeless cats and dogs by taking a proactive approach, promoting humane education throughout the state, thus improving the lives of companion animals. As a CAIT volunteer, Brenda is always the first member to sign up to help with its many animal public service programs.

Brenda, who earned a Masters in Management (Health Care Administration) from Central Michigan University and is a registered medical technologist with the American Society of Clinical Pathologists, is impressed with the caliber of the people she knows at UTCVM. "You get used to being amazed," she says. "Even with all the credentials people have and the international recognition, I feel I can pop my head in the door and say hi. They are real people."

When all is said and done, she says, "I'll be able to stand back and say I had some role in the college's success." ■

Cross Reporting of Abuse

Growing awareness of the link between human and animal abuse leads to a new state law.

It may seem painfully obvious, but in the past two decades, researchers have documented mounting evidence of the connection between human and animal abuse. Growing awareness of this link has led to increased efforts to stop the cycle of violence.

The new Tennessee Cross Reporting law, which went into effect July 1, 2006, provides a legal framework to promote cooperation between human and animal welfare agencies that deal with family violence and animal abuse. Tennessee is one of only a handful of states with similar laws on the books.

"In the past, cases of animal abuse in family violence situations have gone unreported," says Elizabeth Strand, Ph.D., LCSW, director of Veterinary Social Work at UT's College of Veterinary Medicine. The new law requires employees of any child or adult protective services agency who know of, or reasonably suspect, animal abuse to report to the appropriate agency that investigates cases of cruelty, abuse, or neglect of animals. "Cross reporting raises awareness about this issue," Dr. Strand says.

For the past three years, Dr. Strand, who is a founding member, past chair, and current member at large of the Animal Abuse Task Force of Knox County's Community Coalition on Family Violence, has also documented the incidence of animal abuse reported by women entering a domestic violence shelter in Knox County. The statistics, gathered through surveys of the women, are disturbing. "Preliminary results of the studies I've done locally show that about 74 percent of pet-owning women report their animals have been threatened with harm, 50 percent report actual harm, and 17 percent say that an animal has been killed," she says.

Dr. Strand also collects animal abuse numbers from the records of the 4th Circuit Court in Knoxville, under the leadership of Judge Bill Swann. "Over the last three years, on average, 35 percent of pet owning victims who take out an Order of Protection report animal abuse," she says.

But statistics don't tell the whole story. In fact, battered women may delay their decision to leave

an abusive situation out of fear for the fate of a pet. The Animal Abuse Task Force, through its Animal Haven program, works to find shelter for the pets of victims of domestic violence. "Temporary shelter is provided on a crisis basis," Dr. Strand says. She and many others in the animal and



Dr. Elizabeth Strand

human welfare community would also like to see the creation of a shelter that would allow women to remain with their pets. Though a small number, about 8 percent, of animal-owning victims of abuse are same sex partners or others, the vast majority are women. UTCVM's Companion Animal Initiative of Tennessee (CAIT) program is also beginning efforts to train veterinarians about the human/animal abuse link, and to foster interagency cooperation among mental health and social services, law enforcement, and schools.

"It takes true collaboration and mutual respect between human and animal welfare organizations to help this legislation be enacted and carried out," Dr. Strand says. "In Tennessee, we are gaining more respect between the two, and that's really important."

Dr. Strand's research has appeared in the March 2003 issue of *Journal of Social Work in Education*, for which she co-authored an article "Domestic Violence and Animal Cruelty: Untangling the Web of Abuse" with former UT colleague Dr. Catherine Faver, who is now with The University of Texas Pan American. Further collaborative research findings on the link between battered women and pet abuse are in press. ■

CAIT

Improving the lives of companion animals in Tennessee

In just one year since it was established at the UT College of Veterinary Medicine, the Companion Animal Initiative of Tennessee (CAIT) has launched a variety of projects in outreach and education. CAIT continues to grow and strengthen while working diligently to improve the lives of companion animals in Tennessee.

CAIT recently partnered with the Knoxville News-Sentinel to promote the Learning to Save Lives Curriculum, which was presented at the Conference on Homeless Animal Management and Practice (CHAMPs) in Anaheim, California in September 2005. This newspaper-based curriculum for students in elementary, middle, and high schools emphasizes the role animals play in our lives and creates learning opportunities that help young people become responsible pet owners. In September 2006, CAIT will present the curriculum at the American Humane Conference in Chicago, IL.

Dr. Lila Miller, DVM, was our guest speaker in September 2005. Dr. Miller, senior Director of Veterinary Services and Veterinarian Advisor for the American Society for the Prevention of Cruelty to Animals, spoke to local county and city shelter workers and animal organizations on shelter medicine and disease control in shelters. She also gave a presentation to veterinary students and practicing veterinarians on the recognition and documentation of animal abuse. Dr. Miller lectures at universities across the nation on topics related to shelter medicine.

In December 2005, CAIT was one of 80 organizations that participated in a project to provide services to the homeless.



Teresa Jennings
Program Coordinator

The Knoxville chapter of Homeless Connect is part of a nationwide effort to address the many needs of the homeless, including the safety and well-being of their companion animals. Volunteers from local government, social services, and faith-based organizations offered health care, mental



UTCVM Class of 2007 students Robert Moore and Catrina Herd volunteered at the Homeless Connect Event.

health counseling, legal assistance, and housing information for the homeless population of Knox County. UTCVM students volunteered with CAIT to provide veterinary services for the pets of those homeless citizens.

CAIT also led a number of workshops and presentations at the state and local level.

- To educate citizens on issues facing companion animals in Tennessee, in fall 2005, CAIT held six public forums with guest speakers ranging from animal control officers from across the state to Judge Bill Swann from the 4th Circuit Court in Knoxville and Senator Tim Burchett.
- In April 2006, CAIT worked with the UT College of Law's Pro Bono Animal Law Project to sponsor a presentation by Dr. Bernard Rollin entitled "Animal Rights as a Mainstream Phenomenon: Animal Use and Emerging Social Ethics." Dr. Rollin is director of Bioethical Planning at Colorado State University and developed the first university course on veterinary ethics.
- In honor of Dog Bite Prevention Week, in May 2006, volunteers from CAIT and Human Animal Bond in Tennessee (HABIT) teamed with other volunteers from the college and community to hold dog bite prevention classes for children ages four to eight. Through education we hope to reduce the incidence of dog bites in children.



Companion Animal Initiative of Tennessee



Animal control officers Ken Boyd (Chattanooga) and Rhonda Bender (Oak Ridge) attended one of CAIT's first public forums on issues facing companion animals.

- CAIT's legislative committee kept an eye on several pieces of companion animal-related legislation this past legislative year, but only one was passed into law. This legislation, Cross Reporting of Animal Cruelty and Child Abuse, requires employees of a county child or adult protective services agency who, while acting within the scope of employment, gain knowledge of an animal that is the victim of cruelty, abuse, or neglect to report the behavior to the appropriate entity in that county. (See related article on page 27)
- CAIT has distributed more than 400 copies of The Compiled and Edited Tennessee Laws Pertaining to Animals in a variety of formats. The full notebook contains all the animal laws of Tennessee, the cat-dog version was created with animal control officers in mind, and the CD contains both versions. Those with Internet access can also access the full version through the CAIT website.
- Representatives from the Tennessee Veterinary Medical Association, Knoxville Veterinary Medical Association, Young-Williams Animal Center, and CVM have created a Vague Language and Terms Task Force to provide guidance in interpreting terms found in Knox City and Knox County ordinances pertaining to the care of companion animals.



CAIT member Nancy Cann is a regular volunteer at community events to educate the public on the importance of spay/neuter.

- CAIT's Education Committee has developed a Speakers Bureau. Experts from CVM and the community are available to speak on topics such as general health care for pets, care for senior pets, pet selection, myths and truths about spaying and neutering, pet overpopulation, animal abuse, and coping with the loss of a pet. These presentations are about 45 minutes each and are free of charge to interested groups or organizations.
- With the help of the Instructional Video Department, CAIT is working to create public service announcements for distribution to television and radio stations across Tennessee. These PSAs will highlight animal abuse and the importance of spaying and neutering pets. If you would like a copy of these PSAs to send to your local media, please contact Sandra Harbison at (865) 755-6861 or sharbiso@utk.edu.

Looking toward the future, CAIT is working with animal organizations and veterinarians across Tennessee to promote the **13th annual Spay Day USA, February 27, 2007**. Spay Day is a day focused on raising the public's awareness of the overpopulation problem facing cats and dogs in this country. CAIT hopes to engage citizens in becoming proactive to help prevent the births of unwanted litters of cats and dogs in Tennessee. If you would like to sponsor the spay or neuter of at least one companion animal or feral cat, volunteer to help, or make a donation to help support Spay Day 2007, please contact "T" Jennings at 865-755-2276 for further information.

For more information, visit the CAIT website at www.vet.utk.edu/cait, or email us at CAIT@utk.edu, Teresa Jennings, CAIT Program Administrator. 

HABIT

HABIT celebrates twenty years of animal and human community volunteerism!

HABIT (The Human Animal Bond in Tennessee) held its annual banquet on May 9 to honor its wonderful volunteers and to celebrate its 20th anniversary year. Two hundred volunteers, honored guests, family and friends gathered to celebrate HABIT's two decades of service to the community. Some of the founding members of HABIT were in attendance including Ben and Georgia Granger, Anne and Ted Tedford, and Yvonne Kitchen, widow of Dean Hiram Kitchen, and their children Diane and Michael.

Featured speaker at the banquet was UT's Coach Pat Summitt, the winningest coach in NCAA history. Summitt spoke of her family and how important it is to give back to the community. This lesson of giving back, and doing your best, was taught her by her parents and is something she is trying to pass on not only to son, Tyler, but also to the women who are the Lady Vols. ■



Lady Vols Coach Pat Summitt visits with long-time HABIT board members, Ben and Georgia Granger.



HABIT gala guests Vicky McKernan and Gail Ingram review the silent auction items.



HABIT Chairwoman, Joan Cohn, with Dr. John New who initiated the HABIT program in 1986.

Animal adoption and foster care opportunities



GAMES, CONTESTS, COOL PRIZES, CELTIC TUNES & GRUB

October 7, 2006

1:00PM to 5:00PM (rain or shine)

Grace Lutheran Church, Oak Ridge, TN

483-3787

131 W. Gettysburg Avenue (next to Woodland Elementary school—Follow the pink puppy paw print signs)

Parking in the Woodland Elementary lot

Admission is free

Dr. Elizabeth Strand,

UT College of Veterinary Medicine,
will present a Pet Loss & Grief Seminar

Michael Sims,

Professor, UT College of Veterinary Medicine,
with Rufus, dog bite prevention mascot

Pet Blessing in the pavilion at 4:00PM
Pastor Stephen Damos

- Music by Four Leaf Peat www.fourleafpeat.com
"Knoxville's Premier Celtic Band"
- Chocolate-Orange Guinness Cakes, Fruit Scones, Ginger Fizz, Scottish Oatcakes
- Over 30 rescue groups, organizations and pet supply exhibitors
- Dog nail clipping provided by Paw Prints
- Microchip implantations for a modest donation of \$20
Courtesy of Dr. Barbara Reeve UTCVM'85, Jackson Square Animal Clinic

No sales are for profit but benefit the participating rescue groups



BODY CONDITION SYSTEM

1		1	Ribs, lumbar vertebrae, pelvic bones and all bony prominences evident from a distance. No discernible body fat. Obvious loss of muscle mass.
2		2	Ribs, lumbar vertebrae and pelvic bones easily visible. No palpable fat. Some evidence of other bony prominence. Minimal loss of muscle mass.
3		3	Ribs easily palpated and may be visible with no palpable fat. Tops of lumbar vertebrae visible. Pelvic bones becoming prominent. Obvious waist and abdominal tuck.
4		4	Ribs easily palpable, with minimal fat covering. Waist easily noted, viewed from above. Abdominal tuck evident.
5		5	Ribs palpable without excess fat covering. Waist observed behind ribs when viewed from above. Abdomen tucked up when viewed from side.
6		6	Ribs palpable with slight excess fat covering. Waist is discernible viewed from above but is not prominent. Abdominal tuck apparent.
7		7	Ribs palpable with difficulty; heavy fat cover. Noticeable fat deposits over lumbar area and base of tail. Waist absent or barely visible. Abdominal tuck may be present.
8		8	Ribs not palpable under very heavy fat cover, or palpable only with significant pressure. Heavy fat deposits over lumbar area and base of tail. Waist absent. No abdominal tuck. Obvious abdominal distention may be present.
9		9	Massive fat deposits over thorax, spine and base of tail. Waist and abdominal tuck absent. Fat deposits on neck and limbs. Obvious abdominal distention.

The BODY CONDITION SYSTEM was developed at the Nestlé Purina Pet Care Center and has been validated as documented in the following publications:
Marley D, Bariga J, W, Moyens T, et al. Comparison of body fat estimates by dual-energy x-ray absorptiometry and deuterium oxide dilution in client owned dogs. *Compendium*. 20(1); 23 (PA): 70
Lafrenie DP. Development and Validation of a Body Condition Score System for Dogs. *Canine Practice Today*. August 2017; 42(1): 10-13
Kraus DA. Effects of Diet Restriction on Life Span and Age-Related Changes in Dogs. *JAVMA* 2002; 282(1): 315-320

Call 1-800-222-VETS (8387), weekdays, 8:00 a.m. to 4:30 p.m. CT

Obesity Kills Pets!

- **Monthly: Compare your dog to this chart.**
- **Limit treats (high calorie)!**

BODY CONDITION SYSTEM

1		1	Ribs visible on shorthaired cats; no palpable fat; severe abdominal tuck; lumbar vertebrae and wings of ilia easily palpated.
2		2	Ribs easily visible on shorthaired cats; lumbar vertebrae obvious with minimal muscle mass; pronounced abdominal tuck; no palpable fat.
3		3	Ribs easily palpable with minimal fat covering; lumbar vertebrae obvious; obvious waist behind ribs; minimal abdominal fat.
4		4	Ribs palpable with minimal fat covering; noticeable waist behind ribs; slight abdominal tuck; abdominal fat pad absent.
5		5	Well-proportioned; observe waist behind ribs; ribs palpable with slight fat covering; abdominal fat pad minimal.
6		6	Ribs palpable with slight excess fat covering; waist and abdominal fat pad distinguishable but not obvious; abdominal tuck absent.
7		7	Ribs not easily palpated with moderate fat covering; waist poorly discernible; obvious rounding of abdomen; moderate abdominal fat pad.
8		8	Ribs not palpable with excess fat covering; waist absent; obvious rounding of abdomen with prominent abdominal fat pad; fat deposits present over lumbar area.
9		9	Ribs not palpable under heavy fat cover; heavy fat deposits over lumbar area, face and limbs; distention of abdomen with no waist; extensive abdominal fat deposits.

Call 1-800-222-VETS (8387), weekdays, 8:00 a.m. to 4:30 p.m. CT

Obesity Kills Pets!

- **Monthly: Compare your cat to this chart.**
- **Limit treats (high calorie)!**



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