

# Snapshots

Short stories about Mizzou's advances in health-related teaching, learning, research, economic development and clinical treatments.



Illustration by Drew Roper

## Breaking down botanicals

**BILL FOLK** VENTURED into an herbal medicine shop in South Africa, where he studies traditional medicines, and found rows of rainbow-colored tonics. All were reputed to help alleviate or prevent various ailments and infections.

"I wouldn't touch any of them with a 10-foot pole without evidence of their safety and efficacy," says Folk, professor of biochemistry.

Yet, many Americans don't question their purchase of dietary supplements, even though there's little scientific evidence that they are safe or effective. Americans spend more than \$25 billion a year on over-the-counter botanicals, which are not regulated by the U.S. Food and Drug Administration.

Through the newly formed MU Center for Botanical Interaction Studies, more than 20 researchers are working to provide

scientific data on how certain herbs and crops might provide health benefits. The National Institutes of Health funded the center, one of five in the country, with a \$7.6 million grant to study botanicals that are reputed to help fight prostate cancer, boost the immune system and lessen damage from strokes.

This grant builds upon research that MU scientists have cultivated for several years. The new center's director, Dennis Lubahn, professor of biochemistry and child health, has led an NIH-funded center studying the benefits of phytoestrogens, dietary estrogens found in many foods. As part of that research, Grace Sun, professor of biochemistry, and her colleagues discovered that compounds in green tea helped to protect neuron cell death in cell culture models of Alzheimer's disease. Animal testing with the stroke model is next.

Folk has also been studying botanicals through a \$4.4 million NIH grant. He and collaborators are conducting the first placebo-controlled, randomized human clinical trial on

Sutherlandia, a plant widely used in Africa for tuberculosis, HIV and AIDS.

However, such clinical trials are costly, making it impossible for every botanical to be so heavily scrutinized. That's why Mizzou researchers hope to identify botanicals that have the most potential and warrant further study.

With help from scientists at the Missouri Botanical Garden and the National Soybean Center, Mizzou researchers will study more than 600 soybean and 60 elderberry varieties to determine genetic differences that might alter health benefits.

"We know elderberries may be good for you, but we don't know why they're good or how good they are," Sun says.

An obvious advantage is that the research results will be easily translatable, even in grocery stores.

"Maybe in the next five years, there will be a lot of elderberry products," Sun says. "I wouldn't mind; elderberry jam is tasty."

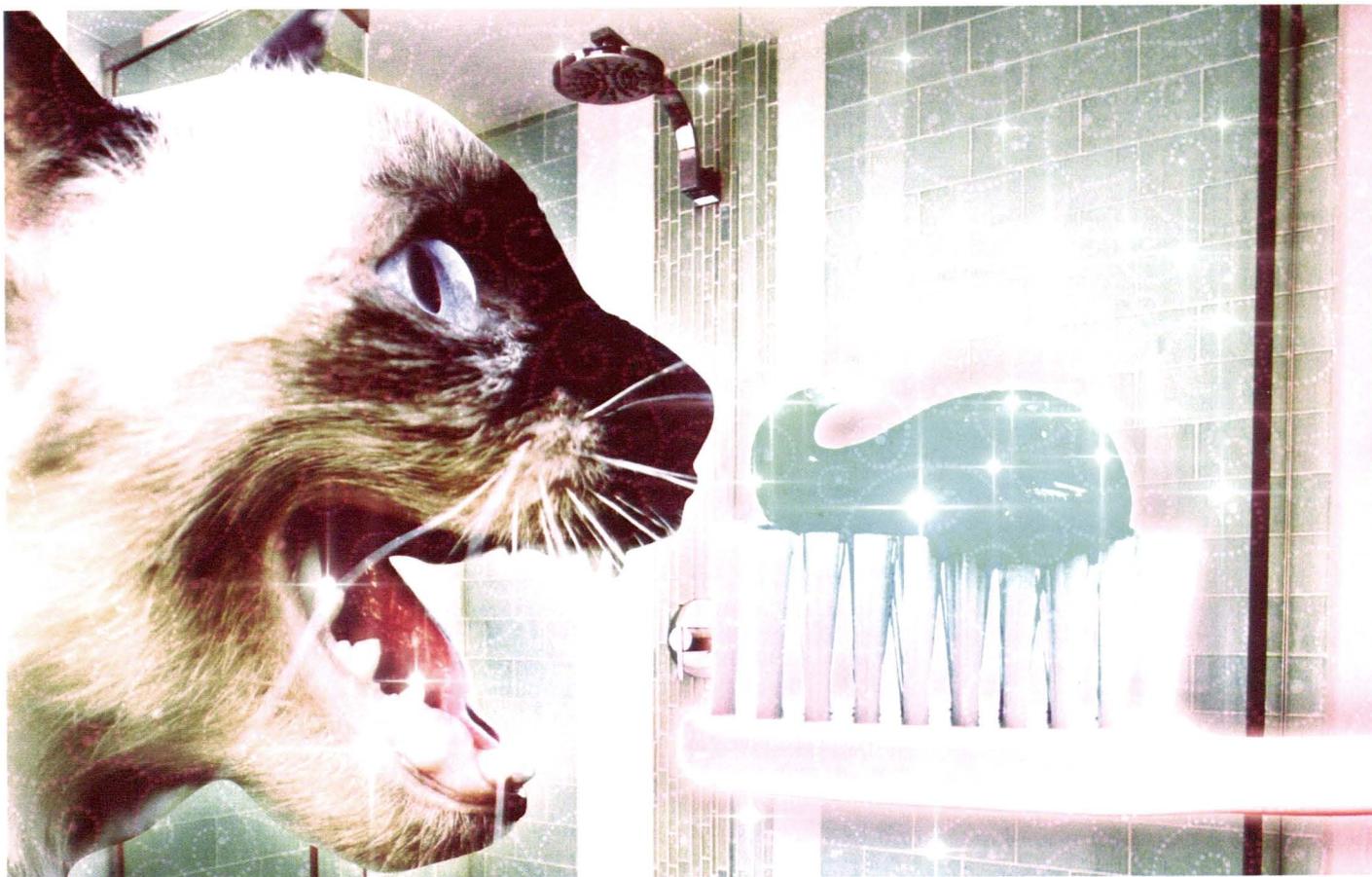


Illustration by Blake Dinsdale

## Animal dentistry

**ACCORDING TO** Richard Meadows, teaching professor at the College of Veterinary Medicine, the crossover between vets and dentists can flare up in unexpected ways. “I got new root canal equipment just before I went to the dentist to get my teeth cleaned last year,” Meadows says. “I gave my dentist — he’s a buddy of mine — a hard time because my equipment was newer and better than his. Six months later, I go in again, and he’s got the same setup.”

The overlaps don’t end with equipment, Meadows says. Experimental studies in cats have shown promising results with Fosamax, which is used for osteoporosis in menopausal women. The cats are being treated for a common and painful condition called tooth resorption.

Meadows explains that bones have a lifelong cycle that renews our skeleton every 10 to 12 years. Mammals have cells called osteoclasts, which eat bone. “Munch it up into liquid and spit it out,” Meadows says. This is OK because we also have osteoblasts, which build new bone. But they need to occur at the same rate.

When the ‘blasts don’t work as fast as the ‘clasts, bone density is lost — not replaced. In humans this leads to osteoporosis; in cats it leads to tooth resorption, a painful affliction in which a feline’s tooth is eaten away from the root.

One out of every two cats suffers from this difficult-to-detect condition, which can now potentially be prevented with a drug designed for humans.

## Public health

**MIZZOU’S NEW** Master of Public Health program was accredited by the Council on Education for Public Health in October 2010. The program began in 2007 with 58 students and has grown to more than 160 students. It is the second accredited public health master’s program in Missouri and the only one of its kind at a public university. Incorporating MU’s academic strengths in health, social sciences, veterinary medicine and policy analysis, the program addresses the needs of underserved populations and prepares public health leaders at local, state and national levels. Students from China, India and Zimbabwe are enrolled in it, and it has spawned careers at local, state and federal public health agencies; private think tanks; research universities; and nongovernmental agencies.



Illustration by Drew Roper

## Sonic therapy

**NANDHU RADHAKRISHNAN** hears voices. He sees them, too. A speech pathologist in the School of Health Professions, Radhakrishnan has the expertise and equipment to diagnose, describe and even visualize data from vocal sounds. He can spot not only neurological maladies such as tremors but also the culturally determined tones of operatic tenors and Hindustani classical singers. By studying how the tenors and classical singers produce their undulating sounds, he might find a cure for the unwanted tremors.

In Parkinson's, tremors can settle in any part of the body. When they affect the larynx, throat or mouth, the spasms can cause the voice to wobble enough that communication becomes difficult. "Sometimes, people become embarrassed, limit themselves to one- or two-word responses and in effect isolate themselves," Radhakrishnan says. Similar problems can arise from several other neurological diseases. Although health care providers can improve tremors slightly with medication, no good treatments exist for the problem.

Growing up in India, Radhakrishnan marveled at the ability of classical singers to make quick pitch changes, known as Taan gestures. Indian singers consciously control these fluctuations. While living in the United States, Radhakrishnan became

interested in vibrato, Taan's slower and smoother counterpart in Western operatic tradition. These trained singers consciously produce vibrato early in their studies, but it eventually becomes an unconscious aspect of vocal production, he says.

In his lab, Radhakrishnan uses special equipment to study how singers produce Taan and vibrato. A neck strap with electrodes that sit on either side of the larynx measures how frequently the vocal folds, aka vocal cords, open and close. Another instrument looks like an oxygen mask covering the mouth and nose. It senses how much air flows out during vocalization. Data from these instruments are displayed on his computer screen — Taan gestures form a jagged plot, and vibrato forms a wavy line with fewer fluctuations.

Radhakrishnan has a hunch that understanding how singers produce "artistic tremors" such as Taan and vibrato might lead him to a successful therapy for the unwanted ones. For instance, because tremor patients' voices wobble in predictable patterns, it might be possible to teach them to intone the reverse of the pattern as they speak, in effect cancelling out the tremor. It would be a sort of singing cure. Others have used singing to treat conditions including depression and sleep apnea, so perhaps Radhakrishnan's tunes will do the trick.

## Nanotech experts form new company

**TWO MU RESEARCHERS** have formed a company to develop a promising treatment for prostate cancer using gold nanoparticles.

The new company, Shasun NBI, is a joint venture of Kattesh Katti and Raghuraman Kannan of the School of Medicine and India-based Shasun Pharmaceuticals Ltd., which will invest \$2 million to \$3 million for research and testing that could lead to the treatment's use in humans. Shasun NBI will be housed in the MU Life Science Business Incubator at Monsanto Place.

The company's activities will also be focused at the MU Research Reactor, one of the few sites in the world able to produce the radioactive nanoparticles created by Katti and Kannan.

The researchers have been studying nanoparticle treatment for late-stage prostate cancer for more than five years. Experiments using mice demonstrated an 85 percent reduction in the size of prostate tumors, with little or no toxic side effects observed. The research also saw no evidence of radiation damage, a sign that the nanoparticles are only toxic to tumors.

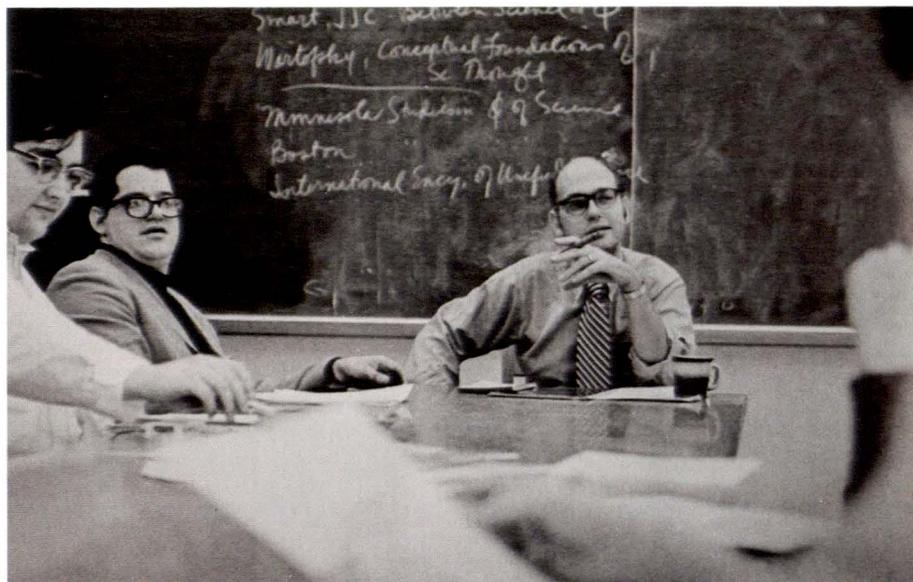
## Reality course: wrestling with ethical questions

**FOR THE PAST THREE DECADES**, most MU pre-med students have spent a semester in the classroom of philosopher Bill Bondeson and puzzled over tough medical ethics questions. Bondeson will retire after the spring 2011 semester.

Some of the biggest medical ethics questions of our time unfolded as the years rolled by. For instance, in 1978, Louise Brown, the first “test tube” baby was born. A decade later, geneticists set out to map the human genome. Jump forward one more decade, and the right-to-life case of Terry Schaivo started making headlines. And long before reality TV, Bondeson was bringing cases from University Hospitals and Clinics into the classroom discussions. “I mask the cases, of course,” says the professor of philosophy and family and community medicine. “But students like the approach that this is real life.”

Despite dealing with polarizing issues, Bondeson does not take sides. “It’s not my job in this course to take a political or ethical slant. We raise questions, I sort things out, and then students make up their own minds. I hope they never figure out what I think.”

The legendary teacher also administered



1970 Savitar photo

**In 1970, Bill Bondeson was an up-and-coming faculty member who directed and taught in the Honors College. He retires this year.**

several key programs during his 45 years at MU: director of the Honors College, founder of the College of General Studies, assistant to the chancellor, director of the University Concert Series, co-director of the Health Care and Human Values Committee, and co-director of the Wakonse teaching conference. “I’ve been given a wonderful range of tasks here,” he says. “I really have been blessed. I’m an academic, and this is my

natural habitat.”

Bondeson plans to travel during retirement, including a stint in Italy. He wants to hear from friends, students and colleagues. His e-mail address is bondesonw@missouri.edu, and his retirement reception 4 p.m. to 6 p.m. March 18, 2011, at the Bingham Gallery is open to all.

[MORE ON BILL BONDESON'S CAREER | MIZZOOMAGAZINE.COM](http://MIZZOOMAGAZINE.COM)

## Connected by more than a leash

**REBECCA JOHNSON** has studied the positive effects of human-animal interaction — specifically people and dogs — for 11 years. Her research has focused on therapy dogs helping the elderly transition to nursing-home life and increase their walking speed, and improving general health through the “Walk a Hound, Lose a Pound” program, in which participants walk shelter dogs for exercise.

“When people interact with a dog, their blood pressure decreases, their heart rate decreases, and they experience a relaxation effect,” says Johnson, who received the 2010 Sinclair School of Nursing Faculty Award for Excellence in Service. “It’s a chemical response to interacting with the dog.”

Her new project at the MU Research Center for Human-Animal Interaction is

a collaboration with the Central Missouri Humane Society and the Columbia Canine Sports Center, and it will pair shelter dogs with combat veterans who will train the pooches in obedience class. It is a win-win situation. The better-behaved dogs become more adoptable, and veterans with post-traumatic stress disorder (PTSD) benefit from the therapeutic bond.

“Dogs are unconditionally loving,” says Johnson. “They love you whether you are nervous, anxious, scared, depressed — whatever you are, they just love you.”

After the obedience training, veterans will serve as mentors for the families who adopt dogs and help with any potential behavior problems. The “superstar” dogs, according to Johnson, will have the chance to help others as PTSD service animals.

“A very powerful way of healing is by helping others,” Johnson says. “That’s what this process project is all about. Helping dogs and helping people.”



Photo by Rob Hill

**Rebecca Johnson, Research Center for Human-Animal Interaction director, studies the benefits of human-companion animal interaction.**