

Annette Rauch

DR. ANNETTE RAUCH, V86, MS00, has always been something of a savior, picking up stray dogs and cats, injured birds, and whatever other critters-in-need crossed her path. "I try to scan the roadside as I'm driving, and I've often stopped to pick up an injured or abandoned animal," says Rauch. "Even if I'm not successful, at least I try to intervene."

Her work at the School of Veterinary Medicine is also allowing her to come to the aid of animals all over the country through a pioneering program she's developing in veterinary forensic pathology. "Veterinarians don't have a lot of places to go to learn about issues of animal cruelty," says Rauch, an assistant research professor in the Department of Environmental and Population Health and the principal investigator of the two-year pathology study. "We're trying to help veterinarians across the country learn what evidence they need to gather, and how to save that evidence for a court of law—what to collect, how to store it, how to document it."

Though state anti-cruelty laws have been on the books since the 1800s, penalties have traditionally been so light as to be almost meaningless. In the past decade or so, however, many states have been working to elevate animal-cruelty charges from misdemeanors to felonies. "Some state anti-cruelty laws carry with them hefty fines and long prison sentences," says Rauch, "but to get a conviction, you need to come to court with good solid evidence or the district attorney won't even bring the case to trial. As the penalties increase, so does the burden of proof."

The current information on veterinary pathology is sparse, and the little out there is not centrally located. Rauch is working on a website (www.tufts.edu/vet/forensics) that will serve as a clearinghouse for case reports, educational opportunities, names of investigative organizations, and information on the link between animal abuse, child abuse, and domestic violence. Her project is the only one in the United States that seeks to give veterinarians the tools they need to work effectively with humane investigators in bringing abusers to justice.

Her future, she says, may include taking the lead in further developing the field of veterinary forensics. "As you get into the discipline, you see more and more opportunities for additional research," Rauch says. Ultimately, this project will help animals. "As a society, we need to take animal abuse seriously. Expanding people's circle of compassion helps us all, human and nonhuman animals alike." —*Elizabeth Gehrman*

Dr. Annette Rauch, with Shadow, brought home after he was confiscated in an animal-cruelty investigation.



resistant genes may be hidden within discarded breeds.

"If a modern commercial breed of livestock were to be decimated, by forces natural or man-made, that breed would be lost forever, taking with it valuable genetic characteristics," says Saperstein. "Rebuilding the genetic base of commercial livestock is but one example of the value of preserving endangered breeds." These goats," he says, "may be considered 'freaks' by some, but we need them as animal models for genetic research, possibly to be used for gene therapy in animals some day. You never know what answers may lie in their gene pool; maybe the treatment for muscular dystrophy. Someday they may be little treasures from the past."

The genetic "library" offers a glimpse into one way that Tufts veterinarians intersect with public health. The scientists are, among other

things, well positioned to call attention to naturally occurring or intentionally introduced zoonotic infectious diseases—diseases that can be transmitted to humans by animals. These conditions represent three-fourths of the world's emerging infectious diseases, including West Nile virus, SARS, and monkeypox.

Ten years ago, Tufts became the first veterinary school to grant a dual degree in public health. Veterinary students can supplement their training with courses from Tufts Medical School and obtain both a veterinary degree and a master's of public health (DVM/MPH) in just four years. Since Tufts started the program, the seriousness of public health preparedness has been on everyone's mind, the legacy of 9/11, anthrax attacks, and global outbreaks of infectious diseases. Other veterinary schools are now following Tufts' lead by establishing similar programs.

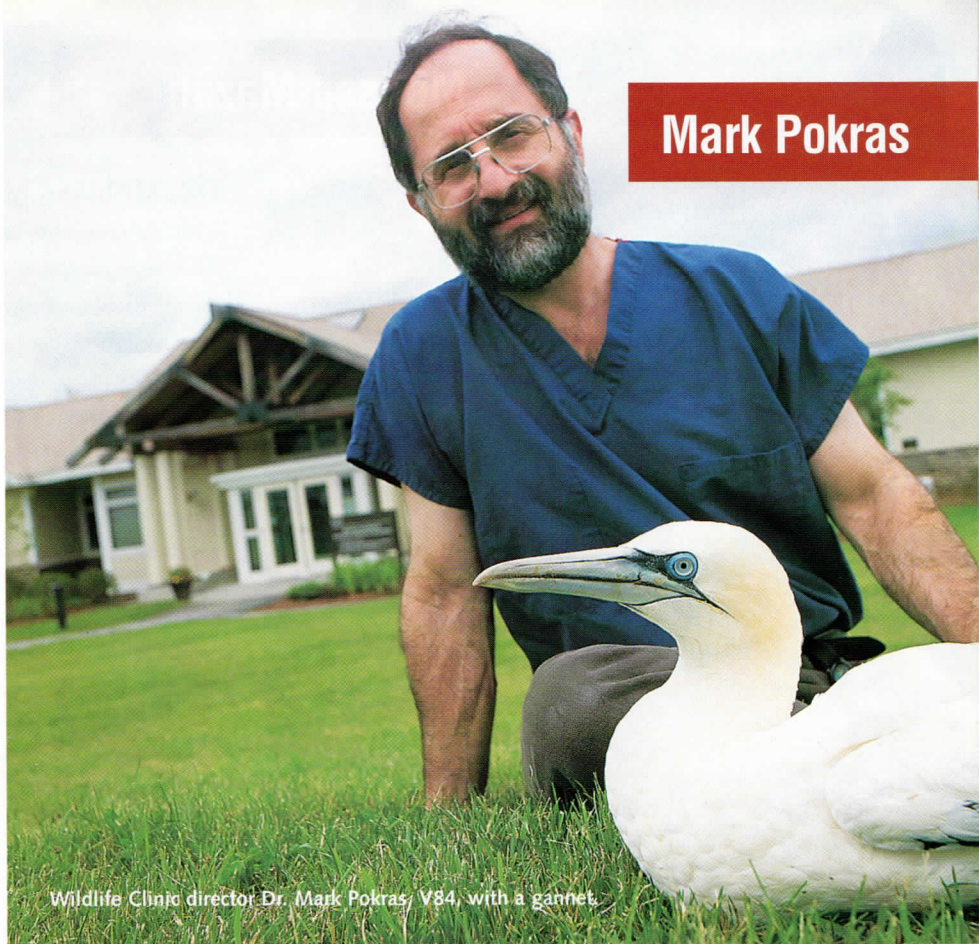
Mark Pokras

Progress has also been made in the signature program in international veterinary medicine. The first of its kind in the nation, it has gone on to apply veterinary medical principles to wildlife conservation, as well as developing programs to support sustainable agriculture in the context of local cultures and traditions.

Dr. Christine Jost, V96, F03, assistant professor of international veterinary medicine, brings her veterinary and Fletcher School degrees to projects whose success depends on interdisciplinary training and outlooks. In Burkina Faso, for example, a collaboration between the Veterinary School and the School of Engineering, funded by the National Oceanic and Atmospheric Administration (NOAA), is exploring how climate forecasting can enhance the use of precious agricultural resources. In Nepal, a program supported by the United States Agency for International Development (USAID) looks at improving livestock services and animal health-care delivery at the community level by researching diseases and other issues associated with livestock food production. Tufts veterinary students are paired with Nepalese veterinary students to develop public health intervention programs.

“The point is that the human-animal relationship is really critical to individual and community survival,” says Jost. “The role of the veterinarian is to be a problem-solving thinker. In these communities that are so dependent on animals, it’s essential to consider that relationship when we talk about community development.”

The baby snapping turtle is no bigger than a deck of cards, so try as he might to sink his neck into the dark safety of his shell he cannot escape the tweezers hovering over his tiny lower jaw. “Your neck is only so long!” says Dr. Tara Rittle, an intern at the Tufts Wildlife Clinic. She gently places a drop of epoxy where a small piece of wire has stabilized a fracture. Tufts student Heather Blake, V04, observes that the feisty turtle has gained weight; his injury hasn’t interfered with a healthy appetite for aquatic turtle sticks. But veterinarians won’t release him back to the wild until his jaw is as good as new.



Wildlife Clinic director Dr. Mark Pokras, V84, with a gannet.

BY THE 1880S biologists knew that waterfowl were being killed by lead shotgun pellets—not so much from getting hit as from ingesting them. A mere century later, in the 1990s, effective legislation was passed to ban the use of lead pellets for hunting waterfowl.

Dr. Mark Pokras, V84, director of the Wildlife Medicine Program, is doing his best to make sure it doesn’t take that long to change the laws regarding lead fishing sinkers—about the size of snails and other loon delicacies—that he estimates kill about half the loons that die on New England’s lakes annually, as well as nearly 30 other species of birds and snapping turtles.

Since the problem came to his attention in 1988 after he performed an autopsy on a loon found in New Hampshire, Pokras has thoroughly researched its scope, published papers, and presented his findings at scientific colloquia. He has devoted hundreds of hours over the past 16 years to working with environmental nongovernmental organizations (NGOs) and consulting with policymakers, with the result that legislation has been passed in three states and Canada.

“Thank goodness there’s more than a little idealism out there in veterinary medicine,” he says. “Knowing that lead is toxic is nothing new. The question is how do we take something like this and use it as a tool to improve

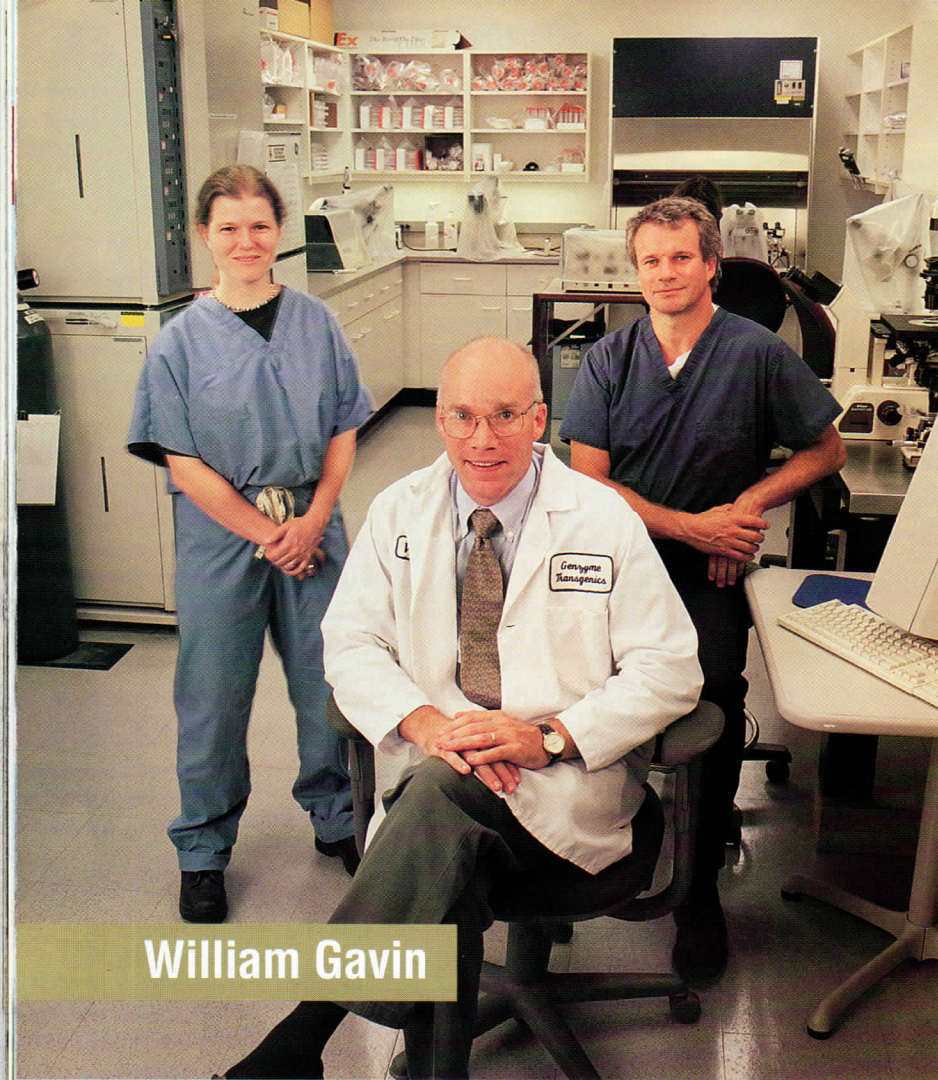
the well-being of people and animals and the environment?”

That kind of passion and activism are just what Pokras likes to cultivate in students in his position as associate professor of wildlife medicine and director of the Tufts Center for Conservation Medicine.

The center, says Pokras, focuses on an increasingly critical concern: “How do we integrate the interests and skills of veterinarians with those of medical professionals, ecologists, conservation biologists, and policymakers in such areas as emerging diseases, climate change, environmental contaminants, and antibiotic resistance?”

For Pokras, Tufts’ vision is far-reaching. “I think most veterinary schools are asking, ‘What is it that veterinarians have always done, and how can we train students to fulfill those roles?’” he says. “But we should be looking toward the future. What’s the horizon like for the next 25 years? In what areas can we place graduates where veterinarians have never been before?” He mentions examples such as aquaculture, humane societies, international relief agencies, NGOs, and public health departments. “How do we take these young, idealistic, enthusiastic people who are coming through here and give them the skill sets they need to save the world?”

It’s a tall order, but Pokras is doing his part to see that it’s fulfilled. —Elizabeth Gebrman



William Gavin

RICHARD HOWARD

Dr. William Gavin, V94, with Dr. Jennifer Altbuch, V02, and Dr. Peter Flanagan, V91, at GTC Biotherapeutics Corporation.

THE ANTI-CLOTTING PROTEIN ATIII is an important player in the human body; if your blood plasma does not have enough in supply, you are at an increased risk of thrombosis.

A deficiency of ATIII can be hereditary or acquired. Acquired ATIII deficiency can occur in multiple disease states, such as liver disease, sepsis, burn, trauma, bypass surgery, and transplantation. Yet because patients often need a little extra, there are occasional shortages of plasma-derived ATIII in the United States; it is expensive to produce and, so far, prohibitively difficult to synthesize in stainless-steel bioreactors.

Luckily, a solution is at hand in the form of transgenics, a relatively new science that transfers the genes of one species into another. “We can produce ATIII effectively in animals,” says Dr. William Gavin, V94. “Basically, our bioreactor is a goat.”

Gavin, senior director of veterinary services and caprine founder development at GTC Biotherapeutics Corporation, and his team — Dr. Michael Schofield, V91, associate director of veterinary services; Dr. Peter Flanagan, V91, senior herd veterinarian; and Dr. Jennifer Altbuch, V02, assistant herd veterinarian—oversee about 2,200 goats at the company’s research facility in Charlton. The animals produce ATIII in their milk thanks to a human gene inserted in their chromosomes.

“There’s actually a piece of goat gene connected to a piece of human gene,” Gavin explains. “The human piece tells the gene to make ATIII, and the goat piece allows for production in the mammary gland.” Purifying the protein from goat milk is not only easier than making it in cell culture, but also safer than isolating it from human plasma, which has the potential for transferring human diseases. Depending on the genetics of the animal—GTC has made “multiple founder animals,” says Gavin—the one to three liters of milk produced daily can yield up to ten grams of recombinant (genetically engineered) protein per liter. Multiplied by thousands of goats, that’s a significant amount of a drug potentially worth millions of dollars. This product is currently in Phase III clinical trials.

GTC Biotherapeutics is also working with cows and, though the animals are kept in Iowa, Gavin and his team collaborate occasionally on research in which they are involved. The company is also working on recombinant proteins that may some day be used in the treatment of Crohn’s disease, rheumatoid arthritis, neurological and autoimmune disorders,

nephritis, HIV/AIDS, small-cell lung cancer, myasthenia gravis, multiple sclerosis, and organ transplant rejection. Gavin believes more Tufts vets will play a role in the success of transgenics.

“Tufts’ philosophy is to look for potential areas where veterinarians can fill a role,” he says. “They aren’t just looking at traditional veterinary medicine, but are constantly expanding their roles in biopharmaceuticals, business, advanced research, and specific areas of endeavor like immunology. It’s endless.”

Gavin, who started studying embryology and theriogenology—the study of reproduction in animals—during his undergraduate days, began his research at Tufts when he worked with Karl Ebert, D.V.M., a Tufts professor and researcher who developed the first transgenic goat. And this work has since continued on with the help of Dr. Sandra Ayres, V93, a collaborating associate professor. “Embryology and theriogenology are fascinating,” Gavin says. “The developmental component, being able to manipulate the reproductive system and improving upon gestation capability, are all very interesting and challenging. And if you look at the advances in embryology that have been made in just the past 10 years, it’s amazing. Five years ago nobody could clone large animals. Now it’s considered almost routine.”

—Elizabeth Gehrman