BAKER INSTITUTE *for* ANIMAL HEALTH

2013 ANNUAL REPORT

To Improve Animal Health
Through Basic & Applied Research

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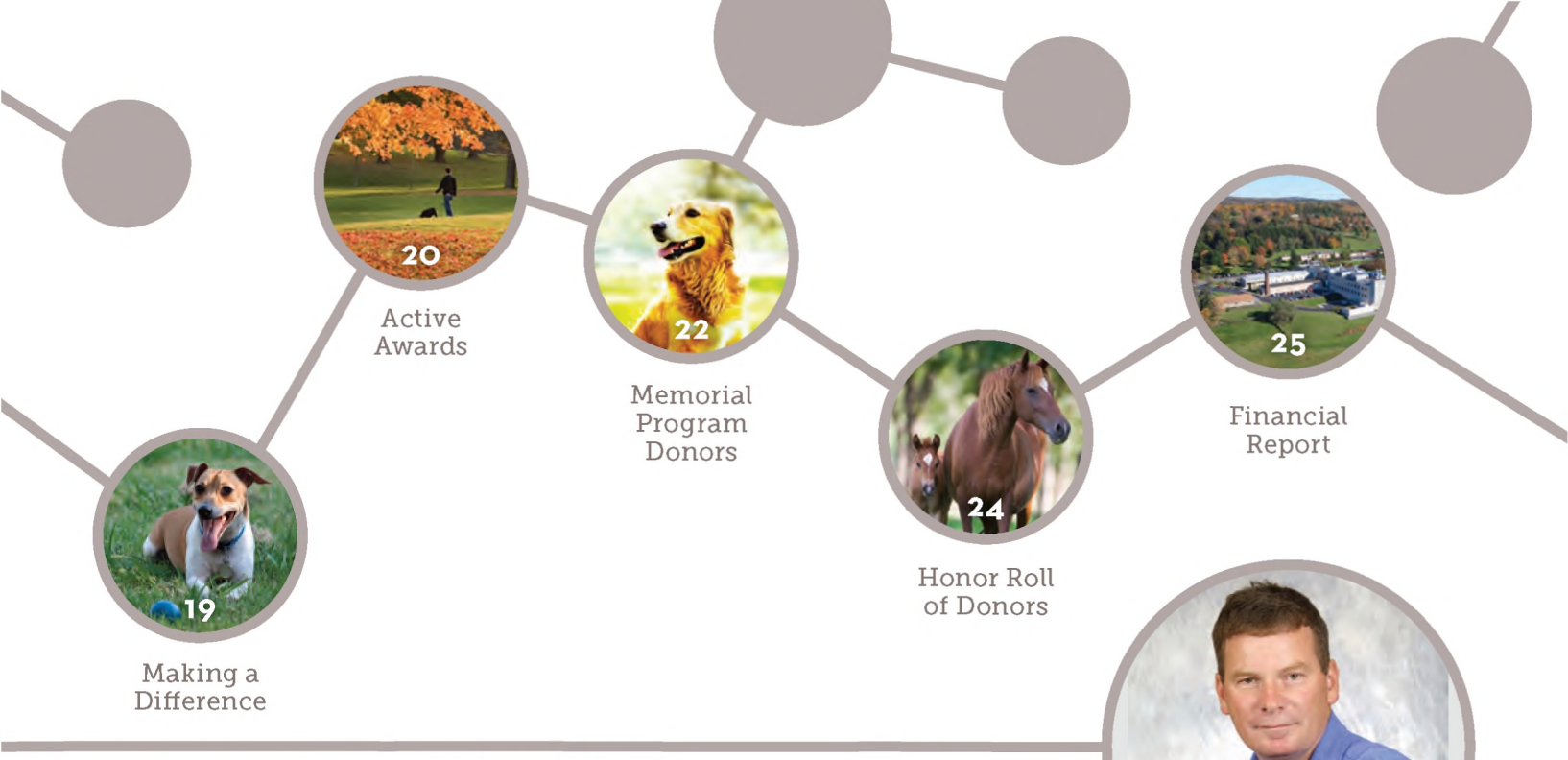


A MESSAGE FROM THE DIRECTOR

Dear Friends,

It is a pleasure to present our generous supporters with the 2012-2013 Annual Report of the Baker Institute for Animal Health. Many of you are long standing friends of the Institute. We sincerely appreciate your loyalty to this unique organization and look forward to working with you in the future.

This is the 63rd year since our founding by Dr. James A. Baker and it is an honor to continue to build on our great legacy through ground-breaking studies of the diseases that afflict animals, as well as the humans who care for them. This year we have continued our work on viruses and other pathogens of dogs, cats, and horses and on the underlying causes of cancer in animals and in humans. The Institute programs that are training the next generation of veterinary and health science researchers continue to flourish, and we currently have several outstanding trainees working in our laboratories. This past year has also seen several of our trainees complete their studies here and accept positions at other institutions. We look forward to the impact that these impressive young investigators will have on both animal and human health in the future.

In this report, we highlight the many different types of research that are ongoing in the different Institute laboratories. I am particularly excited to report on the work of our newest faculty member, Dr. Gerlinde Van de Walle. Her research programs address several diseases of great importance to animals and to humans. These include studies of equine herpesviruses, which cause serious respiratory and neurological diseases in horses, as well as ground-breaking work investigating the herpesviruses that can cause serious infections of cats and dogs, including infections that damage the surface of the eye. She is also collaborating on studies to reveal the underlying causes of cancer in animals, where she is investigating the sources of cells that cause breast cancer in dogs and cats. Dr. Van de Walle's work is just one example of the scientific excellence that has come to typify the Baker Institute, and we are delighted to have her as part of our team.

Thank you for your continued support of the Institute and for allowing us to continue to improve the health and well-being of all animals.

As always, thank you so much for your support.

Best regards,

Colin Parrish

Colin R. Parrish, PhD

CURRENT FACULTY

DOUGLAS ANTCZAK, VMD, PHD

Dorothy Havemeyer McConville Professor of Equine Medicine

The mule has served humankind as a beast of burden from the time of Aristotle through present day. This hybrid between a male donkey and female horse, and its lesser known relative, the hinny (a cross between a stallion and a female donkey), have also made important contributions to our understanding of biology and, particularly, genetics. For example, the term 'hybrid vigor' owes its origin to the observation that the mule has characteristics of strength and longevity superior to both of its parent species. On the other hand, horsemen have long contended that mules and hinnies are distinct creatures, suggesting that their inheritance may not be equal - even though both inherit half of their genes from horse and donkey parents. This presents a genetic conundrum.

The Baker Institute has studied mules and hinnies since the mid-1980s, beginning with a study of how infertile female mules can function as surrogate mothers for horse or donkey embryos. Most recently, Baker Institute scientists used mule and hinny tissues to examine gene expression in the placenta in a study that addressed the genetic puzzle about possible differences between mules and hinnies. For this work, Dr. Doug Antczak and his colleagues teamed up with Drs. Andy Clark and Xu Wang of the Department of Molecular Biology and Genetics at Cornell to apply cutting-edge gene sequencing techniques to placenta samples from mules and hinnies. This approach enabled scientists to identify whether particular genes were expressed only from the father's or mother's chromosomes, or from both.

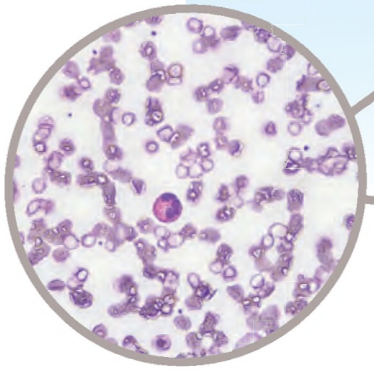
The study produced the most definitive evidence yet that there is a division of labor between genes of the mother and father in producing normal mammalian offspring. Examination of the so-called imprinted genes, a small subset of genes expressed only from the mother's or father's chromosomes, revealed that paternally expressed imprinted genes predominate in placental tissue. Such an outcome had been predicted 25 years earlier from studies of mouse embryos but never verified experimentally.

This means that genes from the donkey father dominate the placenta of the mule, while in the hinny placenta the imprinted genes of the horse father are expressed. Because the imprinted genes of horses and donkeys carry distinct DNA sequences, this confirms that the horsemen's folk adage is true — mules and hinnies are indeed genetically different!

This research also has implications for human health, where imprinted genes have been shown to be essential for normal fetal and placental growth and development. There is still life in the Old Grey Mule and much to be learned from these remarkable hybrids of the horse and donkey.

JUDITH APPLETON, PHD

Alfred H. Caspary Professor of Immunology



When large numbers of white blood cells called eosinophils show up in the blood, it's a sure sign of either allergies or worm infection. Interest in these cells has grown following the increased number of diseases with which they've been associated. Dr. Appleton's lab is exploring the eosinophil's role in infection in order to understand these associations.

Eosinophils are very important in allergies and can cause trouble in the lungs of people with asthma. Some therapeutic drugs that block eosinophils from going to the lungs are very effective in helping people with this debilitating respiratory condition. While our understanding of eosinophils' role in allergies has improved recently, their long-known association with worm infections has been a harder mystery to solve.

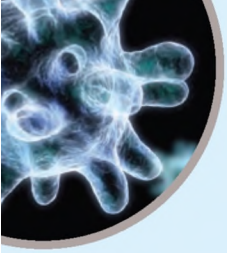
"Traditional thought says that eosinophils must be protecting the body against worms," said Dr. Appleton. "However, our work has shown that for the worm we study, *Trichinella spiralis*, the complete opposite is true. Eosinophils actually help these worms grow and spread."

This counter-dogmatic discovery could alter the assumption that boosting eosinophils must be good for reducing parasitic infection. Very versatile for a parasite, *Trichinella* infects dogs, cats, and people, and findings relating to it could translate to other worms, according to Dr. Appleton. Transmitted through the ingestion of infected meat, *Trichinella* larvae live for a long time within muscle cells before bursting out and moving to the intestines as adults.

"We found that eosinophils energize the larvae in the muscle and help them to grow," said Dr. Appleton. "When eosinophils are absent, the parasite grows poorly. To make matters worse, we've also recently found that eosinophils influence the immune response in such a way that they protect parasites from being killed."

Dr. Appleton's lab is studying how eosinophils influence the immune response to enable parasite growth and survival, focusing on how the immune cells influence metabolism. Recent obesity research that links eosinophils to metabolism, revealing their influence on fat cells, has fueled her investigation.

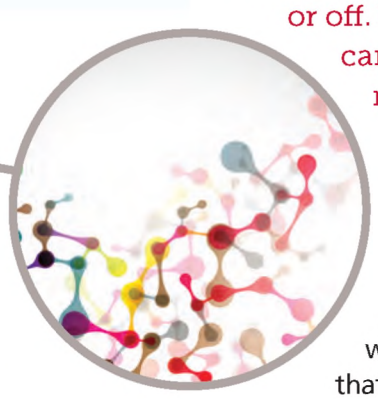
"These worms live in muscle cells," said Dr. Appleton. "If the host cells take up more glucose because of eosinophil stimulation, there's more available to worms and they can quickly grow. Our future work will explore whether *Trichinella*, which infects several species, is under this type of immune-mediated metabolic control."

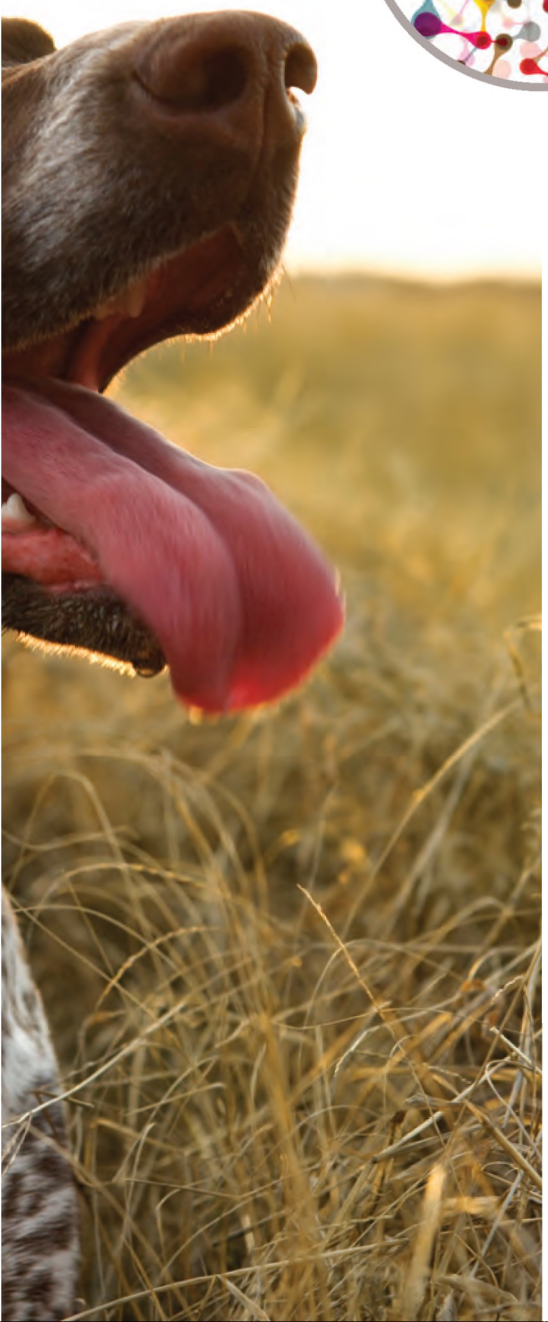


SCOTT COONROD, PHD

Associate Professor of Epigenetics and Reproductive Biology

DNA is packaged into the cell nucleus by wrapping around small bundles of proteins called histones, which contain an array of small chemical modifications (or marks). The organization of marks on histones determines when a particular gene turns on or off. Dr. Scott Coonrod and his team work in the new field of cancer epigenetics, which explores how changes in these modifications at certain genes may lead to cancer. They are investigating the role that a histone modification called citrulline plays in cancer growth and how new compounds that prevent this mark from forming may shut down out-of-control cancer cell growth.





A recent discovery in their lab linked the epigenetic enzyme PAD2, which produces the citrulline mark, to the growth of breast cancers that possess estrogen receptors. Building from this, very recent work reached an important milestone, finding definitive evidence that PAD2 activity causes cancer formation. For those fighting cancer, this work has serious potential.

"Most people eventually become resistant to existing anti-tumor drugs, raising the stakes in the search for drugs that use new pathways," said Dr. Coonrod. "We believe we can make new effective drugs by inhibiting PAD2 using a compound our collaborator created. We recently showed that our drug model works in cancer cell lines in the lab. It also blocked breast cancer growth in mice with no adverse effects. With this and our past data, we can start moving toward clinical trials that will illustrate the effectiveness in humans."

The group is exploring exactly how PAD2 sparks cancer. Estrogen is an important driver of most breast cancers. Dr. Coonrod's group has found that PAD2 appears to help estrogen turn on cell growth-related genes by associating with the estrogen receptor and placing the citrulline mark on histones in front of the genes' estrogen targets. Additionally, they have shown that their PAD2 inhibitor can block the activation of estrogen's target genes in breast cancer cells.

Dr. Coonrod's group also recently published a study showing that macrophages, the body's most powerful immune cells, have a way of catching their prey that can backfire on people who are overweight and others at risk for cancer, diabetes, and chronic inflammation. They showed that macrophage DNA can unravel and move outside cells. Called extracellular traps, these sticky DNA bits can occur anywhere. A troubling number of these traps appear inside rafts of macrophages surrounding dead fat cells in obese mice. There the traps drive inflammation, likely increasing risk for several major diseases. Dr. Coonrod's group discovered what causes macrophage DNA to unravel. They then worked with collaborators at The Scripps Research Institute to develop a preventative drug. "We showed this drug can prevent cancer growth by inhibiting the process that triggers macrophage DNA to unravel," said Dr. Coonrod. "We envision someday using this as a preventative therapy for cancer and other inflammation-related diseases."

VICKI MEYERS-WALLEN, VMD, PHD, DACT

Associate Professor of Genetics and Reproduction

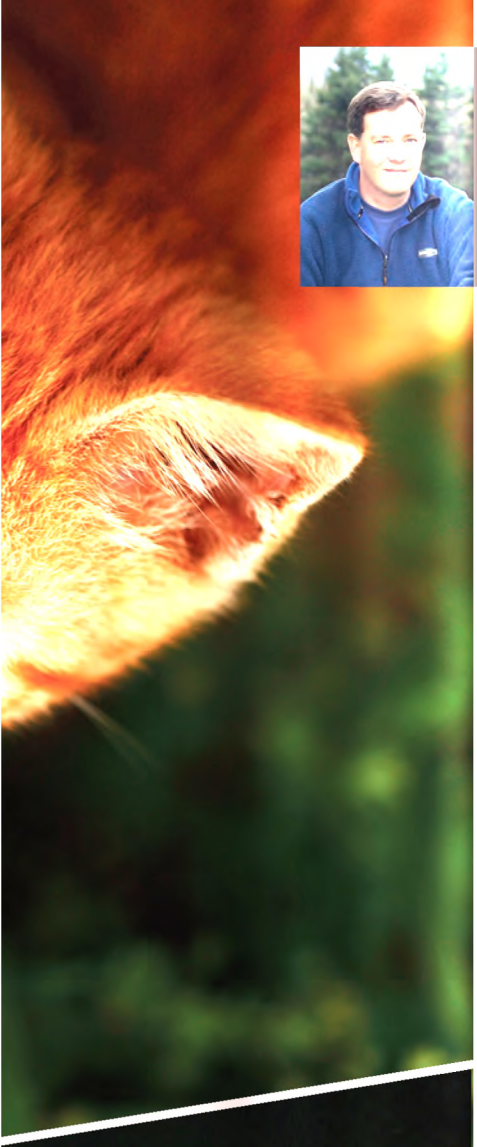
This past year, a shared quest to find the roots of a genetic disease in dogs and humans brought researchers from opposite sides of the globe together. Canine genetics researcher Dr. Vicki Meyers-Wallen, partnered with her counterpart in human research, Dr. Andrew Sinclair at the Murdoch Children's Research Institute in Melbourne, laid the foundations for a collaboration that will leverage their expertise to find the mutations behind a group of canine and human developmental diseases. Dr. Meyers-Wallen recently secured a National Institutes of Health grant for this project as a result of the collaboration.

In disorders of sexual development (DSD), mutations in DNA alter the reproductive system's growth. Many variations of DSD exist, but in one type of DSD, people with female chromosomes develop unusually masculinized physical traits. This disorder also occurs in 27 dog breeds. Dr. Meyers-Wallen studies the canine model of DSD, focusing on the American cocker spaniel and its close relative, the English cocker spaniel, which should make it easier to find the common mutation that causes this disorder.

"It's really difficult to find the mutations causing these diseases in people. The disorders are uncommon, families are small and vary greatly, and most humans are widely outbred," said Dr. Meyers-Wallen. "In comparison, dogs within a breed are closely related. Each breed's genome has long areas in its chromosomes that are extremely similar in all dogs of that breed. Disease genes are usually in one of those areas."

Knowing this helps researchers hone in on genetic regions in which mutations can hide, shrinking the proverbial haystack from the whole genome to several small DNA chunks. While Dr. Meyers-Wallen searches these areas for mutations in dogs, Dr. Sinclair searches in children who have the same kind of disorders. Their collaboration uses genomic mapping to compare canine data with human data. By pooling information and expertise, Drs. Meyers-Wallen and Sinclair hope to assist each other's search and their shared mission to understand what causes these diseases.

"We're already finding several interesting things," said Dr. Meyers-Wallen, who has shared her knowledge by giving seminars at the Sinclair lab, the Monash University at Melbourne, and to the veterinary faculty of the University of Sydney. "Using what we've done so far, we foresee making significant progress in the next two years."



JOHN PARKER, DVM, PHD

Associate Professor of Virology

Charles Darwin may well have been imagining feline calicivirus (FCV) when he introduced the concept of survival of the fittest. The sometimes deadly virus has endured for decades, evolving to evade host immune responses, environmental changes, and vaccines.

The virus' persistence and the opportunity to develop a vaccine effective at preventing disease symptoms and infection, which may effectively eliminate the disease, have captured the attention of Dr. John Parker, Associate Professor of Virology, and his research team. With funding from the National Institutes of Health, the Morris Animal Foundation, and the Feline Health Center, Parker and his team are investigating several aspects of FCV's ability to infect and kill. Together, the knowledge gained will further our understanding of the factors involved in virus immunity and persistence, opening the door to options for new viral control strategies.

During 2013, Dr. Zhengchun Lu, a postdoctoral associate in the Parker lab, made mutant versions of FCV and found that some of these mutant forms prevent the virus from binding to its receptor. Because infection requires that the virus first attach to a specific receptor on a susceptible cell's surface, Lu's insights bring us one step closer to identifying opportunities to prevent FCV from penetrating the cell's membrane.

In complimentary work, Meleana Hinchman, a technician in the Parker lab, investigated FCV's ability to bind to and infect cells. Her research has confirmed that sometimes, FCV binds to cells but does not infect. Working at the molecular level, Hinchman identified residues on the surface of the virus coat that are linked to FCV's ability to bind and undergo conformational change, a process that is necessary for FCV to penetrate the cell. A better understanding of where on the surface the binding and penetration occur is a necessary step toward the development of potential therapeutics.

Amanda Fischer, a Cornell veterinary student also seeking a master's degree, worked with purified versions of the virus and its receptors to develop chemical substances and tests that will detect FCV. Fischer is also working with one of Parker's collaborators at Penn State, Dr. Craig Cameron, who is studying enzymes involved in the replication process. Together the collaborative team hopes to determine whether growth properties of mutant versions of FCV are different and to use their findings as a proof of principle to develop an effective vaccine.

In addition to these projects, Dr. Parker also supported Dr. Emily Desmet's efforts to explore fundamental cellular processes, including how protein synthesis occurs in cells infected by viruses. Because all viruses are parasites, they rely on the host cell's processes for their replication. Desmet found that viruses duplicate and isolate the machinery needed for protein synthesis, effectively shielding their life support from antiviral attacks launched by the cell.

Overall, in 2013, Parker's research team was committed to understanding how viruses operate, how they leverage their host cells to satisfy their own needs, and how the host responds to viral invasions.

COLIN PARRISH, PHD

John M. Olin Professor of Virology
Director, Baker Institute for Animal Health and Feline Health Center

What do HIV, SARS, Ebola, avian influenza, swine flu, and rabies have in common? They are all dangerous viruses that have jumped genetic barriers to infect new species. Viruses transferring to new species spark emerging diseases that can spur major threats to public health and the well-being of animals, as well as people. With funding from the National Institutes of Health, Dr. Parrish's lab is studying how viruses make this leap.

Extremely contagious and often lethal, the notorious puppy-plaguing canine parvovirus (CPV) emerged in the 1970s. A vaccine originally developed at Baker Institute can prevent infection, but once puppies are infected treatment is difficult. CPV has also made the leap into other hosts, spawning variants that have emerged in wild animals such as foxes, skunks, and raccoons. Tracing CPV from its ancestor in cats and closely related animal hosts to its newly emerging forms, the Parrish lab explores how parvoviruses and others can expand their host range.

"The virus isn't sitting idle in dogs," said Dr. Parrish. "Since 1978 it has been spreading to different animals and may be going back into dogs in new forms. Raccoons already have a parvovirus unique to them. Seeing CPV's mobility, we think it's possible that CPV in dogs may be related to raccoon parvovirus. A common ancestor of these viruses could have gone from dogs to wildlife, and then from wildlife back to dogs, evolving new characteristics as it switched back and forth. This is a great model for gaining possible insights into other species-jumping viruses."

Examining the parvoviruses emerging in wildlife, Parrish lab postdoctoral fellow Dr. Andrew Allison found that their DNA very closely matches CPV's with only a small number of mutations. Like keys to locks, viruses must conform to the shape of the receptors on the cell surface to infect them. These receptors vary slightly between the carnivores that these different parvoviruses infect. The viral mutations Dr. Allison found affected their ability to bind to the transferrin receptor, which CPV must bind to in order to invade cells.

"The CPV mutations in raccoons and skunks are adaptations to slight species variations in this receptor," said Dr. Parrish. "After CPV first emerged, some of the adaptations that let it become really well adapted to dogs may have occurred when dogs came in contact with the virus that was infecting raccoons. Contact between dogs and raccoons may be enabling the virus to mutate and jump back and forth between those species over time."

The Parrish lab explores similar questions of host range variation and control in other viruses as well, including canine influenza. Originating from equine influenza virus, it emerged in dogs around 2000. The Parrish lab is examining the differences between the equine and canine viruses to determine the viral properties that may control host specificity, again providing further insight into how viruses can jump from one animal host to another, and leading to new control strategies.

ALEXANDER TRAVIS, VMD, PHD

Associate Professor of Reproductive Biology and Wildlife Conversation

From nanotechnology and medical diagnostics to wildlife conservation and human nutrition, things are busy in the Travis lab. In 2013, they celebrated the birth of Klondike, the western hemisphere's first puppy born from a frozen embryo. A joyful Beagle/Labrador Retriever mix, Klondike's very existence is exciting news for endangered canids like the red wolf. He is proof of concept for one of many reproductive technologies that can be used to conserve endangered species.

Travis' lab is collaborating with the Smithsonian Conservation Biology Institute to freeze reproductive materials like fertilized eggs, a process called cryopreservation. Since canids can only become pregnant once or twice a year, cryopreservation allows people to coordinate timing for transferring embryos into surrogates to aid repopulation efforts.

Meanwhile, the lab's fertility research has yielded technology commercialized by the new startup company Androvia to offer a new way of testing male fertility. Standard semen analysis can diagnose about half of infertility cases by observing whether sperm look normal and swim correctly. Androvia's product is designed to detect the other half of cases, in which infertility is tied to sperm's function. Weill Cornell Medical College is currently running clinical trials using this technology.

"By studying how sperm produce energy to swim, we've been inspired to make a platform technology that could power small medical devices using glucose in the bloodstream," said Dr. Travis, referring to a project funded by a National Institutes of Health Pioneer grant now in its final year. "This is far-future science — kind of like building an engine when the rest of the car hasn't been built. So we've also been looking at more immediate applications for our technology."

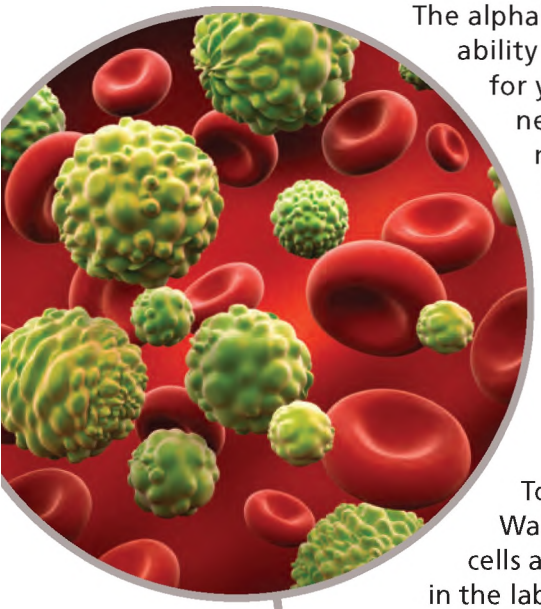
One such application may be point of care diagnostics, where minutes can matter. In collaboration with Weill Cornell Medical College, the Travis lab is looking at blood of patients presenting with stroke-like symptoms for ways to measure stroke-signaling biomarkers using the lab's technology.

"Imagine a handheld device for paramedics that uses our nanotechnology to detect and quantify biomarkers quickly, enabling you to diagnose strokes within 10 minutes," said Dr. Travis. "There's a very effective treatment for strokes caused by blood clots, but it must be given within three to four hours after the stroke. Unfortunately, right now diagnosis usually takes much longer than that, so only 4% of patients get this treatment in time. If we can help speed up the diagnostic process, that would make a big difference for a lot of people."

GERLINDE VAN DE WALLE, PHD

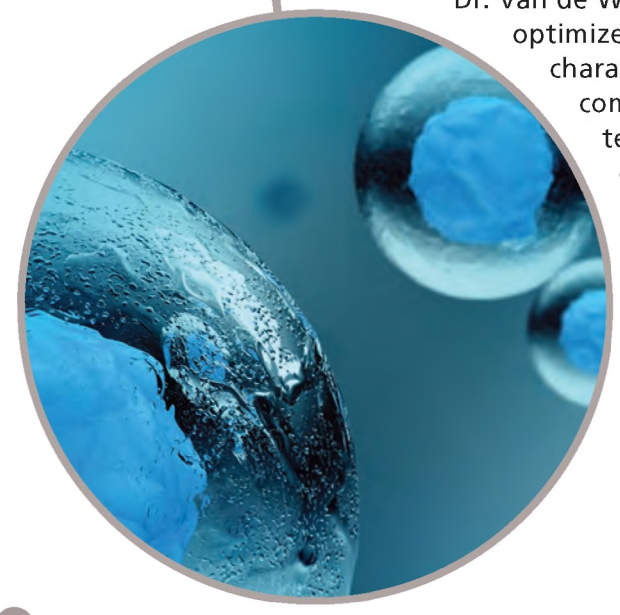
Assistant Professor of Viral Pathogenesis and Stem Cell Biology

With the right tools, any task is doable. This philosophy guides the work of veterinary scientist Dr. Gerlinde Van de Walle. She and her team are developing tools that will help investigators find answers that have eluded discovery for centuries. These answers could change the way we treat cancer and potentially eliminate some herpesvirus infections from the animal kingdom.



The alphaherpesviruses are known for their ability to evade the host's immune defenses for years, even decades, before causing a new viral outbreak. This recurrence can manifest in a variety of forms, including shingles, genital herpes, and cold sores. Dr. Van de Walle's work will improve our understanding of how and why the virus reactivates, lay the groundwork for more effective vaccines and better antiviral agents, and offer options to prevent the virus from causing additional outbreaks.

To accomplish these goals, Dr. Van de Walle is using explant models, in which cells are taken from an individual and grown in the laboratory. These cells can be taken from species not infected as well as those naturally infected with the virus and comparisons can be made between infected and non-infected cells. Using these models, every aspect of growth and infection can be monitored and the virus/host interaction can be studied.



Dr. Van de Walle is also working hard to optimize the isolation and proper characterization of stem cells from companion animals. Her research team currently studies two kinds of stem cells: mesenchymal stem cells from horses, which will help clinicians treat equine joint and soft tissue injuries, and mammary gland stem cells from dogs and cats, which will yield benefits for animals and people suffering from breast cancer.

ABOUT THE PRIZE

The Bicknese Family Prize was established in 2005 by Dr. Joanne Bicknese, CALS '76, DVM '78, MS, ELS, as an annual award to support research activities of a woman scientist-in-training. The award aims to provide support at a critical point in the trainee's academic development and to help launch her into a successful career. Dr. Bicknese, one of the Institute's most devoted and generous supporters, is a current member of the Institute's Advisory Council and served six years as chair during the Institute's 50th Anniversary and the building of the West Wing. The fund honors her parents, Helen and Louis Bicknese, and her aunt and uncle, Grace and Carl Bicknese.

The immune system is one of nature's wonders, defending the body from a constant assault by foreign invaders. So how does a fetus, composed of foreign tissue, survive and grow inside its mother's body without being attacked by her immune defenses?

Dr. Brosnahan, a post-DVM PhD candidate at Cornell's Baker Institute for Animal Health, studies pregnancy immunology in the lab of Dr. Douglas Antczak. Supported by a five-year Career Development Award from the National Institutes of Health (NIH), her research uses the pregnant mare as a model for investigating the mammalian maternal immune system.

Her research contributes to basic scientific knowledge in the fields of reproductive biology and equine immunology and genetics. It also has the potential to bring advances in the areas of human fertility, contraception, and transplantation medicine as well as specific equine reproductive and infectious disorders.

Dr. Brosnahan's past includes a host of achievements, including receiving two summer NIH training grants to study demographics and health issues of geriatric horses, spending two years in equine ambulatory medicine practice, completing an equine internal medicine residency, earning an MS in Veterinary Biomedical Sciences, and becoming a Diplomate of the American College of Veterinary Internal Medicine in the specialty of Large Animal Medicine.

"Dr. Bicknese's generosity in establishing this award is so very much appreciated," said Dr. Brosnahan. "The funds enabled me to present my research at a conference and to purchase needed supplies for my research. At a time when the funding climate for young scientists seems bleak, it is wonderful to see this support for my work, and on a larger scale for the role of the Baker Institute in training tomorrow's scientists."

The Baker Institute and Feline Health Center (FHC) Advisory Council is comprised of a variety of different members, providing invaluable guidance, financial support, and assistance to the Director and staff of the

DAVID BEHNKE TO CHAIR THE COUNCIL

David Behnke and his partner Paul Doherty began supporting the Baker Institute more than 20 years ago, ever since a friend made a gift in memory of their first dog. Now, after seven years of serving as Vice Chair of the Institute's Advisory Council, David is assuming the role of Chair, where he will provide leadership to a council that offers guidance and feedback to the Director and staff on all areas of Institute operations. He succeeds Dr. Richard Henry '68, who is stepping down as chair after seven years of service.

David brings a long, broad history of leadership experience to the council. He serves as Managing Director and Head of United States Investments at Najeti Ventures, LLC. and is a Principal and Founder of Behnke Doherty & Associates. He serves on the boards of Triton Logging (Chairman), Deep River Snacks, and Prestolite Electric. He has previously served on the boards of Annie's, MVP (Chairman), DataPath (Executive Committee), and Direct Fuels. He also served as the Chief Financial Officer of DataPath, now a division of Rockwell Collins Satellite Communications Systems, Inc. Prior to that, he worked for JP Morgan for 22 years as a Managing Director, heading a variety of divisions. In addition to the Baker Institute, David serves on the board of the Housatonic Valley Association and is a Corporate Trustee of the Trustees of Reservations in Massachusetts. Previous not-for-profit board affiliations include the Connecticut Chapter of the Nature Conservancy, the Connecticut Fund for the Environment, the Connecticut League of Conservation Voters, and the Steep Rock Association. He and Paul split their time between Washington, Connecticut and Martha's Vineyard along with their two adolescent Gordon Setters, Chester and Cooper.

As Chair, David will be focusing, in particular, on raising awareness of Baker Institute and gaining additional suppport. "The Baker Institute is the pre-eminent research institution for the diseases of dogs, cats, and horses. Past and current research conducted here has significantly improved and lengthened the lives of all these companion animals and, with that, the lives of their owners. Yet most pet owners have never heard of the Institute, let alone what we have accomplished. If we are to continue to overcome the health challenges of our animals, we need to get the word out about who we are, what we do, and what that work means for the future of the animals we love. That will be the core focus of my work as Chair of the Institute."

A WARM WELCOME TO OUR NEW ADVISORY COUNCIL MEMBERS

Dr. Donald Powell '69

Raised on a farm in southern Delaware, Dr. Powell grew up surrounded by animals. In grade school he met Rita, who later married him and supported him throughout his education and subsequent quest to start a veterinary business from scratch. He is now Chief Executive Officer of Pender Veterinary Centre, Ltd., a thriving 25-veterinarian group he cofounded in Fairfax, VA. Attributing much of their success to Cornell, the Powells have given back in many ways, from employing six current Cornell DVMs to supporting the Baker Institute and Feline Health Center (FHC) for decades to serving on advisory boards for the College of Veterinary Medicine, Baker Institute, and the FHC. Dr. Powell received the Baker Institute's Arthur F. North, Jr. Canine Service Award in 1999, recognizing his contributions to the improvement of canine health and well-being.

Mrs. Linda Rossi

They never intended to be pet owners, but Dr. Cliff Rossi and his wife Linda were in for a life-changing experience when a black and white cat showed up at their door. When no one claimed her they took her in, naming her Mustang Sally. She developed kidney problems, opening their eyes to the diseases that plague cats and the power that research has to make a difference. Learning what Cornell's FHC does for cats, they became involved. Mrs. Rossi provides insights from her long career in managing corporate business and marketing.

Institute and FHC. They help to ensure that the Institute's research programs, facilities, and outreach are not only the best today, but also that the Institute continues to prepare for the future.

DEVOTED VET AND VOLUNTEER RECEIVES ARTHUR F. NORTH, JR. CANINE SERVICE AWARD

Dr. Richard Henry '68 has stepped down from a long tenure of leadership as Chair of the Baker Institute's Advisory Council, where his impact still resounds. To honor his years of service, he has been awarded the Arthur F. North, Jr. Canine Service Award, which recognizes those whose contributions to the improvement of canine health and well-being reflect a spirit of concern for all dogs. The award was established in 1982 by friends of the late Arthur F. North in recognition of his widely respected dedication, integrity, and keen interest in the progress of veterinary medicine, which he demonstrated as a medical and surgical innovator, a strong proponent of veterinary research, and an effective advocate of research directed toward improving canine health.

Dr. Richard Henry's own excellence showed early in veterinary college, where he earned honors in every subject and graduated second in his class. Joining Deer Park Animal Hospital in Deer Park, NY, he helped it grow into one of the area's most respected veterinary centers. He has been an active community volunteer, spending time in animal shelters, speaking at local high schools, and serving as Secretary of the Long Island Veterinary Medical Association.

A long-standing participating veterinarian in the Baker Institute's Memorial Gift Program, Dr. Henry has been making contributions on behalf of his clients since 1971. He has dedicated himself as a valued member of the Institute's Advisory Council since 1994. Dr. Henry and his wife, Fay, have made a significant investment in the Institute's future, including a generous pledge of $10,000 to the Institute's Building Fund in 2001. That year he was honored with the Founders' Award for exceptional dedication to the practices of the veterinary arts and the advancement of veterinary sciences.

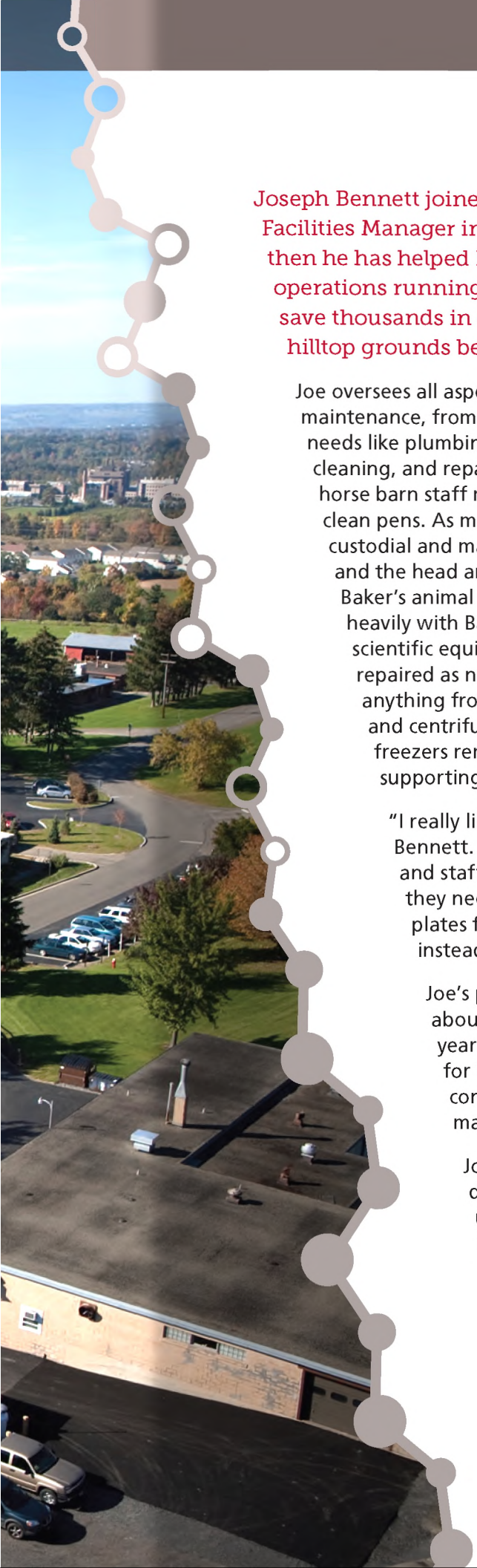
Mr. Mark Rosen

Learning how important cats were to Tamara Kirson, now his wife, Mark Rosen was determined to do all he could to bring cats into her life despite his allergies. When Ralph, a friendly neighbor cat, began visiting their house, Mark got his own introduction to the joys cats can bring. The couple later moved to Paris and adopted two kittens of their own. One, Osny, developed asthma and kidney problems. They subscribed to *CatWatch* newsletter, learned of the FHC, and met Dr. James Richards via email while seeking guidance. He became their mentor from afar in caring for their cats. Touched by his kindness and advice, the pair became passionate supporters and volunteers with the FHC.

Dr. Bradley Davis '83

Dr. Davis recalls his parents taking him to Cornell's College of Veterinary Medicine's Open House as a young child and hoping he had a future there. As a Cornell student years later, he learned about the high impact research done at Baker Institute has had, and he has been a consistent supporter through the memorial gift program ever since. A longtime client of his, Baker Advisory Council Chair David Behnke encouraged him to volunteer, and he joined the Advisory Council in spring 2011 with the hope of contributing to Baker's growth and continued successes. Dr. Davis is the owner and operator of the multi-veterinarian practice Davis Companion Animal Hospital in Woodbury, CT. He shares his life with his wife, three children, one new grandchild, five dogs, and two cats.

LONG TERM STAFF HIGHLIGHT: JOSEPH BENNETT



Joseph Bennett joined the Baker Institute as Facilities Manager in April of 2000. Since then he has helped Baker keep all its operations running, expand facilities, save thousands in costs, and keep the hilltop grounds beautiful.

Joe oversees all aspects of building maintenance, from managing building needs like plumbing, heating, cooling, cleaning, and repairs, to helping horse barn staff maintain fences and clean pens. As manager, he oversees custodial and maintenance staff and the head animal technician for Baker's animal facilities. He interacts heavily with Baker's faculty, keeping scientific equipment maintained and repaired as needed. This ensures that anything from electrical equipment and centrifuges to incubators and freezers remain functioning, thereby supporting Baker's scientific discoveries.

"I really like the hands-on work in this position," said Bennett. "I also like the interaction. As manager I get to work a lot with faculty and staff and learn some of what they're doing and why they're doing it. When they need something made, a lot of times I can help. I just made plexiglass plates for gel drying in a lab. They were ecstatic; if they had bought them instead, they'd have spent $100 apiece."

Joe's project to adjust Baker's cooling system dropped its electric bill by about 25 percent, saving $80,000 annually. Joining Baker during the year of its 50th Anniversary, when the Institute had just broken ground for its West Wing addition, he was heavily involved in coordinating its construction. At over 40,000 square feet, it is the largest section of the main complex at Baker.

Joe has worked at Cornell since 1977, when he joined the poultry department, later becoming farm manager. He fondly recalls teaming up with the late poultry professor Dr. Robert Baker, inventor of the famed Cornell Chicken Barbecue Sauce/Finger Lakes Marinade recipe, to cook more than 50 chicken BBQs for Cornell and the surrounding community.

In his free time, Joe enjoys camping and fishing with his wife and restoring old trucks, including a first-place winner of the Antique Automobile Club of America car competition.

After years of working in laboratories on Cornell's main campus, Becky Harman joined Dr. Douglas Antczak's group at Baker Institute's Equine Genetics Center in 2009. As a Research Support Specialist, she immediately began to appreciate the resources the Institute had to offer.

In order to advance his research in pregnancy immunology, Dr. Antczak encouraged Becky to learn new techniques and take advantage of cutting-edge equipment available at the Institute. While working with Dr. Antczak, Harman was invited to travel to several professional meetings to present data. She enjoyed these opportunities to spend time with colleagues and collaborators from other institutions.

Last summer, Harman moved within Baker to the Laboratory of Viral Pathogenesis and Stem Cell Biology headed by Dr. Gerlinde Van de Walle. Here she is involved with the development of a canine corneal culture system used to study the mechanism of canine herpesvirus infection and to evaluate corneal damage resulting from such infection. As she works in a field that is relatively new to her, Becky appreciates the support and technical advice from her co-workers at the Institute more than ever.

In addition to conducting basic research, Becky spends time assisting graduate and postdoctoral students and supervising undergraduates. She feels fortunate to work at the Baker Institute, surrounded by people at all stages of their scientific careers who are engaged in their research and enthusiastic about teaching and learning.

Becky graduated from Cornell with a B.S. in Natural Resources in 1992, and has worked at Cornell ever since. She earned an M.S. in Animal Science through Cornell's Employee Degree Program, and is in the process of applying for the PhD program in the field of Immunology and Infectious Disease. If accepted, she plans to continue working at the Institute while pursuing her degree.

DR. APPLETON LEADS LAND GRANT MISSION ACROSS CORNELL AS NEW VICE PROVOST

Dr. Judy Appleton, the Alfred H. Caspary Professor of Immunology in the Baker Institute for Animal Health, was named Vice Provost of Cornell University in February 2013, when she stepped down from her position as Associate Dean for Academic Affairs in the College of Veterinary Medicine.

"I have been very impressed by the innumerable ways that Cornell faculty, staff, and students educate the public as they meet their responsibilities in the contexts of research, outreach, teaching, and learning," said Dr. Appleton. "I hope to promote the Land Grant mission as a strategy for advancing the stature of the University."

As Vice Provost, Dr. Appleton serves as the coordinator of the four New York State Contract Colleges at Cornell and represents the University in its dealings with the State University of New York and the state government. In addition, her office supports the broader Land Grant mission and public engagement activities of the University in all Cornell's colleges. The Reserve Officers Training Corps programs on campus and the Cornell Prison Education Program also report directly through her to the Provost.

Dr. Appleton joined the Baker Institute at Cornell in 1982 and became a faculty member in 1987. In 2007, she was appointed Associate Dean for Academic Affairs in the College of Veterinary Medicine. She has taught and conducted research on topics related to immunology, parasitology, and disease pathogenesis, with broad applications to understanding both infection and allergy.

DR. TRAVIS LEADS THE ATKINSON CENTER FOR A SUSTAINABLE FUTURE'S ENVIRONMENTAL INITIATIVES

Dr. Alex Travis, Associate Professor of Reproductive Biology at Baker Institute for Animal Health, joined the David R. Atkinson Center for a Sustainable Future (ACSF) as Associate Director of Environmental Programs in July 2013. He is one of the Atkinson Center's three associate directors leading ACSF's tightly linked programs in energy, environment, and economic development.

"Alex has been involved with ACSF from our early days, including leading our faculty advisory board," ACSF Director Frank DiSalvo remarked. "He brings a wealth of experience, enthusiasm, and ideas to the position."

Research relating to environmental sciences occurs across Cornell Colleges. Dr. Travis leads ACSF's work to cultivate innovative collaborations relating to the environment within and beyond Cornell. Projects covered range from studies of wildlife conservation, management of water resources, impacts of land use change on valuation of ecosystem services, the design and engineering of the built environment, and the history and sociology of environmentalism. Dr. Travis' own lab researches reproductive biology, especially important for sustaining small threatened populations, and works internationally on conservation programs that focus on the intersection of human poverty, hunger, and biodiversity conservation.

DR. DONALD POWELL '69 AND MRS. RITA POWELL

Raised on a farm in southern Delaware, Dr. Powell was surrounded by animals early on. Two in particular grabbed his heart: a loyal rat terrier named Nicky that his parents gave him in grade school and a proud Chincoteague pony named Jiffy. These early relationships helped chart his course to become a veterinarian. Meanwhile, grade school introduced another life-changing element: it was there that he first met his future wife, Rita. As they grew, they grew closer, and soon married. When he ventured away from his home state to earn his DVM at Cornell's College of Veterinary Medicine, she was there to support him every step of the way, and worked at various offices in the College while he studied.

To take a break from school's demands, Dr. Powell regularly played basketball with Cornell's famed feline innovator Fred Scott, DVM '62, PhD '68, who told him about the Feline Health Center (FHC). For three of his four years in school Dr. Powell worked at the College's Companion Animal Hospital. There he learned of Baker Institute and gained invaluable experience to launch an ambitious business shortly after graduation, becoming cofounder and Chief Executive Officer of Pender Veterinary Centre, Ltd. in Fairfax, VA. Starting a new business was no easy task, and both Powells put in long hours to make it succeed. Today, their work has more than paid off, yielding Pender's thriving 25-veterinarian practice.

"A lot of our success goes back to the opportunity to attend Cornell," said Dr. Powell, who, along with Rita, has given back in many different ways, from employing six current Cornell DVMs to supporting the Baker Institute and FHC for decades and serving on advisory boards for the College, Baker Institute, and FHC.

"We support these institutions not only because of all Cornell has done for our lives and my career, but for the science it is doing to advance veterinary medicine," said Dr. Powell. "I believe in the power of basic research to ultimately help address diseases in animals and people."

The Powells have also aided the Baker Institute and FHC by helping Pender's charitable foundation make significant contributions to both institutions over the years in the names of patients who have passed. In 1999, Dr. Powell and his partner in the Pender Pet Caring Foundation, Dr. Mark Johnson, won the Baker Institute's Arthur F. North, Jr. Canine Service Award. This award recognizes those whose contributions to the improvement of canine health and well-being reflect the same spirit of concern for all dogs as embodied by Dr. North.

"We enjoy giving," said Dr. and Mrs. Powell. "One of the tenets of our Christian faith is that it is more pleasurable to give than to receive. We treasure this pleasure."

Dr. Gregory Acland, Professor of Medical Genetics

Morris Animal Foundation, *Module I, Medical Therapy Service Facility,* Principal Investigator

NIH, *Models for Therapy of Hereditary Retinal Degenerations,* Principal Investigator

Dr. Douglas Antczak, Dorothy Havemeyer McConville Professor of Equine Medicine

Harry M. Zweig Memorial Fund for Equine Research, *Fine Mapping of Candidate Genes Contributing to Equine Left Recurrent Laryngeal Neuropathy,* Co-Investigator

Harry M. Zweig Memorial Fund for Equine Research, *T-Cell Mediated Immunity and Vaccine Development in Horses,* Principal Investigator

Morris Animal Foundation, *Genetic Studies of Equine Sarcoid Tumors,* Principal Investigator

Morris Animal Foundation, *Major Histocompatibility Complex Class I Molecules as Receptors for Equine Herpes Virus,* Principal Investigator

Morris Animal Foundation (with University of Minnesota), *Gene Expression Study,* Co-Principal Investigator

NIH, *Immune Tolerance to Serial Trophoblast Transplants,* Mentor

Dr. Judith Appleton, Alfred H. Caspary Professor of Immunology

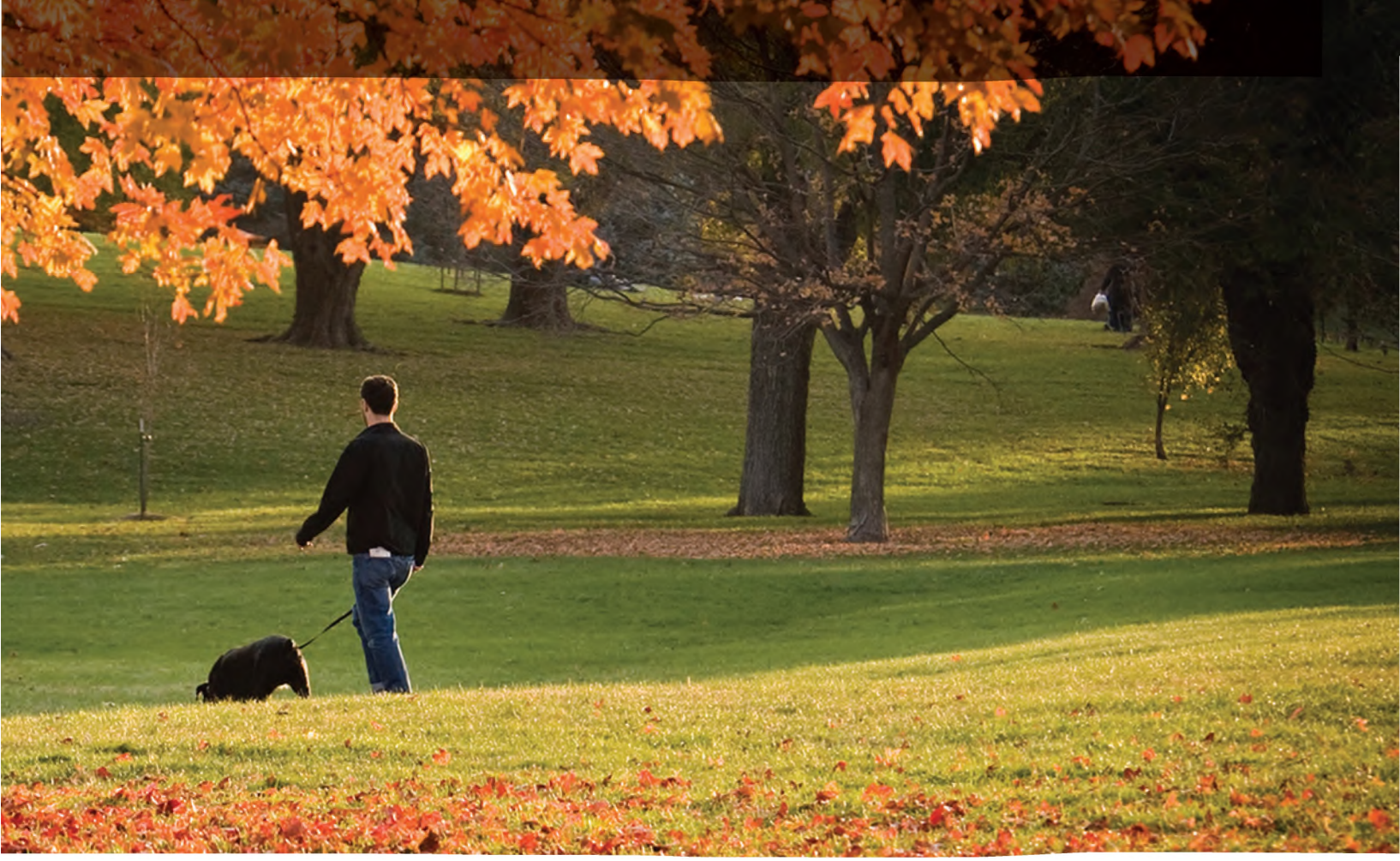
NIH, *Eosinophils Promote Nematode Infection,* Principal Investigator

USDA-Federal Formula Funds, *Application of New Concepts for Control of Internal Parasites in Sheep and Goats,* Co-Principal Investigator

Dr. Scott Coonrod, Associate Professor of Epigenetics and Reproductive Biology

Department of Defense, *Epigenetic Analysis of Breast Cancer,* Principal Investigator

Susan G. Komen for the Cure, *Role for PAD4 as an Estrogen-regulated Transcription Cofactor During Mammary Development and Breast Cancer,* Mentor



Dr. John Parker, Associate Professor of Virology

BARD (US-Isreal), *Development of a Plasmid-based Reverse Genetics System for Bluetongue and Epizootic Hemorrhagic Disease Viruses to Allow a Comparative Characterization of the Function of the NS3 Viroporin in Viral Egress,* Principal Investigator

Morris Animal Foundation, *The Role of Feline Junctional Adhesion Molecule A in Feline Calicivirus (FCV) Infection,* Principal Investigator

NIH, *Regulation of Reovirus Induced Apoptosis,* Principal Investigator

Dr. Colin Parrish, John M. Olin Professor of Virology

NIH, *Mechanisms of Parvovirus Infection and Host Range,* Principal Investigator

NIH, *Structural Controls of Functional Receptor and Antibody Binding to Viral Capsids,* Principal Investigator

NIH, *The Evolutionary and Biological Bases of Host Switching in Viruses,* Principal Investigator

Dr. Alexander Travis, Associate Professor of Reproductive Biology and Wildlife Conservation

New York City Partnership Foundation, *Assays of Sperm Function to Diagnose Male Infertility,* Principal Investigator

NIH, *Nanoscale Energy Production for Implantable Medical Devices,* Principal Investigator

CTSC Seed Funds, *Developing a Multiplex Point-of-care Platform to Detect Multiple Stroke Biomarkers,* Principal Investigator

Dr. Vicki Meyers-Wallen, Associate Professor of Genetics and Reproduction

Feline Health Center, *Viral Particle-based Display of Multiple Antigens for Feline Immunosterilization,* Principal Investigator

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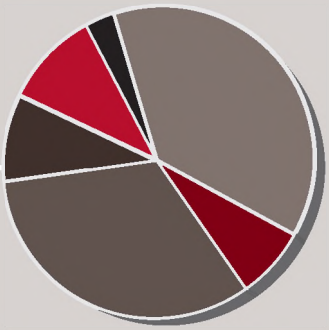

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