Duke Cancer Institute member Paul Modrich, PhD, was awarded the 2015 Nobel Prize in Chemistry. Modrich is also a James B. Duke professor in the Department of Biochemistry at Duke University School of Medicine and a Howard Hughes Medical Institute investigator. He shares the prize with Aziz Sancar, MD, PhD, of the University of North Carolina at Chapel Hill, and Tomas Lindahl, FRS, FMedSci, of the Francis Crick Institute and Clare Hall Laboratory in the United Kingdom.

According to the Nobel Foundation, the three scientists, working independently, have revealed how cells repair damaged DNA, which is vital knowledge about how a living cell functions. That knowledge is used for the development of new cancer treatments.

Will Eward, DVM, MD, works to find better treatments for a cancer called sarcoma. It makes no difference to him that half of his patients walk on four legs and bark at the doorbell.

Eward, an assistant professor of orthopaedics, spends the first part of his week treating dogs at Triangle Veterinary Referral Hospital, and the second half treating people at Duke Cancer Center. “When it comes to cancer, it really doesn’t matter if you have fur or skin or feathers,” he says, “It’s the same disease.”

Sarcoma is rare in humans, but when it strikes, it’s often lethal. It’s much more common in dogs. In his early days as a full-time small animal veterinarian, Eward saw so many dogs with sarcoma, he became frustrated with the lack of good treatments. So he went to medical school to launch a full-scale fight against the disease in both species.

A few other cancer specialists, including Duke’s Mark Dewhirst, DVM, PhD, Gustavo S. Montana Professor of Radiation Oncology, have believed in this idea, called “Comparative Oncology” or “One Medicine,” for more than 40 years. Increasingly, scientists are taking notice. The approach is behind a new formal partnership between Duke Cancer Institute and the College of Veterinary Medicine at North Carolina State University. The Consortium for Comparative Canine Oncology (C3O) will formally bring together cancer doctors and researchers at the two institutions and will fund research projects that include both. Dewhirst and Eward are members of the C3O steering committee at Duke, as is Neil Spector, MD, Sandra K. Coates Associate Professor of Medicine. Many new cancer medications are first tested in research animals, such as mice that are bred to get cancer. But studying that same drug in a pet dog who developed cancer naturally is much closer to studying it in a human. “Because of a dog’s size, you can do dosing that’s more like dosing in a human,” Dewhirst says. And, dogs get cancer as they age just like we do, so pets in clinical trials may have other illnesses, like diabetes or heart conditions, making the results more realistic, he adds.

In addition, the idea of “dog years” is true...
The Other End of the Leash  Continued from page 1

Oncologists Will Eward and Cindy Eward demonstrate an orthopaedic exam with their dog, Virgil. Will Eward treats both people and dogs with cancer.

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that are still out there in the body, they’ll grow a new tumor. Sarcomas do this to a greater extent than the more common cancers.” So he and colleagues Brian Brigman, MD, PhD, and David Kirsch, MD, PhD, teamed with scientists at MIT to develop a technology to reveal every last sarcoma cell. The patient gets an IV of tiny fluorescent probes that glow when they come into contact with certain enzymes that are present in soft tissue sarcoma. When the glow is gone, so is the cancer. The technique worked well in mice. But when the researchers applied to the U.S. Food and Drug Administration (FDA) to test the device in humans, they were told they needed to do years of additional testing in laboratory animals first.

Eward, who owns four dogs himself, decided to go another way. “The idea that we would ignore pet dogs with cancer and try things on healthy laboratory dogs is just a wrong-minded approach,” he says. So Eward and colleagues, including his wife, Cindy Eward, DVM, organized a trial to test the imaging device in pet dogs who were having sarcoma surgery. The trial took place at their veterinary practice and at Tufts University. “It worked great in these dogs,” Eward says. When the imaging technique showed that all the tumor was gone, the pathology test after surgery confirmed it. And it was safe; the dogs with sarcoma had no adverse effects from it. “Because of this trial in pet dogs, the FDA gave us the green light to go ahead with a phase 1 human clinical trial,” Eward says. That trial, which tested the safety of the technique, is complete. The team plans to enroll human patients in a phase 2 trial in early 2016.

The Genes We Share

Moving forward, researchers are excited about the possibility of applying newer targeted therapies in dog trials. Pet owners are likely to be especially interested in these therapies, which are less toxic than traditional treatments, says Kastan. And the pets could help scientists find biomarkers that measure when a targeted therapy is hitting its mark.

In addition, pet dogs may help reveal previously unknown cancer-causing genes. Eward believes that the most important genetic mutations will likely be those that are found in both dogs and humans. “If you look at a sarcoma, you will have thousands of mutations. You’re overwhelmed with information,” he says. “But if we find that a certain type of sarcoma in a dog and the same type of sarcoma in a human have only four mutations that are common between them, those are probably the driver mutations.” Kastan agrees that sequencing and analyzing the genetic mutations of cancers in dogs is a priority. He especially sees value in doing that with certain breeds, such as golden retrievers, that are more likely to get certain types of cancer. “Many of the genes that we know about that cause cancer in humans, like the BRCA genes in breast cancer, were discovered by studying families that have a high predisposition to cancer. When a particular dog breed gets a high rate of a particular cancer, it means there’s something about their genetic makeup that’s predisposing them,” Kastan says. “So studying them is like studying a family.”

Pet owners—81 percent of whom consider their pets as family members—would likely agree.

Innovations lead to better cancer treatments. Support DCI by visiting gifts.duke.edu/dci or calling 919-385-3129.

Pretty in Pink by Karen E. Butler

Linda Suitt stepped out for the 2015 Making Strides Against Breast Cancer walk held at North Hills Mall, in Raleigh, on Saturday, Oct. 17. Suitt, who was diagnosed with breast cancer in 1993, was treated at Duke Cancer Institute. More than 1,700 individuals registered for this year’s American Cancer Society walk, which, to date, has raised almost $200,000. Duke Cancer Institute teams have raised $17,276.

Funds support scientific research for better treatments and a cure and provide for vital programs and services offered to breast cancer patients across the nation. The American Cancer Society is currently investing more than $7.4 million in research grants at Duke. Fundraising continues through December 2015.

To pledge your support to one of our 11 Duke Cancer Institute teams, visit tinyurl.com/qdjdhm.
Singing the Praises
One woman’s uplifting story of beating lung cancer
by Carol Harbers

H elen Wadford’s cancer survivorship story is too remarkable, it had become the stuff of legend. “I heard you gave one of your patients a pill and she sang at church that evening,” said a new lung cancer patient to Jennifer Garst, MD, director of oncology clinical research and professor of medicine at Duke Raleigh Hospital. The patient didn’t know Wadford personally, but knew her story.

Although Wadford’s triumph over cancer wasn’t quite that simple, it was dramatic enough to hearten those faced with the disease.

In January 2012, the 56-year-old Louisville, North Carolina, resident noticed a cough that she assumed was...a cough. Months later, the cough was still there, and she felt terrible. A CT scan confirmed the worst: non-small cell lung cancer, stage 4.

CLEARING THE AIR
For many people, hearing of a lung cancer diagnosis leads to the assumption that the patient is or was a smoker. Not true for Wadford—or for 15 to 18 percent of all lung cancer diagnoses. “This is not your grandfather’s lung cancer,” Garst says. “The percentage of people with lung cancer who have never smoked has been slowly growing over the past 10 years.” The alternate cause? For some, it is a genetic mutation.

The silver lining to a genetic mutation is that there are now targeted drugs to treat these lung cancers. Targeted therapies can be very effective, with fewer side effects.

“Chemotherapy is like a cluster bomb,” Garst explains. “It kills the cancer, but it kills healthy cells as well. Targeted therapies are like heat-seeking missiles. They attack the tumor cells directly and have fewer side effects. We routinely test all lung cancer specimens for specific genetic mutations. If the mutation is present, targeted therapy is better than chemotherapy.”

WHAT A PILL!
The thoroughness of her first appointment with Garst took Wadford a bit by surprise. “I met with all the people on the lung cancer team,” she says. “They were remarkable, over the top.” Garst told her then that she wanted to test her for the genetic mutation.

Wadford tested positive and was treated with the drug erlotinib. “When Dr. Garst came in to tell me I had tested positive, she was beaming,” Wadford says. Instead of infusions, Wadford took a pill every day, beginning in September 2012. She did not lose her hair, although it did thin. She developed a temporary rash on her chest and face.

By November 2012, Wadford was in remission. She got this good news in the morning—that afternoon there was to be a benefit put together by her friends. Garst gave her prints of two X-rays of her lungs: the one from her first appointment and the current one. As she and her husband drove to the benefit, Wadford says, “I was about to bust open with the good news. My husband showed those X-rays around as if he was showing a newborn baby.”

And yes, she did sing at church—a solo—two days after the benefit.

THE NEXT GENERATION
Now a three-year survivor, Wadford continues to do well. In early 2015, Garst began to see some resistance to the erlotinib, and suggested a trial of a new drug. “New research means great improvements in genetic drugs,” says Wadford. “She wanted to be proactive, and I was all for it.”

A biopsy was required before enrollment in the trial, and by the time her test results came back, Duke’s trial had enrolled the maximum number of participants. But Garst offered another option. “She asked how I would feel about traveling to Emory to enroll there, since their trial was not yet full,” says Wadford. “My husband and I are retired, so it was not a problem.”

Since February, Wadford has been taking the targeted, experimental drug known as AZD9291, an epidermal growth factor receptor inhibitor. “Dr. Garst calls this drug ‘the new kid on the block,,’” says Wadford. “She keeps in close contact with my doctors at Emory. I feel wonderful. I take a pill every morning at 6:00 a.m. I’ve had no side effects at all. I do everything I want to do.” For Wadford, this includes showing up at every ballgame her grandchildren play in, and lots more singing.

Support our next-generation care: give online at gifts.duke.edu/dci or call 919-385-3129.

Kimberly Blackwell Wins Distinguished Alumni Award

K imberly Blackwell, MD, professor of medicine and director of the breast cancer program at Duke Cancer Institute, in October 2015 was presented the Distinguished Alumni Award, which is the Duke Alumni Association’s highest honor. Blackwell is a 1989 graduate of Duke University.

A clinical oncologist at Duke since 1994, Blackwell has dedicated her time, research, and expertise to the mission of fighting breast cancer.

Over the past several years, Blackwell developed a new breast cancer treatment known as the “smart bomb.” The treatment, T-DM1, attacks a particular protein found in an aggressive type of late-stage breast cancer while leaving the healthy cells untouched.

Blackwell also played a major role in the development of another breast cancer drug, lapatinib.

Her research in the fight against cancer earned her a spot on TIME Magazine’s “100 Most Influential People in the World” list in 2013. Blackwell serves as professor of medicine and assistant professor of radiation oncology at Duke University Medical Center and maintains an active clinical practice. Her clinical and research interests surround the formation of blood vessels in breast cancer, breast cancer in younger women, and hormonal therapy.

Blackwell dedicates her time, research, and expertise to the mission of fighting breast cancer.
Supporters Receive Shingleton Award

Duke Cancer Institute (DCI) chose two foundations as recipients of the 2015 Shingleton Award. Named for the institute’s visionary founder and emeritus director, the late William W. Shingleton, MD, the award recognizes people who have demonstrated exceptional service and generosity in furthering the institute’s mission to defeat cancer. The awardees are:

- The Rory David Deutsch Foundation
- The Holt Brothers Foundation.

Ross and Mindy Deutsch lost their seven-year-old son, Rory, to a brain stem glioma. After his death, they established the Rory David Deutsch Foundation to eradicate pediatric brain tumors and other devastating childhood diseases as well as to make a difference in the lives of affected children and their families. They established the Rory David Deutsch Memorial Endowment Fund at Duke, and it has now become a $3 million professorship. They also provided support to help recruit Oren Becher, MD, as the first Rory David Deutsch Scholar. Becher studies central nervous system tumors in children and teenagers and new treatment regimens for children and young adults with gliomas. The couple have served on the Board of Advisors of the Preston Robert Tisch Brain Tumor Center at Duke since 2002.

Ellyn Samsky and Alan Samsky have been instrumental in raising funds for the Rory David Deutsch Foundation. Ellyn is the sister of Ross Deutsch. The couple serve on the Board of Advisors of the Tisch Brain Tumor Center. Terrence Holt and Torry Holt, both former standout football players for North Carolina State University and the National Football League, say they first learned the persistence and toughness they would need from their parents while growing up in Gibsonville, North Carolina. Their mother, Ojetta, the pillar of the family, was diagnosed with cancer when Torry was ten and Terrence was six. They lost their mother to the disease when they were teenagers. In 2000, the brothers realized their vision of providing education and empathy to children facing cancer in their families by founding the KidsCan! program, which now operates at four locations around the country. KidsCan! was launched at Duke in 2007 with donations from the Holt Brothers Foundation. The program, run by the Duke Cancer Patient Support Program, provides empathy, peer support, and education to children who have cancer in their family.

The awards were presented Oct. 29, 2015, at the Shingleton Awards Dinner.

The Duke Comprehensive Cancer Center (now the DCI) established the Shingleton Award in 1987.

Former NFL standouts Terrence and Torry Holt founded the KidsCan! program to give education and empathy to children facing cancer in their families.

The Shingleton Award recognizes people who have demonstrated exceptional service and generosity in furthering Duke Cancer Institute’s mission to defeat cancer.
Are Flame Retardant Chemicals Fueling Thyroid Cancer? by Angela Spivey

Surgeon Julie Ann Sosa, MD, professor of advanced oncologic and GI surgery, is an international authority on thyroid cancer, and right about now her expertise is in great demand. Thyroid cancer is the fastest-increasing cancer in the United States in both men and women. In just three years, the endocrine surgery program that Sosa runs at Duke has grown from one surgeon to four.

But when Sosa started talking to environmental chemist Heather Stapleton, PhD, she started thinking about how to put herself out of business. Stapleton, the Dan and Bunny Gabel Associate Professor of Environmental Ethics and Sustainable Environmental Management, runs the go-to lab in the nation for identifying flame-retardant chemicals lurking in furniture, TVs, and other products. Because chemical companies are allowed to keep their formulations secret, even furniture manufacturers often don’t know which chemicals are in their products or how harmful they may be. Many flame retardants can slowly leach out of products and end up in the dust in your house. In almost all homes, Stapleton has detected traces of several chemicals that were banned years ago.

When Sosa met Stapleton through a colleague, she was fascinated to learn all of this. She was especially interested in Stapleton’s studies in animals showing that some flame retardants alter thyroid function, and that because of the shape of the molecules, the chemicals may be able to throw our own hormones out of whack.

Could the growing rate of thyroid cancer be caused in part by exposure to these chemicals that are found in most of our homes? Many scientists have thought about this question, but Sosa and Stapleton have the tools, knowledge, and patients they need to actually explore it in real people. They’re doing just that in a pilot study, funded by Duke Cancer Institute’s pilot grant program in Cancer and the Environment.

Thyroid cancer incidence in the United States has increased more than 270 percent in the last 20 years. Rates are also increasing around the world. “It’s a pandemic,” Sosa says. Some have argued that rates aren’t really rising that much, but rather that more tumors are being diagnosed because of increased use of imaging, which detects even the smallest of tumors. “That isn’t the whole story, because it’s not just the smallest cancers that are increasing in incidence,” Sosa says. “And the increase is also being seen in developing countries; they’re not just the countries that are currently available and cheap. But there are other chemicals out there that could potentially be used instead.”

In preliminary results, the team has found a connection between levels of one particular brominated flame retardant and cases of thyroid cancer. People with higher levels of this chemical in their house dust are five times more likely to have thyroid cancer than others in the study.

In addition, Stapleton says that some manufacturers may be using flame retardants even when they don’t need to. For example, her studies have found the chemicals in products that aren’t required to meet the flame retardant laws, such as nursing pillows and baby bath toys. As a surgeon, Sosa’s focus is on removing thyroid cancer and doing it safely. But, more and more, she thinks about preventing the cancer, as well as the financial and emotional costs that go with it. “These are generally young and middle-aged patients who are given a diagnosis they will carry for the rest of their lives. They need surveillance, continued diagnostics, and treatment for decades,” Sosa says. “By operating, I’m helping one person at a time. But, together, I hope Heather and I can have a much bigger impact.”

This research is funded by a generous donation from Fred and Alice Stanback to Duke Cancer Institute and the Duke Nicholas School of the Environment.

Help us form more collaborations that can lead to prevention and cures: give online at gifts.duke.edu/dci or call 919-385-3129.

WANT TO PARTICIPATE?
The researchers are recruiting people diagnosed with thyroid cancer and people who don’t have thyroid cancer to participate in this study. To learn more, call Kate Hoffman, PhD, at 919-484-6952.
22 Years of Celebrating Life
Brain tumor survivors say the annual Angels Among Us fundraising event feels like a family reunion.

by Angela Spivey

In February 2002, Sabrina Lewandowski of Raleigh, North Carolina, had just had surgery to remove a brain tumor—glioblastoma, one of the most aggressive. She was scared, and she didn’t know anyone else living with the disease. “When I was first diagnosed, I honestly thought I was the only one with a brain tumor,” she says. “I felt so lonely.”

That changed in the spring of that year, when she attended her first Angels Among Us event. It’s an annual 5K run and family fun walk that raises money for research in the Preston Robert Tisch Brain Tumor Center at Duke. But for survivors like Lewandowski, the event is much more than that; it’s a lifeline.

“At the 2012 race, Lewandowski walked with her daughter Layla. A nurse who had helped treat Lewandowski, Donna Van Arnold, brought her a baby blanket she had knitted. “It was so cold that year. That blanket saved us,” Lewandowski says. “I get to see these people one or two days every year. It’s almost like a family reunion. I can’t imagine not being a part of it.”

SONGS AND TEARS

Like Lewandowski, when Alan Stephenson of Bahama, North Carolina, first attended the event, he was recovering from brain tumor surgery. “That first walk, my wife Dianne had to hold my hand most of the way and help me keep my step,” he says. “But I wanted to get out and be around others who had been through what I had.”

That was in 2009. In 2010, Stephenson sang “Angels Among Us,” a song made popular by the country band Alabama. He sang with a group who traveled from Indiana to support another survivor, Eric Lacey. “Eric walked with us that year,” Stephenson says, his voice catching. “He used a cane and struggled around the course as many people do.” Lacey passed away before the next event.

The next year, Stephenson began performing the song with Jeff Bradford, a brain tumor survivor who lives in Cary. Now it’s a tradition. “We’re surrounded on stage by survivors of all ages,” Stephenson says. “It’s impossible for me to get through the song without crying. Maybe one of these days I’ll be able to do it.”

Bradford sees the event as a celebration. “It’s a reminder that we’re still here, still breathing,” he says. “It’s a tribute to all of those that weren’t as lucky as us to receive the care that everyone gets at the Duke brain tumor center. They give you the best chance you have anywhere. They give 125 percent.”

Both men raise money for the event. Bradford and his wife Andrea and daughters Zoe, Riley, and Ella Grace make bumper stickers and magnets to sell. In 2015, Stephenson and friends hosted a rock concert and split the proceeds between Angels Among Us and Sam’s Wish Fund, a charity that grants wishes to sick children. “Many of the treatment breakthroughs at Duke happen as a direct result of Angels Among Us and what these teams raise—whether it’s a team of 5 people or 200,” Stephenson says.

LIKE CHRISTMAS

Chesley and Van Gresham of Greensboro, North Carolina, look forward to Angels Among Us in the same way that some families anticipate Christmas. “Family members come from northern Virginia, and if they don’t get to come, they’re upset,” Chesley says. “Everyone can’t wait to mark it on their calendars each year.”

In 2015, 30 people from their family attended. The Greshams began supporting the event in 2006, the year after their son Tate had surgery at Duke to remove a brain tumor. He was just two years old.

Now age 11, Tate ran in the Angels 5K in 2015. “He was all riled up because he was so lucky as us to receive the help we received,” Chesley says. “Everyone can’t wait to mark it on their calendars each year.”

In 2009, Van and Chesley’s alma mater. “We felt that Duke saved Tate’s life. We want to help them do the same for others,” Chesley says.

The 23rd annual Angels Among Us 5K and Family Fun Walk is Saturday, April 23, 2016. Register or learn more at angelsamongus.org.

ANGELS AMONG US BY THE NUMBERS

In 1994 (the 1st year the event was held), 200 participants raised $27,000.

In 2015 (the 22nd year the event was held), 4,000 participants raised more than $2 million.
Those same investigators found that, for those improving care delivery for patients with advanced cancer.

Yousuf Zafar, MD, associate professor of medicine, is a medical oncologist and health sciences researcher at Duke Cancer Institute and the Duke Clinical Research Institute who focuses on improving care delivery for patients with advanced cancer.

**WHAT DO YOU MEAN BY “FINANCIAL TOXICITY,” AND WHY IS IT IMPORTANT?**

Financial toxicity is a term we coined in the literature to describe how cost of care for cancer patients impacts their wellbeing, quality of life, and quality of care. Different people experience it in different ways; it can be anything from paying $50 out of pocket a month more than you expected, all the way to declaring personal bankruptcy as a result of cancer treatment, or anything in between. It’s an unexpected cost as a result of cancer care that impacts patients’ wellbeing.

**WHAT CAN FINANCIAL TOXICITY LEAD TO?**

The biggest direct consequence is that financial toxicity can impact whether patients stay on their treatment. When patients struggle to pay for treatment, in many cases they stop it. They’re likely to give up potentially life-saving treatment because of that potential cost.

There was an interesting study that found that a diagnosis of cancer more than doubles a patient’s risk of declaring personal bankruptcy. That risk holds true regardless of the type of drugs or the type of cancer; just the diagnosis produces this result. Those same investigators found that, for those patients who do declare bankruptcy, there is a 70 percent greater risk of mortality. It doesn’t just hurt your finances; it hurts your outcomes.

**WHAT CAN PHYSICIANS DO TO HELP PATIENTS DEAL WITH THIS PROBLEM?**

When we prescribe a treatment for patients, we counsel them on potential physical toxicities. We need to do the same thing with potential financial toxicity. We need to say, “Even though you have insurance, you might get hit with a bill for this.”

So much of the cost of medical care is unknown up front. You would never walk into a car dealership and say, “OK, I’ll take that one. Just bill me later.” We’ve been trained to do that with health care, because traditionally insurance paid for most procedures. But now more of those costs are being borne by patients; not only is the cost of treatment going up, but so is the percentage of costs that insurers pass on to patients. We should make sure our patients understand that.

In cancer care, for example, I know that oral chemotherapy can often include very high out-of-pocket costs for patients. So before I send a patient home with an expensive prescription, I’ll ask our pharmacist to run it through their insurance plan, so the patient knows before they leave how much their copay will be, and whether they can afford it.

Just as we draw on various disciplines to address patients’ physical problems, we need to draw on various disciplines, like pharmacists and social workers, to address their financial ones. I think a lot of physicians don’t want to bring up costs because we don’t know the answers. But there are people around us who do know the answers. We need to bring them into the discussion up front.

**WHAT CAN PATIENTS DO TO MANAGE THE FINANCIAL EFFECTS OF CANCER CARE?**

The first thing is awareness. It’s important to realize that even if you have insurance, you may get hit with big bills.

The second is engagement. Don’t be afraid to bring up cost. Don’t be afraid to ask your doctor how much a particular drug is going to cost, and if your doctor doesn’t know, ask them who does. That can prompt the doctor to pull in other people on the team.

Some resources are available. Pharmaceutical companies have patient assistance programs. Charitable foundations can help with expenses. So there are some resources out there, but for the most part, I don’t think many patients are getting to those in a timely fashion.

**WHAT DO YOU HOPE TO SEE HAPPEN IN THIS AREA IN THE COMING YEARS?**

Major changes will have to happen in the policy realm. Value-based insurance design, for example, basically helps decrease out-of-pocket payments when cost is going to potentially impact whether a patient can get treatment. There are things like accountable care organizations and bundled payments, where they say, “For this diagnosis you get X amount of money. You can do whatever you want as long as it falls within that amount.”

I hope we see some real policy changes. Maybe we start letting the federal government actually negotiate prices with drug companies. That’s part of the drug approval process in Europe. But here, by law, we’re not allowed to think about cost when we approve a drug in the U.S.

The point is that more people than we realize are suffering as a result of the financial burden of their health care, including cancer care. According to the U.S. Centers for Disease Control, one out of three Americans has trouble paying their medical bills. So this is a very prevalent problem. It’s not just a few people who have inadequate insurance or no insurance. It’s millions and millions of people.