RUTGERS
Cancer Institute
of New Jersey

Autumn ■ 2015

CANCER Connection

Fine Tuning:

Faith, family, friends, and the targeted nature of precision medicine are helping **Rachael McCleery** *battle a second bout of ovarian cancer.*

Director's Corner

NICK ROMANENKO

As precision medicine continues to gain momentum across the nation, investigators at Rutgers Cancer Institute of New Jersey are making significant advances in translating discoveries stemming from this initiative. Genetic profiling can be considered the backbone of this work, but as you'll read in our cover story, along with the mechanical identification of cancer cell abnormalities, it takes keen human observation, a wealth of knowledge and a team of experts to match and 'fine tune' the right treatment to attack the right target. It's a challenge Precision Medicine Director **Lorna Rodriguez, MD, PhD**, faces in trying to find a better therapy for Rachael McCleery, who is battling a second bout of ovarian cancer.

For McCleery and so many others, the precision medicine program at Rutgers Cancer Institute is offering access to new treatment options. Recognizing a great need to propel this research is New Brunswick developer Omar Boraie and his family. A fixture in the 'Healthcare City' he helped create, Mr. Boraie has always 'given back' to his community. Thanks to a $1.5 million pledge from the Boraie family, the **Omar Boraie Chair in Genomic Science** has been established at Rutgers Cancer Institute, further supporting the important work behind precision medicine *(page 24)*.

Researchers also are making great strides with another type of cutting-edge treatment known as immunotherapy, in which the body is prompted to use its own defenses in tackling cancer. Diagnosed with stage IV melanoma, John O'Donnell embarked on a clinical trial led by Associate Director for Clinical Science and Chief Surgical Officer, **Howard L. Kaufman, MD, FACS**, examining an experimental drug known as T-VEC which is derived from a form of the herpes virus. This clinical trial gave Mr. O'Donnell an opportunity for treatment not yet offered at that time as a standard therapy. In late October, the FDA approved T-VEC for the treatment of melanoma *(page 12)*.

Such work is years in the making, and we have an eye on training the next generation of scientists. Support of our **CURE** and **CREHST** programs is helping prepare high school and undergraduate students for careers in oncology research *(page 26)*. And as you'll learn in our **Making a Difference** section, funding raised through community walks, golf tournaments and similar events further fuel our research mission.

As we maximize all that science and technology have to offer at this moment to provide the best treatment options for our patients, we are always looking ahead to the future and hoping you will continue to support us in our goals.

Sincerely,

Robert S. DiPaola, MD

Director, Rutgers Cancer Institute of New Jersey, and Vice Chancellor for Cancer Programs, Rutgers Biomedical and Health Sciences (RBHS)

RUTGERS
Cancer Institute
of New Jersey

CANCER Connection

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Forefront

News from the front lines at Rutgers Cancer Institute of New Jersey

DEBBIE VOGEL

Heavy Impact

Ovarian cancer patients who are overweight or obese are often given less chemotherapy per pound of body weight in order to reduce the toxic side effects associated with higher doses, and this in turn may lower their chances of survival, according to a study by researchers at Rutgers Cancer Institute of New Jersey and Kaiser Permanente Northern California Division of Research. The study was published in the July 2 online edition of *JAMA Oncology* (doi: 10.1001/jamaoncol.2015.1796).

STEVE HOCKSTEIN

Doses of chemotherapy are generally based on a patient's weight. However, doctors may decide not to provide doses over a certain level to reduce real and serious toxic side effects. For cancer patients who are overweight, this results in reducing the chemotherapy dose per pound of body weight – and possibly the effectiveness of chemotherapy in improving outcomes.

"Our study is the first to evaluate the impact of dose reduction in survival after an ovarian cancer diagnosis in normal weight, overweight, and obese women," said lead author **Elisa Bandera, MD, PhD** *(above)*, epidemiologist at Rutgers Cancer Institute and professor of epidemiology at Rutgers Robert Wood Johnson Medical School and Rutgers School of Public Health. "We found that for each body mass index (BMI) category, ovarian cancer patients with dose reduction experienced a poorer survival rate."

The study included 806 women with epithelial ovarian cancer who received the combination of chemotherapy drugs paclitaxel and carboplatin. Approximately 30 percent of those women were obese and 31 percent were overweight based on BMI. Fewer than three percent were underweight. A high BMI was the strongest predictor of dose reduction. Researchers found that obese women received less paclitaxel and carboplatin per kilogram of body weight when compared to women of normal weight. Those with a dose reduction of 85 percent or lower had approximately a 30 percent higher risk of mortality than those who received higher dosing (85 percent to 100 percent). This finding was strongest among normal weight women. ■

The study was supported by the National Cancer Institute (K22 CA138563, UC2 CA148185, U24 CA171524) and the Kaiser Permanente Center for Effectiveness and Safety Research.

We're Growing!

To date, 2015 has been a year of tremendous growth for **Rutgers Cancer Institute of New Jersey** with the arrival of 22 outstanding faculty members who join us from National Cancer Institute-designated cancer centers, universities and hospitals throughout the country. Additional information on these individuals, who are also faculty members at **Rutgers Robert Wood Johnson Medical School**, can be found at **cinj.org**.

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Forefront

Welcoming Todd Demmy, MD, FACS, FCCP

Rutgers Cancer Institute of New Jersey is pleased to announce the arrival of **Todd Demmy, MD, FACS, FCCP** *(below)*, as its new Chief of Thoracic Oncology and Associate Chief Surgical Officer. Dr. Demmy also has been appointed as a Professor in the Department of Surgery and Chief of the Section of Thoracic Surgery, within the Division of Cardiothoracic Surgery at Rutgers Robert Wood Johnson Medical School.

NICK ROMANENKO

Todd Demmy, MD, FACS, FCCP, is an international leader in minimally invasive thoracic surgery and a pioneer of the VATS procedure.

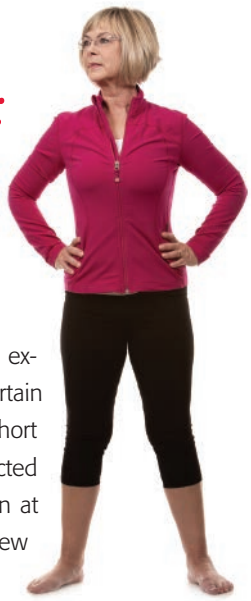
Dr. Demmy joins the center from Roswell Park Cancer Institute where he served as Clinical Chair of Thoracic Surgery and Professor of Oncology. He was also a Professor of Surgery at the State University of New York – Buffalo. Prior to his time at Roswell Park, he was at the University of Missouri Hospital and Clinics and Ellis Fischel Cancer Center where he served as Chief of Thoracic Oncology, Co-Director of Cardiac Transplantation and Associate Professor of Surgery.

He is an international leader in minimally invasive thoracic surgery and is one of the pioneers of video assisted thoracoscopic surgery or VATS. Because VATS is minimally invasive, it is less stressful on the patient and improves outcomes for those with locally advanced lung cancer. He has received international recognitions for advanced VATS operations including chest wall resections, the first U.S. VATS extrapleural pneumonectomy, and the world's largest series of thoracoscopic pneumonectomies.

Dr. Demmy received his undergraduate degree at Pennsylvania State University and medical degree from Jefferson Medical College. He then completed a general surgery internship at Baylor College of Medicine followed by a residency and research fellowship in cardiothoracic and cardiovascular surgery at Allegheny General Hospital-West Campus, Medical College of Pennsylvania.

He has published more than 130 articles in peer-reviewed journals as well as book chapters and presents regularly at national and international professional meetings. Dr. Demmy also has received international recognitions for training videos and educational courses for trainees and practicing surgeons. ■

Clinical Trials Corner:



TRIUMPHant Exploration

A breast cancer clinical trial examining the benefit of a certain dose of radiation given over a short period of time to only the affected part of the breast is now open at Rutgers Cancer Institute of New Jersey. The trial, known as the TRI-faction Radiotherapy Utilized to Minimize Patient Hospital Trips — or TRIUMPH-T Trial — will explore the effect of treating patients with radiation delivered over a shortened period of two to three days versus longer periods associated with traditional radiation therapy. A previous study by Rutgers Cancer Institute researchers showed the approach of giving radiation therapy over a two-day period is safe.

Accelerated partial breast irradiation (APBI) involves modified doses of radiation given over a much shorter period of time to the affected part of the breast only. The resulting biological effect is similar to the longer treatment. As more APBI studies are done, researchers at Rutgers Cancer Institute want to see if three doses of focused radiation delivered over two or three days is better than conventional courses over longer periods of time.

"By further examining short courses of APBI, there may be an opportunity to present treatment options that may provide better outcomes and improved quality of life," says Cancer Institute radiation oncologist and principal investigator of the trial **Atif Khan, MD**, who is an associate professor of radiation oncology at Rutgers Robert Wood Johnson Medical School and director of brachytherapy services at Robert Wood Johnson University Hospital – the flagship hospital of Rutgers Cancer Institute. ■

For more information on how to take part in this trial, supported in part by the Consortium of Cianna Medical and Elekta, individuals can call 732-235-8675 or e-mail cinjclinicaltrials@cinj.rutgers.edu.
For information on other clinical trials offered at Rutgers Cancer Institute of New Jersey, visit cinj.org/clinical-trials.

Exploring Hereditary Breast Cancer

Rutgers Cancer Institute of New Jersey researcher **Bing Xia, PhD**, associate professor of radiation oncology and pharmacology at Rutgers Robert Wood Johnson Medical School *(left in photo, right)*, and Rutgers Cancer Institute Associate Director for Basic Science **Eileen P. White, PhD**, distinguished professor of molecular biology and biochemistry at Rutgers School of Arts and Sciences *(right in photo, right)*, have been awarded a $2.4 million grant (R01 CA188096) from the National Cancer Institute (NCI). The funding will enable them to explore the potential of targeting the cellular-survival mechanism of autophagy in hereditary breast cancers.

Mutations in the *BRCA1* and *BRCA2* genes account for nearly a quarter of hereditary breast cancers and about five percent of all breast cancers, according to the NCI. Another gene that has a critical function in the same tumor suppression pathway is *PALB2*, first discovered by Dr. Xia in 2006. The PALB2 protein physically links together BRCA1 and BRCA2 proteins to suppress breast cancer development. These genes produce tumor suppressor proteins that help repair damaged DNA – the material that makes up one's genes. When *BRCA1*, *BRCA2*, and *PALB2* genes are mutated, DNA repair may not take place properly, causing further mutations in other genes. As a result, normal cells can develop into cancer cells.

The team recently found that normal breast cells affected by the loss of this tumor suppression mechanism appear to hijack autophagy to mitigate stresses. Taking advantage of this process, the cells can multiply, turn rogue and evolve into cancer cells. With this grant, investigators will further model autophagy defect in *PALB2* and in *BRCA1*- and *BRCA2*-associated hereditary breast cancers and test the potential of blocking autophagy for the prevention and treatment of these cancers. ■

DEBBIE VOGEL

Game Changer

For more than 60 years, the standard of care for patients with prostate cancer fueled by androgen hormones that has spread to other parts of the body has been androgen deprivation therapy (ADT). While the response rate is high, resistance to ADT often occurs. Generally, when ADT is no longer working, chemotherapy is administered for these patients. Research coordinated by the ECOG-ACRIN Cancer Research Group and published in the August 5 online version of *The New England Journal of Medicine* (doi:10.1056/NEJMoa1503747), examined the outcomes of giving the chemotherapy drug docetaxel at the start of ADT.

The study included 790 patients (median age of 63 years) who were enrolled and randomized between 2006 and 2012 to receive either ADT plus docetaxel every three weeks for six cycles or ADT alone. Investigators found that by adding docetaxel at the beginning of the ADT regimen, median overall survival was improved by 13.6 months.

"The effectiveness of the concomitant approach demonstrated in this definitive study indicates the importance of future clinical studies that seek greater clinical benefit through the study of multi-targeted approaches in earlier disease settings," says Rutgers Cancer Institute of New Jersey Director **Robert S. DiPaola, MD**, the study's senior author, who adds that the publication supports a change in standard practice guidelines. ■

Along with the National Cancer Institute, the study was supported in part by Public Health Service Grants CA180820, CA180794, CA180795, CA180802, CA180799, CA180790, CA180853, CA180801, CA180888, CA180801, CA31946, CA180821; the National Institutes of Health and the Department of Health and Human Services.

Mark N. Stein, MD, ***is a member of the Urologic Oncology and Phase I/Investigational Therapeutics Programs at Rutgers Cancer Institute of New Jersey who has an interest in prostate cancer and exploring new agents for all solid tumors. He also is an associate professor of medicine at Rutgers Robert Wood Johnson Medical School.***

Dr. Stein has been at Rutgers Cancer Institute since 2004, after completing a fellowship at Mount Sinai School of Medicine, which was preceded by a residency at Montefiore Medical Center of Albert Einstein College of Medicine. While Dr. Stein has clinical expertise in prostate, kidney, bladder and testis cancers, his research interest is in investigational drugs and how they affect all solid tumors. He shares more about his work with us.

Q: You conduct research on new drugs and compounds to see how they impact current cancer treatments. What are some items of note you are working on?

A: Many of the phase I trials we conduct involve drugs for which there is already at least some experience for other earlier trials and now we are looking at new combinations or schedules. We conduct 'first-in-human' trials as well. Earlier this year we opened such a trial with a drug called ONC201 being developed by a biotechnology company called Oncoceutics. There are special challenges in a first-in-human trial. Most importantly it requires commitment from the patients as they track any side effects they may have, and come to frequent appointments for monitoring and measurement of levels of the drug in the blood. For the research nurses and physicians these

NICK ROMANENKO

types of trials require a keen sense of observation as we navigate the challenges of giving a drug in people for the first time. The other challenge is figuring out which group of patients is most likely to benefit from a medicine. A tremendous amount of laboratory research goes on before a drug is administered to people allowing us to make educated decisions about who is most likely to benefit. Nevertheless there are almost always surprises with a drug helping in ways we didn't expect or unfortunately not working as hoped. ONC201 has particular preclinical activity in prostate, colon and brain cancers, and we continue to monitor that activity.

Q: Currently you are the principal investigator of a vaccine trial for prostate cancer. Tell us more about that.

A: We are evaluating a novel immune therapy that uses a modified form of the listeria bacteria to stimulate the body's immune system against prostate cancer cells. Our bodies have multiple mechanisms for keeping the immune system under control so that we do not develop out of control inflammation and auto-immune responses. Laboratory data suggest infection with listeria may not only do a good job of stimulating production of immune cells but may also decrease levels of some of the immune suppressors in our body making it a very interesting vehicle for stimulating the immune system.

Initially we will work with the company producing this vaccine and other cancer centers conducting this trial to determine the safest dose of the listeria-prostate specific antigen vaccine. Once that is accomplished, the trial will enter a second phase in which the listeria will be combined with pembrolizumab, a medicine currently approved for treating melanoma, to see if this combination improves the length and quality of life for men with advanced prostate cancer.

Q: You are also collaborating with investigators who are part of the Big Ten Cancer Research Consortium. What are you currently exploring?

A: We are working with the University of Illinois in Chicago on a novel approach for treating metastatic kidney cancer that combines two approaches currently being used to treat the disease (immune stimulation and blocking growth of new blood vessels in the tumor) into one therapy. We hope this dual approach will increase the number of people who respond to treatment and prolong duration of response to treatment without increasing toxicity. We are developing new concepts in prostate and bladder cancer as well. By collaborating with Big Ten members, we can conduct relatively large, robust studies and get answers quickly. ■

An author or co-author of more than 40 publications, Dr. Stein also sits on the editorial board of* Hem/Onc Today *and serves as a Steering Committee Member for the Big Ten Cancer Research Consortium, and as a member of the Prostate Cancer Clinical Trial Consortium and ECOG-ACRIN's Genitourinary Committee, all of which are collaborative, national platforms for the development of novel therapeutics to treat cancer.

BY MICHELE FISHER

Fine Tuning

The smile on her face and beaming attitude didn't look like they belonged to someone experiencing a second bout of ovarian cancer – especially someone who is only 28. But those who know Rachael McCleery know her positive exuberance is a constant. Whether hanging out with family and friends or even being sidelined at the hospital, this is a young woman who squeezes every minute out of every day. At the time of our meeting, McCleery was taking care of some last minute blood work so that she could hop a plane the next day to visit her aunt and uncle on their farm in South Carolina. This was after she and her mom Sue told me about the recent night out on the town in Atlantic City they had for the 21st birthday of McCleery's sister – complete with drinks, dancing and a limo. That evening was right up there with her swimming with dolphins this past summer on a family vacation to Florida.

PHOTO BY: NICK ROMANENKO

'Team Rachael:'

The kindness of others, including many strangers, fuels Rachael McCleery's *(left)* desire to remain positive. "We have 'Team Rachael' — a network of family, friends and the entire community of Barrington, New Jersey…The whole town knows her and is in her corner," says McCleery's mom — and biggest cheerleader — Sue.

It was on a family vacation in 2008 at age 20 that a persistent pain in her hip wouldn't subside. Further testing revealed two tumors, one the size of a basketball on her right ovary and one the size of a grapefruit on the left and a diagnosis of ovarian cancer. While shocking to hear in relation to her young daughter, it's a diagnosis that mom Sue is quite familiar with, as her own mother and three of her cousins also battled the disease. Interestingly, the younger McCleery tested negative for the mutation in the BRCA genes that put one at a higher risk of developing ovarian cancer. The diagnosis was equally shocking — and devastating — to this young adult. "I was studying photography in college. I felt that my life was just starting," says McCleery.

Having received the standard of care chemotherapy drugs carboplatin and paclitaxel at Fox Chase Cancer Center in Philadelphia — close to her south Jersey home — she responded well, had both ovaries removed as a preventative measure and remained in remission for five years. During a routine follow-up visit that included blood work in June 2013, she learned her CA-125 levels were up. The CA-125 protein is most commonly found in ovarian cells and serves as a 'marker' or indicator of ovarian cancer. Unfortunately, it was just as she was turning 26 and about to come off of her parent's insurance policy that she learned her cancer was back. Placed on carboplatin again for a few months at a community hospital near her home, the response was not what they hoped. Local doctors wanted McCleery to go to another Philadelphia facility for advanced treatment, but the issue with the insurance required her to stay in state. Not knowing where else to turn, the family called upon the surgeon who operated on McCleery a few years earlier. He and his nurse navigator recommended Dr. Lorna Rodriguez at Rutgers Cancer Institute of New Jersey.

Out of the Box

Lorna Rodriguez, MD, PhD, is the former chief of gynecologic oncology at Rutgers Cancer Institute, who specializes in ovarian and other female reproductive cancers. She is also the director of the precision medicine program at Rutgers Cancer Institute. The blending of such expertise is exactly what McCleery needed at that moment. "When I first saw Rachael in January of 2014, I wanted to have her tumor genetically profiled. At that time our clinical trial examining that approach was not open, and after many discussions with both Rachael and her family we decided to perform surgery," recalls Dr. Rodriguez, who is also a professor of obstetrics, gynecology and reproductive sciences at Rutgers Robert Wood Johnson Medical School.

"Dr. Rodriguez had many options prepared. She gave us hope and a new outlook on the whole thing. She was optimistic and helped restore my fighting spirit," says McCleery, who observed that "Dr. Rodriguez has her own uplifting spirit." "As soon as we met Dr. Rodriguez, we knew we were in the right place," adds McCleery's mom. "With Rachael, we need to think out of the box." "Out of the box" is exactly what Rodriguez had in mind. Because McCleery's cancer was slow growing, the surgery was scheduled at Robert Wood Johnson University Hospital (RWJ) – the flagship hospital of Rutgers Cancer Institute – where Rodriguez removed her uterus and obtained a biopsy sample.

It was after that time that a unique clinical trial at Rutgers Cancer Institute had re-opened to accept additional patients. The trial exam-

"With Rachael, we need to think out of the box," says McCleery's mom, Sue...which is exactly what Lorna Rodriguez, MD, PhD, *(above)* the head of the precision medicine program at Rutgers Cancer Institute of New Jersey, had in mind.

PHOTO BY: NICK ROMANENKO

PHOTO BY: DEBBIE VOGEL

ines tissue samples of those with rare forms of cancer and those whose cancer has stopped responding to traditional treatment. The trial is part of the Rutgers Cancer Institute's precision medicine program. Precision medicine is an effort that drills down to the molecular level of cancer to identify changes or mutations in cancer genes that can be targeted with particular drugs. Many times, the agents identified are not traditionally used for the type of cancer presented by the patient. For instance, a patient may have a diagnosis of lung cancer, but a particular genetic change may indicate that a drug used for a different type of cancer would work better. "It's personalizing cancer treatment," says the doctor. Rodriguez thought McCleery might benefit from this clinical trial.

Identifying genetic changes or mutations is done through a process called genomic sequencing, for which 200 or more known abnormalities are screened. So far, out of more than 500 patient samples from Rutgers Cancer Institute, investigators are finding an average of three mutations in each biopsy. "When traditional care is no longer working, having three additional targets to work with helps the odds of finding an effective therapy," offers Rodriguez. A collective of experts including medical/surgical/radiation oncologists, pathologists, basic scientists, systems biologists and others, known as a tumor board, further investigates those mutations and determines if existing agents or even investigational therapies as part of a clinical trial might help.

Exploring the Unknown

When McCleery's biopsy came back, no mutations were found, but "variants of an unknown significance" were present. "It was a convoluted pathway to navigate," notes Rodriguez, but after examining the results closely and drawing on three decades of her own research experience, she was able to identify a suitable drug for McCleery – trametinib – an agent known as an MEK inhibitor that blocks certain enzymes found to be overactive in some forms of cancer. The drug is currently used in the treatment of melanoma. Some patients may be apprehensive of participating in a clinical trial, but not McCleery. "It was nice to know there were other aspects available, but Dr. Rodriguez made me feel comfortable in participating."

Taking a trametinib pill every day, McCleery's cancer was responding well, notes Rodriguez, as most of her tumors were getting smaller. One, however, continued to grow. Thinking this tumor may be different than the others, Rodriguez prepared McCleery for a second surgery so that a new biopsy sample could be obtained. It also became clear around that time that while most of McCleery's tumors were responding favorably to the medication, side effects were becoming an extreme discomfort. Rodriguez scaled back the medication considerably and performed the surgery at RWJ this past February. Following sequencing of the second biopsy sample, Rodriguez determined that trametinib was still the optimal treatment for McCleery, but given her side-effect reaction, Rodriguez lowered the dose and altered the frequency, hoping to build her up over time to the amount of drug she was initially taking. Along with balancing the need for the medication with the side effects, Rodriguez notes another major challenge. "Some tumors learn to bypass these drugs. The plan is we continue to biopsy and figure out a new pathway and how to proceed from there."

Reaching New Heights in Precision Medicine

Expanding on its precision medicine work, **Rutgers Cancer Institute of New Jersey** has become part of the **Oncology Research Information Exchange Network (ORIEN)**, collaborating on a massive research initiative to personalize cancer treatments for patients.

Using a single clinical trial protocol known as Total Cancer Care,® ORIEN members from around the country are sharing de-identified patient tissue and clinical data to accelerate precision medicine approaches and the development of new treatments. To date, more than 124,000 patients have consented to the study, enabling researchers and clinicians to match eligible patients to clinical trials and conduct larger and more comprehensive analyses faster than ever before.

ORIEN
ONCOLOGY RESEARCH INFORMATION EXCHANGE NETWORK

"Becoming part of ORIEN adds great opportunities for Rutgers Cancer Institute of New Jersey, enabling discovery based on large-scale, diverse population data as well as patient-specific clinical decision support across a broad, national clinical trial portfolio," notes Rutgers Cancer Institute Director **Robert DiPaola, MD**.

ORIEN is growing at a time when the national spotlight is turned to the field's potential and promise to discover targeted treatments. ORIEN leaders stress that this recognition illustrates the need for continued collaboration among oncology experts to identify cutting-edge treatments for patients. ■

Rachael McCleery often turns to her love of photography as a respite from medical appointments.

Slight Detour

Continuing on trametinib since the second surgery, it was in May of this year that McCleery visited Florida. The trip was a special one, as most of her family came along, including 11 cousins — and there was a plan for McCleery to fulfill a desire to swim with dolphins. But a bout of nausea and vomiting uncovering a bowel obstruction landed her in a local hospital there. Not knowing McCleery's medical history or current treatment regimen, the medical team at the Florida hospital viewed her scans and began an 'end of life' conversation with her. "I couldn't believe what I was hearing. That was out of the question," says McCleery. "All I wanted to do was get out of there and swim with the dolphins!" A quick call from Rodriguez to the medical staff in Florida with instruction to boost McCleery's trametinib intake until returning home from her vacation, resulted in her release from the Florida hospital. She was able to finish her vacation — dolphin swim included.

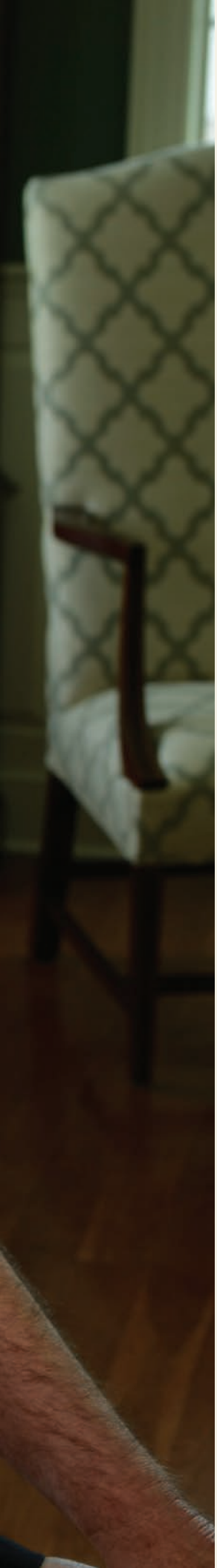
Traveling and keeping up with her photography (photographing landscapes and the occasional celebration for friends) is what helps McCleery escape from the reality of treatments and doctor visits. And it's the kindness of others, including many strangers, that fuels her desire to remain positive. "We have 'Team Rachael,'" says her mom – a network of family, friends and their entire community of Barrington, New Jersey. "They hold walks for Rachael, parades and have even decorated the town fire truck in teal lights (the color of ovarian cancer awareness) for the holidays in honor of her. The whole town knows her and is in her corner." Mom has taken all the t-shirts designed for the events held for McCleery and had a quilt created as a recent birthday gift. In the hospital or on treatment days, it provides a sense of warmth and security. On the day of our photo shoot for this story, McCleery donned the blanket as a cape — much like a superhero — showing her strength in battling her disease and keeping close to her heart all of those who are providing support for her in her journey.

Having come off trametinib this past July and placed on a traditional treatment of doxorubicin thereafter, she continues to project an upbeat attitude and attributes her joy and resilience to her faith and her vast support system, including Rutgers Cancer Institute's entire gynecologic-oncology healthcare team and RWJ nurses, the collective that she dubs "The Dream Team." Her advice to others walking a similar path: "Try to find the positive in everything. It's not easy, but if you're able to do that, you can conquer anything."

Whatever awaits McCleery in the future, she knows that her response to the trametinib treatment for her ovarian cancer is helping to break new ground and contributing to a growing arsenal of therapies that are being found to treat multiple cancers. While she is not the first ovarian cancer patient to be treated with trametinib, her positive response gives researchers the proof they need to move forward with wide-scale testing of the agent. "Other scientists are coming to similar conclusions about trametinib and its effectiveness against ovarian cancer, but without precision medicine, we wouldn't have known how to treat Rachael, as there was no clinical trial available exploring trametinib for ovarian cancer," says Rodriguez. That will change, as a cooperative group clinical trial examining trametinib in ovarian cancer will open soon at Rutgers Cancer Institute, where Rodriguez and her team already know the possibilities — thanks to the fine tuning of precision medicine. ■

Learn more about how a recent gift to support the precision medicine program at Rutgers Cancer Institute will provide additional opportunities to explore groundbreaking treatment strategies for cancer patients (page 24).

PHOTO BY: NICK ROMANENKO



Harnessing Viruses Against Cancer

Looking at John O'Donnell, one would never guess he's waging a battle with melanoma, the deadliest of skin cancers. Tall and fit, he strides into the lobby of Rutgers Cancer Institute of New Jersey like he knows the place well...which he does.

He has just finished a stint of volunteering at Sterling Village, a senior residence in Piscataway, New Jersey. At 67, he's not much younger than the Sterling Village residents. But O'Donnell seems years away from being a 'senior.' He and his wife Karin enjoy giving back to their community. "My wife gets involved in many volunteer activities and she's an organizer," he says. "I just follow her lead and do what she tells me."

Lately O'Donnell, a retired high school math teacher, has had more serious concerns. In 2014 he was diagnosed with stage IV melanoma. Since then, he's undergone experimental immunotherapy treatment at Rutgers Cancer Institute. "I had no qualms about being in a clinical trial," he says. "I felt it was my only hope for survival."

Cancer-focused immunotherapy represents a groundbreaking new frontier of treatment. It works by activating the immune system to fight disease. In clinical trials, immunotherapy has been effective against several cancers, including melanoma, kidney and lung cancers, and Hodgkin's lymphoma. A decade ago, patients with stage IV melanoma would be told they had eight months or less to live. Today, O'Donnell is winning the fight against melanoma with the help of a new immunotherapy drug made from an unlikely source: a virus.

PHOTO BY: NICK ROMANENKO

Viruses: Good or Bad

Many people regard viruses (from the Latin *virus*, meaning toxin or poison) with some degree of fear. These tiny, rugged organisms commandeer living cells to replicate and often destroy these cells in the process. Some viruses, like Ebola and HIV, have the potential to wreak havoc and eradicate entire populations. Others, like the influenza virus, are responsible for some of the worst pandemics in history.

But Howard L. Kaufman, MD, FACS, an international leader in the field of immunotherapy, sees viruses in a different light. "Viruses represent a new class of drugs that can do a great deal of good," he explains. "Used alone or in combinations, they may be effective in treating many types of cancers and have the potential to save lives."

"Viruses represent a new class of drugs that can do a great deal of good. Used alone or in combinations, they may be effective in treating many types of cancers," says Howard L. Kaufman, MD, FACS, one of John O'Donnell's physicians who is highly regarded for his work in treating melanoma and in immunotherapy. "I've always felt that to really cure cancer, you need to activate a very strong immune response. Viruses can do this if we harness them properly."

Dr. Kaufman is trained in both surgical and medical oncology and is highly regarded for his work in treating melanoma and other skin cancers. He was recruited to Rutgers Cancer Institute in 2014 as its associate director for clinical science and chief surgical officer. "My primary interest is in immunotherapy. I became a melanoma doctor secondarily," he says. "I've always felt that to really cure cancer, you need to activate a very strong immune response. Viruses can do this if we harness them properly."

Exciting things are happening in Kaufman's lab right now as his team focuses on developing immunotherapies primarily with viruses. They have had some exciting successes for melanoma. Results from a phase III clinical trial found that patients with advanced-stage melanoma have significant improvement in durable response rate and improved survival when treated with talimogene laherparepvec, or T-VEC. This therapy is made from a herpes virus, best known for causing the common cold sore.

Kaufman presented the trial's results to the U.S. Food and Drug Administration in April 2015. "This drug is first-in-class, meaning it uses a new and unique mechanism of action for treating a medical condition," he says. "So the FDA gave it special scrutiny." In late October 2015, the FDA gave its approval of T-VEC for the treatment of melanoma.

One-Two Punch

T-VEC fights cancer through two different mechanisms, says the scientist. "It is injected directly into the tumor, where it replicates. It does not replicate in normal tissue. The cancer cells are destroyed, releasing more cancer-fighting viruses into the body. T-VEC also boosts the immune system by activating T-cells, a part of white blood cells, which kill tumors. The response rate is pretty remarkable." Unlike chemotherapy, immunotherapy has few side effects—fever, fatigue, nausea and pain at the injection site were the most common.

T-VEC is made safer by deleting the virus-causing genes. "More than 500 cancer patients have been treated with viruses across many different studies without a single case of the virus spreading to household contacts," states Kaufman, who is also a professor of surgery and a professor of medicine at Rutgers Robert Wood Johnson Medical School.

PHOTO BY: DEBBIE VOGEL

John O'Donnell considers himself fortunate to have received care from the team at Rutgers Cancer Institute. "I know I'm in for a lifetime of scans...but my wife Karin and I focus on the positive," he says. "I'm proud of having participated in a clinical trial. I want my sickness to mean something and help others."

Melanoma is difficult to treat when it is in advanced stages or has spread to other areas of the body. Some 10,000 people die from it each year and the incidence rate has increased in the Caucasian population by more than 70 percent over the past 20 years. New drugs are improving this scenario, says Janice Mehnert, MD, director of the Phase I/Investigational Therapeutics Program at Rutgers Cancer Institute and a medical oncologist with a focus on cancers of the skin. "Since 2011 six drugs have been approved to treat melanoma, including three immunotherapies. These drugs are called checkpoint inhibitors. They 'take the brakes off' the immune system and enable it to fight cancer." She explains that used as single agents, many patients treated with these standard therapies will not respond. Much of the promise of the future may lie in combining checkpoint inhibitors with other approved agents or with other novel therapies such as T-VEC, to fight melanoma and other cancers.

The Right Moment

They say timing is everything, and T-VEC came along at just the right time for O'Donnell. "This diagnosis was a surprise but not really a shock," says O'Donnell. "I've had skin problems all my life—allergies to latex and some metals. Years ago I had psoriasis. I was treated in ultraviolet light chambers to clear it up." He admits sometimes going to tanning salons, which he believed offered similar benefits. Indoor tanning may increase the risk of melanoma by up to 59 percent, according to the American Academy of Dermatology.

Sometime around 1996 O'Donnell noticed two irregular-shaped moles on his shoulder. A dermatologist advised him to keep an eye on them. In 2012 he noticed that one of the moles now had a raised bump. He went to another dermatologist who removed them. A biopsy provided the diagnosis no one wants to hear: malignant melanoma.

PHOTO BY: NICK ROMANENKO

After learning that melanoma is very difficult to treat and often incurable, John O'Donnell's eyes were opened to the possibility of a clinical trial with T-VEC. "I said yes on the spot. What did I have to lose?"

O'Donnell needed another procedure to be sure all the cancerous cells had been excised and to remove a margin of surrounding skin as well. He was referred to surgical oncologist James Goydos, MD, FACS, director of the Melanoma and Soft Tissue Oncology Program at Rutgers Cancer Institute. "We work together as a team," says Dr. Mehnert, one of the program's two medical oncologists. "It includes surgical oncologists, radiation oncologists, medical oncologists, radiologists, pathologists, nurses, and social workers. Everyone is involved in some aspect of care."

Following his surgery O'Donnell had regular follow-up care by Institute physicians. "Dr. Goydos told me that with today's knowledge, the moles would have been removed immediately," says O'Donnell. Unfortunately, the damage was done. In 2014 O'Donnell found a large lump under his arm and immediately went back to Dr. Goydos. His melanoma had spread. A CT scan showed a tumor by the lymph nodes under his arm. He had two more lesions in the lung, so removing the tumor was not an option. "When cancer spreads to more than one site, surgery will not be curative," says Kaufman.

Nothing to Lose

O'Donnell was referred to Mehnert for care. She immediately thought of the clinical trial led by Kaufman combining ipilimumab with T-VEC as an excellent option. O'Donnell learned that melanoma is very difficult to treat and often incurable. "I did enough reading online to become thoroughly frightened," he says. A conversation with a research nurse clinician further opened his eyes to the possibility of this clinical trial with T-VEC. "I said yes on the spot. What did I have to lose?"

To be eligible for this therapy, the patient must have a palpable tumor. O'Donnell's tumor was 3½ by 4 centimeters, so he easily fit the criteria. Kaufman gave him his first T-VEC injection in August

The Virus Cancer Connection

The connection between viruses and cancer has been recognized for almost a century. In Italy in the early 1900s, a woman with advanced cervical cancer was bitten by a dog and given the rabies vaccine. To her doctors' astonishment her large tumor disappeared and she lived for several more years. Other experiments with the live rabies virus followed, shrinking tumors in many patients. All eventually died, but the notion of viruses as "natural-born killers" capable of fighting cancer captured the imagination of researchers everywhere. ■ ***(Mahoney, et. al., Scientific American, November 2014)***

PHOTO BY: NICK ROMANENKO

2014. "Dr. Kaufman said he'd take very good care of me, and he did," notes O'Donnell. He remembers feeling a little achy and running a slight temperature, but was fine in a few days.

He noticed a change in the tumor right away. It felt smaller after just one injection. He continued the treatment and a few weeks later a second medication, ipilimumab, was added. "We know T-VEC is effective in bringing about an immune response," explains Kaufman. "When you add another immune activating agent such as ipilimumab it makes the response even stronger." He plans additional studies combining T-VEC with other drugs and extending therapies to different cancers.

Unfortunately O'Donnell did not tolerate ipilimumab well. He developed a rash and became so ill with colitis that he had to be hospitalized. "This is a known side effect of ipilimumab," says Mehnert. "The initial treatment of choice is steroids and fortunately he improved relatively quickly." O'Donnell was thankful to be able to continue the clinical trial with T-VEC alone. He could see the tumor shrinking week by week.

Following O'Donnell's last treatment with T-VEC in January 2015, the affected lymph node was surgically removed. The lesions on his lungs are gone and the tumor has shrunk to 1 by 1¼ centimeters. He feels well and is considered to be in remission. Kaufman, Mehnert and the team will continue to follow him closely. Kaufman says, "While we may not cure every case of melanoma with these therapies, we're turning it into a chronic, manageable disease, like diabetes."

Kaufman, who is president of the Society for Immunotherapy of Cancer, is proud of his outcomes. "Some patients from a phase II clinical trial nine years out are doing well," he says. "I had an 81-year old patient, an avid golfer, who had failed chemotherapy. He had a serious tumor on his leg. We treated him with the virus alone and he had a complete response. I've stayed in touch with this family. His daughter just emailed me saying he celebrated his 90th birthday doing what he loves best, playing a round of golf."

That's the kind of outcome O'Donnell is counting on. He considers himself fortunate to have received care from the team at Rutgers Cancer Institute. "I know I'm in for a lifetime of scans and I'll be connected to Rutgers Cancer Institute for the rest of my life," he says. "There's a level of anxiety, but my wife and I focus on the positive. I'm proud of having participated in a clinical trial. I want my sickness to mean something and help others." ■

"We work together as a team. Everyone is involved in some aspect of care," says Janice Mehnert, MD *(above)*. Other members of John O'Donnell's care team are *(below, clockwise from top row left):* Megan Ruppert; Doris Pindilli, APN-C, AOCNP; Karen Dragert, RN, BSN, CCRC; and Ann Silk, MD.

PHOTOS BY: DEBBIE VOGEL


Dependable
Motors
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BY MARYANN BRINLEY

A *Tale of Two* Cancer *Patients*

Two

miles. Spiro Drecolias, a high-spirited father of three and lung cancer survivor, lives and works just ***two*** miles from Rutgers Cancer Institute of New Jersey in downtown New Brunswick. He owns and operates an auto body shop and towing service in Somerset. Treated for cancer in June 2015, Drecolias credits his surgeon, John Langenfeld, MD, co-director of the Lung Cancer/Thoracic Oncology Program at Rutgers Cancer Institute and associate professor of surgery at Rutgers Robert Wood Johnson Medical School, who relied on "the gold standard operation to remove a lobe in his right lung. It's not trivial surgery but since it was early stage and he is relatively young at 50, hopefully he will be fine." No follow-up treatment, just regular monitoring, is required.

PORTRAITS BY NICK ROMANENKO

Spiro Drecolias, in his body shop at Dependable Motors, has left his lifelong, four-pack-a-day, smoking habit behind forever. His words of wisdom for all smokers: "I started smoking when I was 11! Yes it's hard to quit. I don't reach for that cigarette anymore … I look at my scar. I look at my little kids. Why would I smoke? I need to stay alive."

For 16 years, Dr. Langenfeld has devoted his career to improving the survival of patients with lung and esophageal cancers as well as to finding a genetically-linked cure for lung cancer, the leading cause of cancer deaths in the world. "I think we are getting closer," he says describing his lab's understanding of a bone morphogenetic protein that can be targeted to suppress cancer growth. If "lung cancer wasn't so poorly funded, we might be closer to using this compound in humans."

When Spiro Drecolias showed up in his office last spring and said, "Doc, you've got to take care of me. I've got two little kids to raise. I owe them at least 10 more years," Langenfeld, who is ordinarily low-key and always straightforward, recognized a guy whose story had more drama than most. "He was an interesting patient."

"I could tell that this doctor was good right away," Drecolias says. Feeling fine just four weeks after surgery and going back to work just a few days after the procedure. He has left his lifelong, four-pack-a-day, smoking habit behind forever — "I started smoking when I was 11!" And, he has a medical prognosis that would make any survivor shout with joy. Unfortunately, he can't help but look back and wish the same for his wife, Vicki. "If only she had stayed in New Brunswick, right here in our neighborhood, she might be alive today."

Vicki's Story

Vicki Chugranis Drecolias died in November 2011 from complications after a diagnosis of lung cancer. They met at a club when she was a student at Rutgers' Douglass College and he was working in New Brunswick. "We'd go dancing." They were married on Feb. 24, 1985, had their first of three children in July 1987 and bought their business, Dependable Motors, 20 years ago, together, always together. "She was from Greece too. Hey, I came here in 1968 to find the American dream," he says. "Vicki was very smart. She was my right hand. She was my best part, my mouth piece, my business partner, my phone answerer. She was my best friend. In losing her, I lost a lot. The only thing that keeps me going now are my kids." Their oldest son, Michael, has finished law school and is launching his career, but Joy Stella is 9 and Perry, "short for Periclese, my brother's name," is only 8. They still climb into bed with their father early in the morning. "Her death has been real hard for them. Christmas time is especially difficult."

His wife's stage IV lung cancer came as a shock in June 2011. She'd had no symptoms and seemed perfectly healthy. "We were cleaning out one of the houses we own and rent to Rutgers students when she collapsed in the yard," Drecolias recalls. Misdiagnosed at first with pain in her kidneys from a possible stone, his wife eventually had a CT scan that revealed lung cancer. She had been a long-time smoker, too. "When my wife took a drag of her cigarette, she would inhale deeply and enjoy taking that hit. For me it was more the habit of lighting up and holding the cigarette. The doctors tell me that it doesn't make any difference though. Even second-hand smoke will get you. The cancer isn't going to be worse if you inhale deeply," Drecolias admits.

After a medical consultation and lots of family debate, a group decision was made to take his wife into Manhattan to be treated by what they referred to as the "best of the best" doctors. "Never mind New Jersey," Drecolias says now, regretting the route they took. "Every time we wanted to see the doctor, we had to travel 40 miles and it was the middle of the summer when these big guys were all on vacation. She wound up with whatever staff doctor happened to be on the hospital floor at the time." A chemosensitivity test to determine the best chemotherapy for her type of cancer cost $7,500 out of pocket when insurance wouldn't pay and the procedure to take tissue samples from her before sending them to a West Coast facility for cell typing, cost her dearly. During tissue-sampling surgery, her colon was unknowingly knicked.

"Vicki was my right hand," says Drecolias *(second from left in photo above, with his wife Vicki, center, and their three children, celebrating the baptism of their younger son, Perry)*. "She was my best part, my mouth piece, my business partner, my phone answerer. She was my best friend. … If only she had stayed in New Brunswick, right here in our neighborhood, she might be alive today."

Drecolias remembers how anxious she was to get out of the New York hospital and home to the kids then. "So they gave her chemo and discharged her," her husband says. Back at home she developed sepsis when the contents of the damaged colon slowly seeped into her abdominal cavity, poisoning her. "I rushed her the ***two*** miles up

PHOTO COURTESY OF THE DRECOLIAS FAMILY

the road to Robert Wood Johnson University Hospital (the flagship hospital of Rutgers Cancer Institute), where she went into a coma and lived a little longer, but it was not good. I would go to visit her every day and the little kids saw her just once."

All Over Again

Four years of emotional healing and hard work followed in the wake of his wife's death. Then, a minor car accident and a broken rib sent Spiro Drecolias right back into his worst nightmare: lung cancer. This time, it was his. He's thankful, however. If it weren't for the accident, he might never have had the CT scan that detected cancer in one nodule. In and out of the hospital in three days for the surgery, he kept the truth from his little ones. "I told them I was having a sleep apnea test because I snored," he laughs. Funny but he isn't snoring anymore. "Daddy," they say, "you don't snore anymore."

Early CT screening, especially for smokers like Vicki and Spiro Drecolias, is high on Langenfeld's to-push list. The Lung Cancer/Thoracic Oncology Program at Rutgers Cancer Institute participated in the National Lung Cancer Screening Trial that showed early detection was more effective with a CT scan and saving lives than a traditional chest X-ray. "This is all going to happen with insurance changes now. We were part of that national trial and are now collaborating with the University Radiology Group and Robert Wood Johnson University Hospital on a lung cancer screening program for smokers, especially those in the 30 pack years category (a pack a day for 30 years). "Most people are symptom-free for a long time and as soon as they do show symptoms, it's almost too late," Langenfeld explains.

A Lifetime of Work

Ranked as a top physician through the years by numerous entities, Langenfeld is not the kind of physician who boasts about honors and awards. You have to pry it out of him, or look closely at his CV. He has been recognized for outcomes for esophageal cancer in New Jersey and has been voted a Top Doc by *New Jersey Monthly* magazine for many years. A teacher at Robert Wood Johnson Medical School, he lectures medical students and supervises general surgery residents.

"In large part, I chose thoracic because it would allow me to budget my time between surgery and research," He shares the fact that his mother died of lung cancer at age 56, a very personal incentive for choosing his specialty. "I've stayed within this University system because of the encouragement to do research along with patient care."

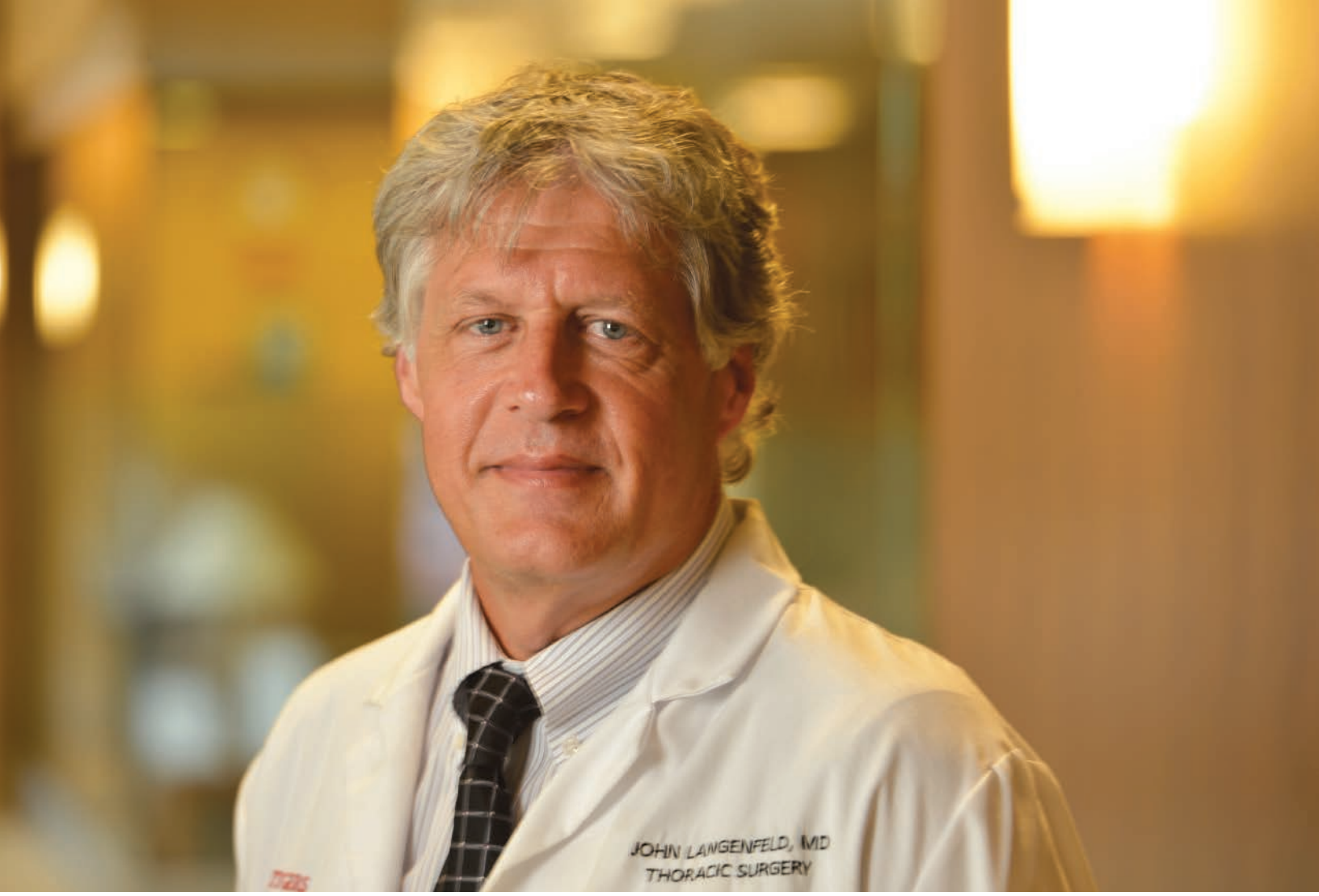
To Stop Cancer Growth

"More patients die from lung cancer than breast, colon, prostate and kidney cancer combined," according to **John Langenfeld, MD**, co-director of the Lung Cancer/Thoracic Oncology Program at Rutgers Cancer Institute of New Jersey and lung cancer researcher. And while "lung cancer initially responds to chemotherapeutic agents, eventually it develops resistance to therapy." To work around this devastating disease, Dr. Langenfeld has been looking at a novel expressed gene for many years and has published numerous research studies in scientific journals since 1991 as well as co-authoring book chapters, including, "Bone Morphogenetic Proteins and Angiogenesis in Developing Tumors" (Humana Press 2008). He also speaks regularly at conferences on this topic including the American Association for Cancer Research.

First distinguished for their ability to jumpstart the formation of bone and cartilage, bone morphogenetic proteins (BMPs) are located throughout the body and orchestrate all kinds of tissue architecture. They are embryonic, in fact, crucial to start of life itself.

"They are also highly expressed in human lung carcinomas," Langenfeld explains. His research now demonstrates that primary and metastatic lung tumors correlate to the presence of BMP-2. "Our long term goal is to use BMP-2 targeted therapy to prevent the progression of lung cancer." And working with Director of Molecular Design and Synthesis David Augeri, PhD, at Rutgers, they developed novel BMP inhibitors to accomplish this. "You can induce cell death in cancer cells with these molecules. We hope to develop the perfect BMP inhibitor to be used to treat patients with cancer. We are so close, but in relative terms, with the appropriate financial support it could be a short time away." ■

To consider making a gift to Dr. Langenfeld's BMP research, visit cinj.org/giving or call the Development Office at Rutgers Cancer Institute at 848-932-8013.



Research however, is clearly his passion. Since 1999, Langenfeld has spent countless hours studying bone morphogenetic proteins (BMPs – a group of factors critical for growth from the embryonic stage and throughout life) and looking for novel therapeutic strategies to treat lung cancer.

When asked about a "eureka" moment in the lab, he answers quickly, "I am personally having one right now (with BMP-2)." *(See sidebar "To Stop Cancer Growth" on facing page.)*

John Langenfeld is brilliant of course, but Spiro Drecolias is gifted with a natural wisdom. "It was just the two of us when we met. Not a lot of opinions or competing voices were there. I could hear what he was saying and he could explain in direct terms. I could talk to him without interruption. And he heard me…saying, 'Keep this guy healthy.'"

Sitting in the gritty front office of Dependable Motors, customers coming and going, noise from the street and the body shop in back, no pretentions are possible. This father of three laughs about all that he has gained from not smoking cigarettes: his words are real wisdom for all smokers. "Yes it's hard to quit." He smoked right up to the day of surgery on June 2 but he's off the nicotine patch already. "It used to cost me $35 a day. That's hundreds of dollars a week. My hands were yellow. Look at them now," he asks, holding fingers up. Not yellow. "Your teeth are awful. Your whole body smells. Food is starting to taste good. It's going to take a while for my lungs to heal. The kids are happy. My house doesn't stink. I don't reach for that cigarette anymore. I look at my scar. I look at my little kids. Why would I smoke? I need to stay alive." ■

John Langenfeld, MD, co-director of the Lung Cancer/ Thoracic Oncology Program at Rutgers Cancer Institute of New Jersey, has devoted his career to improving the survival of patients with lung and esophageal cancers as well as to finding a genetically-linked cure for lung cancer, the leading cause of cancer deaths in the world. "I think we are getting closer," he says.

Making A Difference

Pass it On

The field of genomic science and precision medicine is changing how medical professionals approach cancer diagnosis and treatment. Relatively new, it involves analyzing and treating tumors on a genetic level, allowing oncologists to prescribe individualized therapies for better outcomes. Rutgers Cancer Institute of New Jersey launched its precision medicine program in 2013. Attesting to its national importance during his most recent State of the Union Address, President Obama announced the launch of a national Precision Medicine Initiative focused on finding a cure for cancer and other diseases.

Although several cancer centers are performing next-generation gene sequencing on tumors for research, Rutgers Cancer Institute was one of the first facilities in the country and the only one in the state to apply genomic sequencing as a precision medicine approach to patient care. Genomic sequencing has been especially valuable in finding novel therapies for those who have rare cancers, poorer prognoses, and/or whose treatment options have been limited or ineffective *(see Rachael McCleery's story on page 7)*. Advances in precision medicine increase the ability to classify cancers into subpopulations with similar characteristics but different genetics in order to predict better patient outcomes as well as determine individualized cancer therapies.

Helping to ensure continuation of the Cancer Institute's strong leadership and groundbreaking research in the field of precision medicine, the **Omar Boraie Chair in Genomic Science** has been established. Considered the gold standard in higher education, endowed chairs express the commitment of a university to an academic discipline at the highest levels— and ensure its continued support and progression.

New Brunswick developer Omar Boraie, who has a background in chemistry and a long-standing interest in cancer research, has made a $1.5 million pledge to support this endowed chair. Establishment of the Omar Boraie Chair is part of Rutgers University's '18 Chair Challenge' campaign, in which an anonymous donor is providing a $1.5 million match to each of 18 new chairs resulting in a $3 million endowment each.

"Just as the anonymous donor for the '18 Chair Challenge' encouraged others to come forward, I hope my family's pledge will also inspire others to do the same," says Boraie. "Physician-scientists at

Rutgers Cancer Institute of New Jersey Associate Director for Translational Science Shridar Ganesan, MD, PhD (far left in photo above), has been named the Institute's Omar Boraie Chair in Genomic Science, thanks to the generous support of New Brunswick developer Omar Boraie (inset, left) and his family. ■ Above from left: Dr. Ganesan with the Boraie children: Hiam, Wasseem and Sam; and Rutgers Cancer Institute Director Robert DiPaola, MD.

PHOTOS BY: DEBBIE VOGEL

Rutgers Cancer Institute are making significant advances with precision medicine for those patients whose cancers are no longer responsive. Imagine being able to apply that science to ***all*** cancer patients? I am hopeful this pledge will leverage the support of others so that this important work can satisfy and exceed that goal."

"Mr. Boraie has long been an integral part of the development of New Brunswick as the 'Healthcare City.' His desire to support an endowed chair in genomic science will have a lasting impact on cancer research and the treatment of cancer patients not only in and around New Brunswick, but beyond—and we are grateful for his generosity," notes Rutgers Cancer Institute Director **Robert S. DiPaola, MD**.

Shridar Ganesan, MD, PhD, associate director for translational science, chief of molecular oncology and principal investigator of the precision medicine clinical trial at Rutgers Cancer Institute as well as associate professor of medicine and pharmacology at Rutgers Robert Wood Johnson Medical School, has been named to this chair. A medical oncologist internationally regarded as a top academic researcher and leader, Dr. Ganesan came to the Cancer Institute in 2005 from the Dana-Farber Cancer Institute at Harvard Medical School.

"What we have learned through the years is that cancer is not a single disease, but rather a collection of diseases, each with unique features. Instead of determining cancer type only by the organ in which it originates, time-saving genomic analysis opens the door for additional classification by the set of changes present in each cancer, which can guide more precise — or tailored — therapy," notes Ganesan. "I am honored to be named the Omar Boraie Chair in Genomic Science. This pledge will help innovate clinical research to enable new understandings of cancer biology to benefit patients across even the most challenging disease sites, offering renewed hope for cancer patients and their families." ■

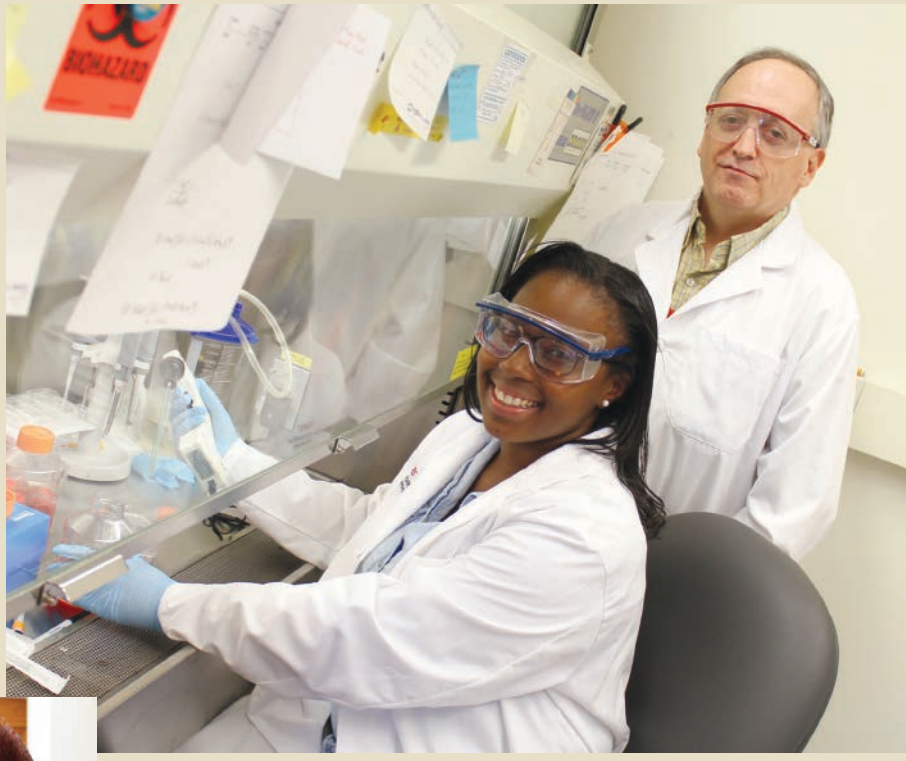
Making A Difference

Sparking Interest

The coveted 'free time' many high school- and college-aged students have after class and during the summer may be devoted to hanging out with friends, working a part-time job or participating in clubs or sports. But for a handful involved in the **CURE** and **CREHST Programs** at **Rutgers Cancer Institute of New Jersey**, this break from the school day means additional instruction time and the opportunity to get a head start on a career in health sciences.

The aim of the **Continuing Umbrella for Research Experience (CURE) Program** is to provide scientific research training and academic and professional enrichment activities to highly-motivated local minority youth. Participants engage in research projects under the guidance of a Cancer Institute faculty mentor. Students are nominated from the 10th and 11th grades of the New Brunswick Health Sciences Technology High School (NBHSTHS) and the first and second year undergraduate class of Rutgers University. Trainees are expected to commit one afternoon per week during the academic year and 37.5 hours per week during the summer to research and program activities.

Participating students say CURE gives them a jump start on academic and career goals. "CURE has allowed me to enrich my knowledge in the sciences and has enabled me to gain hands-on-experience. As a student assistant, I was able to make connections between the topics that I learned in my classes to real-world experiments in the lab. This opportunity has broadened my perspective in the sciences and has provided me with a solid foundation in research, which will be vital as I continue my journey in obtaining a career in the medical field," says Brittany Martinez, a Rutgers undergraduate who started in 2014 and will be with the CURE Program through September 2016.



PHOTOS BY: DEBBIE VOGEL

Above: CURE student Steffany Conyers with Rutgers Cancer Institute researcher and mentor Daniel Medina, PhD. ■ Left: Sunita Chaudhary, PhD, directs the CURE and CREHST Programs.

Esra Abdulrahman, a NBHSTHS student, who also started in 2014 and will continue with the program through June 2016, agrees. "Before joining CURE, the world of research was not very familiar to me. I now know that research is the most groundbreaking opportunity I have ever been offered. I am not able to compare the enjoyment of becoming one with a team of dedicated scientists, spending hours reading on the complexity of cancer, gaining invaluable experience conducting actual experiments, and proudly calling myself a cancer researcher, to any other feeling." Two of Abdulrahman's older sisters who also participated in the program are currently pursuing their undergraduate degrees at Rutgers.

A similarly-designed program is the **Clinical Research Experience for High School Students (CREHST)**. CREHST was developed with the goal of achieving diversity in the biomedical research workforce. Select high school juniors and seniors accepted into the program train alongside physician-scientists at the Cancer Institute and make the same time commitment as CURE students do. The aim of the CREHST Program is to motivate these high school students to pursue college degrees in STEM areas and ultimately choose a career in biomedical research.

"The CREHST Program provides high school students from underrepresented communities with the opportunity to experience how it feels to be in clinical research. The program promotes critical thinking and teamwork and allows the students to explore the hard work that is put into researching different drugs to prevent the spread of cancer. The CREHST Program has been extremely beneficial to me by exposing me to a possible career choice in the medical field," says Mamadi Conteh, who just completed the CREHST Program.

"Both the CREHST and CURE Programs

provide a mechanism to support an earlier link of the educational pipeline for local minority youth, with the ultimate goal of increasing minority representation in health professions for improving access to care and eliminating health disparities in these populations," says **Sunita Chaudhary, PhD**, director of research education at Rutgers Cancer Institute. ■

For additional information about either program, individuals can contact Dr. Chaudhary at: chaudhs4@cinj.rutgers.edu. The CURE program is supported by a grant from the National Cancer Institute (P30CA072720-17S2). The CREHST Program was launched in 2013 with funding from the Rita Allen Foundation. In 2014, the program was supported by the Edward W. and Stella C. Van Houten Memorial Fund.

Protecting Prostate Health

KEITH MUCCILLI

One in six men will be diagnosed with prostate cancer, and it is the most frequently diagnosed cancer in men other than skin cancer, according to the American Cancer Society. That is why **Rutgers Cancer Institute of New Jersey** and its flagship hospital **Robert Wood Johnson University Hospital** teamed up to offer a free prostate cancer education and screening event earlier this fall, to provide men and their families with a better understanding of the disease. Hundreds of men from all over New Jersey attended the event, which has long been supported by the community — including Affinity Credit Union and the Renaissance Community Development Credit Union. Earlier this summer, community leaders gathered at New Brunswick City Hall to learn more and were encouraged by event organizers to be the "feet on the ground" and a "resource to men" in letting their constituencies know about the event. ■

Above, from left: RWJ Community Health Promotion Program Coordinator Yesenia Hernandez; PRAB Chief Executive Officer Jose Montes; Mt. Zion AME Church Senior Pastor Reverend Eric Billips; Cancer Institute urologic oncologist Sammy E. Elsamra, MD; New Brunswick Mayor James Cahill; Cancer Institute Urologic Oncology Chief Isaac Kim, MD, PhD; and RWJ Community Health Promotion Program Director Mariam Merced.

Building Blocks: ***Rutgers Cancer Institute of New Jersey Chief Development Officer Joan Russo (left) and Cancer Institute researcher and Associate Director of Education and Training, Edmund C. Lattime, PhD (second from left) met with Suzana Hot, Esq. and Alexis Tucci, Esq. – trustees of the Jattrude Fogarty Trust – to accept a donation to support breast cancer research at the Cancer Institute. In its aim to fuel innovative study of the disease, the Jattrude Fogarty Trust has contributed more than $700,000 to the Cancer Institute since 1996.***

Making A Difference

Fighting On

Above: Judith and Harvey Shatz ■ Left: Reneé Shatz Amdur

Reneé Shatz Amdur was described as a natural people person with a generous spirit. So it wasn't a surprise to her family when she landed a position as assistant director at Rutgers Hillel, developing programs for students and even personally mentoring them. "Reneé devoted her life to the kids," says her mother, Judith Shatz.

At Rutgers, Amdur made it a priority to help "the kids"—in Hillel and across the university—however she could, often meeting with them one-on-one during rough times. But in 2002, Amdur was forced to deal with adversity of her own when she received a diagnosis of stage IV breast cancer.

She sought treatment at Rutgers Cancer Institute of New Jersey, and even during therapy, kept on thinking of ways to help others. Hoping the outcomes could help someone else, she opted to participate in any clinical trial for which she was eligible, even though she knew there was a risk of side effects and the possibility it may not work for her. After four years of fighting, she lost her battle at age 36. But her family is making sure that her legacy endures.

When Amdur's grandmother asked her what legacy she would like to leave, Amdur responded that she wanted to raise breast cancer awareness among young women. So her grandmother rallied – donating more than $100,000 to help fund the development of BioCONECT (Biology of Cancer Online Education Connecting

IPI PHOTOGRAPHY

Giving LIFE: ***Having raised $5 million through the years for breast cancer programs and other initiatives at Rutgers Cancer Institute of New Jersey, the Val Skinner Foundation held its 16th annual LIFE (LPGA Pros In the Fight to Eradicate breast cancer) charity golf event this past summer and marked the creation of a new grant for Cancer Institute scientists. The Foundation has given $150,000 for the Malaya Southern Kelly grant to be established. Kelly, who passed away in 2014, was honored as a 'LIFE Hero' at the 2013 golf event. The grant will fund efforts in the Cancer Institute's precision medicine program, which aims to personalize cancer treatments through genomic analysis. ■ Above: Veteran LPGA professional Val Skinner (center in black and pink) at the 2015 LIFE Event.***

"For us, supporting education and research is the most inspiring way to give, because we know it's helping others directly," says Harvey Shatz, who along with his wife Judith, is helping to keep the legacy of his daughter Reneé alive by including Rutgers Cancer Institute in their wills to ensure the BioCONECT program continues to raise breast cancer awareness among young people.

Teens) – an innovative high school curriculum supplement for biology and science courses developed by Rutgers Cancer Institute and Rutgers School of Public Health. The curriculum challenges students to apply their knowledge of science, biology, and genetics to breast cancer, learning how the cancer develops, identifying risk factors, and investigating ways to reduce risk. The aim is to not only enhance science literacy, but to also raise breast cancer awareness among teens and emphasize healthy behaviors with long-term benefits.

Amdur's mother and father Harvey have included Rutgers Cancer Institute in their wills to ensure the BioCONECT program continues to raise breast cancer awareness among young people and educate them on the importance of healthy behaviors. "For us, supporting education and research is the most inspiring way to give," says Harvey Shatz, "because we know it's helping others directly." ■

— Reprinted courtesy of Rutgers University Foundation

To learn how to make a tax-deductible gift to support BioCONECT or other programs at Rutgers Cancer Institute of New Jersey, call 848-932-3637 or visit cinj.org/giving.

Walking with a Purpose: ***Participants in the Middlesex County Annual Pancreatic Cancer Run/Walk took time to stretch before heading out on a 5K course this past spring. Sponsored by the Middlesex County Office of Health Services and Middlesex County Board of Chosen Freeholders, the event raised $27,000 this year for pancreatic cancer research at Rutgers Cancer Institute of New Jersey.***

Rutgers Cancer Institute of New Jersey
Network Spotlight

The Rutgers Cancer Institute of New Jersey Network of hospitals spans the state. Network hospitals offer their patients access to the latest cutting-edge cancer therapies and state-of-the-art cancer care available only at NCI-designated Cancer Centers and their networks, while helping patients remain close to home. For more information, visit cinj.org/network.

JFK Medical Center
Targeting Breast Center

As the daughter of a breast cancer survivor, Christine Doda became sensitized to catch any sign of cancer early, and made annual mammographies a regular feature of her health care. **The JFK Breast Center**'s technologically-advanced, patient-centric focus initially drew her there, but the center's rigorous approach is what sealed the relationship for her.

When abnormalities showed up in her most recent ultrasound mammography, she was a bit anxious about needing a biopsy. The biopsy revealed microcalcifications, which are not necessarily dangerous. But when the JFK technicians compared those results to last year's – the number of microcalcifications had increased and were of a concerning shape. They determined a cancer diagnosis of DCIS (ductal carcinoma in situ). While DCIS isn't life threatening, having DCIS can increase the risk of developing an invasive breast cancer later on.

Doda immediately contacted **Renee Armour, MD**, a recent addition to JFK's team of breast surgeons, for a consult. Understanding the anxiety from a cancer diagnosis, Dr. Armour's team made sure Doda was seen quickly to discuss her options. Because of her concerns about recurrence, Doda opted for a mastectomy, which Dr. Armour conducted soon thereafter.

"I was impressed by the Breast Center's technology, yet even more by the people who helped me," recalls Doda. "Talk about thorough – Dr. Armour brought the findings from final pathology to her tumor review board to assess whether I should undergo radiology. My anxiety level was through the roof with a cancer diagnosis, but Dr. Armour and the team understood that, and they've been there for me all the time, explaining my options, the breast reconstruction process and keeping me calm. Now I can go on with my life." ■

INSIGHT PHOTOGRAPHY

"I was impressed by the Breast Center's technology, yet even more by the people who helped me…they've been there for me all of the time, explaining my options… and keeping me calm. Now I can go on with my life," says Christine Doda *(above right)*, with her surgeon, Renee Armour, MD.

Robert Wood Johnson University Hospital
Unveils Laurie Proton Therapy Center

Robert Wood Johnson University Hospital (RWJ) has announced the arrival of the **Laurie Proton Therapy Center** — the first proton beam radiation treatment center of its kind in the New Jersey and New York region. The arrival of proton beam radiation therapy on RWJ's academic medical campus in New Brunswick, represents a significant advance in the range of cancer treatment options that are currently available to New Jersey and New York residents.

Proton Therapy is now part of a comprehensive range of advanced cancer treatment options offered by RWJ in partnership with **Rutgers Cancer Institute of New Jersey**, **Rutgers Robert Wood Johnson Medical School** and private physicians in the community. RWJ New Brunswick is the flagship hospital of Rutgers Cancer Institute.

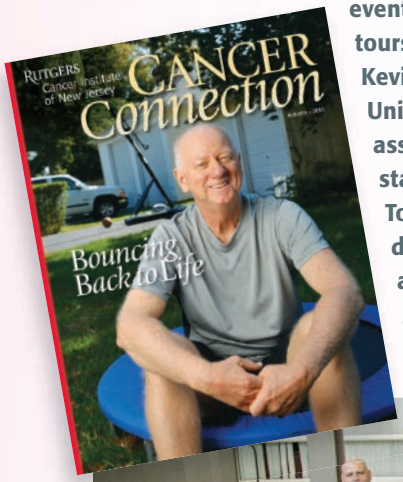
Traditionally, proton therapy systems have had a footprint larger than a football field and cost hundreds of millions of dollars to build and operate. But the traditional model is not financially or spatially accessible for the large majority of cancer treatment sites, which can limit access to this important advance in cancer treatment. Manufactured by Mevion Medical Systems, the MEVION S250 housed at the Laurie Proton Therapy Center on RWJ's academic medical campus is 75 percent smaller, uses 90 percent less energy, and has significantly lower capital and operating costs than traditional systems. Proton therapy provides targeted treatment to cancer cells and causes less damage to surrounding healthy tissues than photon radiation, making it an alternate option for pediatric and adult patients with tumors in sensitive locations, such as near the heart, brain and spine.

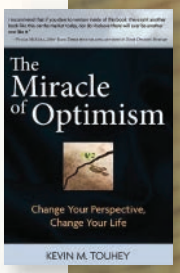
"Proton therapy is an excellent addition to the breadth of cancer treatment destination therapies that are available through our hospital in partnership with Rutgers Cancer Institute of New Jersey and Rutgers Robert Wood Johnson Medical School and private physicians in the community," said **Stephen K. Jones, FACHE**, president and chief executive officer of RWJ and Robert Wood Johnson Health System. ■

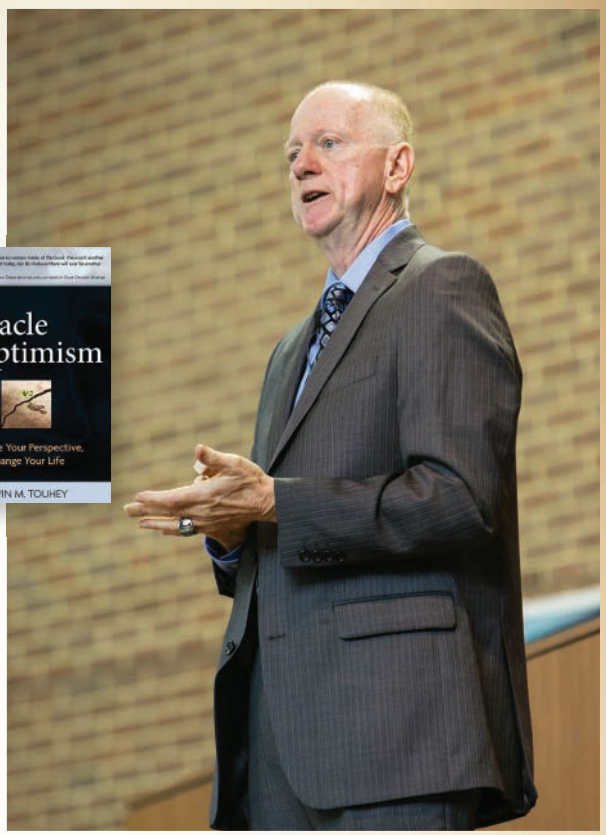
Survivors' CORNER

Still – Bouncing Back to Life

It was a special reunion this past June at Rutgers Cancer Institute of New Jersey's annual Survivors Day event, which featured laboratory tours and motivational speaker Kevin Touhey, who is a former University of Pennsylvania assistant basketball coach and stage IV lung cancer survivor. Touhey shared the ups and downs of his journey and discussed his book *Miracle of Optimism* with attendees. ■







PHOTOS BY KIM SOKOLOFF

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Rutgers Cancer Institute of New Jersey is a team of internationally recognized physicians and researchers driven by a singular focus and mission …
TO FIGHT CANCER.

We are New Jersey's only National Cancer Institute-designated Comprehensive Cancer Center with the expertise and resources to transform innovative research and clinical trials into advanced comprehensive care for our patients. We transform our laboratory discoveries into personalized, patient specific medicine.

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A BOLD Experience

More than 55 high school students spent a week at Rutgers Cancer Institute of New Jersey for the BioCONECT Oncology Leadership Development (BOLD) camp this past summer. Through lectures, games, and interactive demonstrations, the students learned about cancer biology and careers in the oncology field.
Learn more about the BioCONECT program on page 28.

PHOTO BY: DEBBIE VOGEL