

RUTGERS

Cancer Institute
of New Jersey

Summer ■ 2016

CANCER *Connection*



Enlisting a New Army:

*Using the body's own
defenses, immunotherapy
is helping Gemma
McMillan battle
stage IV lung cancer.*

Director's Corner



NICK ROMANENKO

Known as the 'Father of Western Medicine,' the Greek physician Hippocrates once said, "It is more important to know what sort of person has a disease than to know what sort of disease a person has." As you'll read in this edition of *Cancer Connection*, patients at Rutgers Cancer Institute of New Jersey are treated with a very individualized approach, as modern medicine no longer reflects a 'one size fits all' mentality.

Our cover story features Gemma McMillan, who took to gardening in her retirement and flew frequently

from her native Trinidad to New Jersey to see her daughters. When a large tumor on her buttocks during a family visit revealed a diagnosis of advanced-stage lung cancer, Rutgers Cancer Institute's Co-Director of Thoracic Oncology Joseph Aisner, MD, immediately thought of a clinical trial testing an immunotherapy drug that has been yielding positive outcomes with few side effects. This treatment helped McMillan's body use its own defenses to fight the cancer and she's back to her active lifestyle.

When Marcia Bird experienced a recurrence of her endometrial cancer, she knew she didn't want to endure chemotherapy again. Physicians in the Gynecologic Oncology and Phase I/Investigational Therapeutics Programs teamed up to find the right clinical trial for her with a form of immunotherapy. After seeing a rapid, durable re-

sponse, investigators wanted to know more. In enlisting the help of the Precision Medicine Program and having Bird's tumor undergo genomic sequencing, the team found that the presence of a particular mutation may help identify a subset of cancers that can be targeted with immunotherapy drugs (*page 11*). Precision medicine and DNA sequencing efforts also are having an impact on Yehudis Storch, who at age 16 is battling advanced stage colon cancer. A revelation of certain mutations in her cancer helped the pediatric hematology/oncology team identify a combination of drugs that is helping this patient feel a little more like a teen again (*page 16*).

The advances being made through our Precision Medicine Program don't come through science alone. Thanks to a \$10 million anonymous gift to the program and funding from a number of philanthropic and community supporters, including the Val Skinner Foundation, Hugs for Brady Foundation and Kier's Kidz, more personalized treatment opportunities exist for both adult and pediatric cancer patients than ever before. Collaboration in precision medicine continues to grow under Vice President Biden's 'moonshot initiative' and even through ORIEN—the Oncology Research Information Exchange Network—of which Rutgers Cancer Institute is a part along with other cancer centers across the country. This leaves us hopeful that approaches such as precision medicine and immunotherapy are helping us turn the corner on cancer. We value your continued support of our efforts.

Sincerely,

Bruce G. Haffty, MD

Interim Director

Rutgers Cancer Institute of New Jersey

RUTGERS

Cancer Institute
of New Jersey

Bruce G. Haffty, MD
*Interim Director
and Chair, Radiation Oncology*

Joseph R. Bertino, MD
Chief Scientific Officer

Kevin Coyle
Chief Financial Officer

Shabbar Danish, MD
Chief, Neurosurgical Oncology

Todd Demmy, MD, FACS, FCCP
*Chief, Thoracic Oncology and
Associate Chief Surgical Officer*

Richard Drachtman, MD
*Interim Chief, Pediatric
Hematology/Oncology*

David J. Foran, PhD
*Chief Informatics Officer and
Executive Director, Bioinformatics
and Computational Imaging*

Shridar Ganesan, MD, PhD
*Associate Director for Translational
Science and Chief, Molecular Oncology*

Susan Goodin, PharmD
Executive Director, Statewide Affairs

Howard L. Kaufman, MD, FACS
*Associate Director for Clinical
Science and Chief Surgical Officer*

Isaac Yi Kim, MD, PhD
Chief, Urologic Oncology

Edmund C. Lattime, PhD
*Associate Director for
Education and Training*

Sharon Manne, PhD
*Associate Director for
Cancer Prevention, Control
and Population Science*

Janice Mehnert, MD
*Director, Phase I/Investigational
Therapeutics*

Lorna Rodriguez, MD, PhD
*Director, Precision Medicine
and Interim Chief,
Gynecologic Oncology*

Karen Shapiro, MBA, MPH
Chief Operating Officer

Roger Strair, MD, PhD
*Chief, Hematologic Malignancies
and Blood and Marrow
Transplantation*

Antoinette M. Stroup, PhD
*Director, New Jersey State
Cancer Registry*

Linda Tanzer
*Chief Administrative Officer
and Associate Director for
Administration and Planning*

Deborah L. Toppmeyer, MD
*Chief Medical Officer and
Chief, Solid Tumor Oncology*

Eileen White, PhD
*Deputy Director and
Associate Director for
Basic Science*

Steven Zheng, PhD
*Division Chief,
Cancer Pharmacology*

CANCER Connection

Summer ■ 2016



In This Issue ■ Features:

6 New Army of Cancer Fighters

Having had a long career in corporate finance, Gemma McMillan had seen many challenges, but none as difficult as stage IV lung cancer. With the help of a new immunotherapy treatment at Rutgers Cancer Institute of New Jersey, it was a challenge she was able to meet.

By Michele Fisher

11 Working Backward

When researchers at Rutgers Cancer Institute of New Jersey learned of Marcia Bird's response to investigational treatment for a recurrence of endometrial cancer, they were intrigued. They saw the response, then asked the question – and found out more than what they were looking for.

By Michele Fisher

16 Fighting a 'One in a Million' Cancer

Affecting mostly adults, colon cancer is not widely studied in pediatric patients. Research shows 159 children were diagnosed with the disease between 1973 and 2005 – less than one in a million. Battling this 'one in a million' cancer with the help of Rutgers Cancer Institute of New Jersey is 16-year-old Yehudis Storch.

By Mary Ann Littell

■ Departments:

2 Forefront

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

22 Making a Difference

News on how giving and service are making a difference in the fight against cancer at Rutgers Cancer Institute of New Jersey.

26 Network Spotlight

News from our Network hospitals around the state.

28 Survivor's Corner

The financial challenges that accompanied Karla Guillen's breast cancer journey were unexpected, but the Social Work Department at Rutgers Cancer Institute of New Jersey was there to find her the help she needed.

Forefront

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

Helping Caregivers Deal with Stress

Research from an investigator at **Rutgers Cancer Institute of New Jersey** and colleagues from other facilities across the country shows a stress management and coping intervention designed for parents of children undergoing a stem cell transplant had beneficial effects in reducing caregiver distress during the hospitalization period as compared with a minimal care control condition.

Parents of transplant recipients under age 19 that received the P-SCIP intervention reported greater reductions in anxiety, depression, and traumatic distress as compared with parents in the usual care condition. ... “These findings suggest that our intervention had an impact when primary caregivers were experiencing high levels of trauma and stress — during the time of the actual transplant and hospitalization,” notes Sharon Manne, PhD, Rutgers Cancer Institute Associate Director for Cancer Prevention, Control and Population Science, and lead author.

Undergoing a stem cell transplant is a universally taxing physical and emotional stressor for both the child having the transplant as well as the parent providing care to the child. The risk for both long- and short-term medical complications such as infection and/or graft-versus-host disease is high. The experience can result in decrements in both



parent and child quality of life in the decades following this treatment. Moreover, the risk of the child's death as a result of the transplant or a recurrence of the original disease is significant.

Between 2008 and 2013, 218 parents of transplant recipients under age 19 were consented to receive the intervention, called P-SCIP. P-SCIP consisted of five, one hour, in-person sessions over a two-to-three week period following the transplant in which parents learned effective ways of coping with the experience. They were given practice assignments and provided a DVD which reviewed session content. Parents in the usual care condition received an informational DVD and a pamphlet about common concerns of caregivers and children during transplant.

Results indicate parents receiving P-SCIP reported greater reductions in anxiety, depression, and traumatic distress as compared with parents in the usual care condition. These reductions were most notable immediately after the intervention, when the child was

still hospitalized. Long-term reductions in traumatic distress were noted for parents who were most anxious before the transplant, as well as among parents whose children developed graft-versus-host disease.

“These findings suggest that our intervention had an impact when primary caregivers were experiencing high levels of trauma and stress — during the time of the actual transplant and hospitalization and that the intervention was more beneficial for specific subgroups of caregivers,” notes Rutgers Cancer Institute Associate Director for Cancer Prevention, Control and Population Science **Sharon Manne, PhD**, who is also a professor of medicine at Rutgers Robert Wood Johnson Medical School, and lead author. ■

This research was supported by a National Cancer Institute grant (CA127488) to Dr. Manne and was published in the February 25, 2016 issue of ‘Journal of Consulting and Clinical Psychology’ (<http://dx.doi.org/10.1037/ccp0000087>).

Examining Race in Lung Cancer

Lung cancer is the leading cause of cancer deaths in the United States and has a poor five-year survival rate. This in part can be attributed to the disease being diagnosed at a later stage. African Americans have a higher chance of developing lung cancer and have lower lung cancer survival rates as compared to European Americans, which research shows may be due to differences in genetics, environment or modalities of care. Identification of biomarkers that would uniquely distinguish African Americans at a high risk



of lung cancer may help to bridge the gap in lung cancer racial health disparities.

Research from **Rutgers Cancer Institute of New Jersey** scientist **Sharon R. Pine, PhD**, and colleagues from the National Cancer Institute (NCI) and other facilities, shows differences in a type of small protein known as a cytokine vary by race and may contribute differently to the development of lung cancer in African Americans and European Americans. The team

analyzed the levels of ten serum cytokines in blood samples from more than 450 African-American and European-American lung cancer patients or healthy adults. They found the levels of six cytokines were significantly higher among European Americans than African Americans. The levels of two cytokines were associated with lung cancer in both races, but other elevated cytokine levels were associated with lung cancer only in African Americans.

"These findings suggest that cytokine levels in the blood vary by race and may contribute to lung cancer differently between African Americans and European Americans. While additional work would be needed to confirm the results, the data suggest that testing for these cytokines could help identify African Americans who are at an increased risk of developing lung cancer," notes Dr. Pine, who is also an assistant professor of medicine at Rutgers Robert Wood Johnson Medical School and co-lead author of the research. ■

The research was supported by the Intramural Research Program of the National Institutes of Health (NIH), NCI, Center for Cancer Research; Prevent Cancer Foundation; NIH grant R01CA060691, NIH contracts N01-PC35145 and P30CA22453; and NIH grant K07CA125203. It was published in the March 4, 2016, edition of 'Cancer Epidemiology, Biomarkers & Prevention' (<http://www.ncbi.nlm.nih.gov/pubmed/26711330>).

Guarding the Guardian

The p53 gene is known as the "guardian of the human genome" in that it recognizes cellular stress and stops cell proliferation by either allowing the cell to recover from the stress or activating a protein that induces a program to kill the cell if the damage can't be repaired. The loss of this function can result in cancer cells escaping a controlled environment and multiplying throughout the body. A **Rutgers Cancer Institute of New Jersey** researcher continues to make scientific advances in targeting this gene, which is the most commonly mutated gene in human cancer.



JODY SOMERS

Previous research by surgical oncologist **Darren R. Carpizo, MD, PhD** (above), identified a drug compound that restores the tumor suppressor function of the gene by targeting a common p53 mutation. He was recently awarded a \$1.8 million grant (R01-CA200800) from the National Cancer Institute to build upon that work. The aim is to provide the foundation for the development of a new class of anti-cancer drugs that will target p53, resulting in broad activity against all cancer types.

In the next phase of research, Dr. Carpizo, who is an associate professor of surgery and pharmacology at Rutgers Robert Wood Johnson Medical School, aims to further study the mechanism behind the drug compound, known as a zinc metallochaperone. He also plans to investigate other similarly acting p53 mutations, as this will increase the potential pool of patients that could possibly benefit from this novel type of drug compound. ■



DEBBIE VOGEL

Rahul R. Parikh, MD, is a radiation oncologist and co-director of proton beam therapy at the Laurie Proton Center at Rutgers Cancer Institute of New Jersey and Robert Wood Johnson University Hospital (RWJ). An assistant professor of radiation oncology at Rutgers Robert Wood Johnson Medical School, Dr. Parikh integrates his expertise throughout multidisciplinary programs including his specialty in lymphoma and hematologic malignancies.

After

graduating from Albany Medical College in New York with a 'Distinction in Research,' Dr. Parikh completed his internship with Rutgers Robert Wood Johnson Medical School in internal medicine followed by his residency in radiation oncology with Rutgers Robert Wood Johnson Medical School and Rutgers Cancer Institute where he was appointed chief resident.

While continuing to develop his passion for research and treatment, Dr. Parikh was appointed assistant professor of radiation oncology and director of proton beam therapy at Icahn School of Medicine at Mount Sinai in New York City. During this time, he published frequently and engaged further in cutting-edge treatments, such as proton therapy, for various disease sites, including lymphoma, pediatrics, skull based tumors, and benign and malignant brain tumors. Dr. Parikh recently returned to Rutgers where he continues to grow and develop his clinical practice. He was recently appointed chair of the Cancer Committee within RWJ and Rutgers Cancer Institute.

A frequent speaker at hospital and cancer center grand rounds, as well as numerous national and international venues, Dr. Parikh also holds several leadership roles within professional organizations including the American Society for Radiation Oncology, the International Lymphoma Radiation Oncology Group, the Particle Therapy Co-Operative Group, and the American Radium Society.

Q: What do you hope to accomplish in your new role as Cancer Committee Chair?

A: I hope to continue to integrate the multi-disciplinary efforts of RWJ and Rutgers Cancer Institute. I also would like to employ a provider/institution-reported outcomes database through a transparent, patient-friendly environment that portrays institutional outcomes on several cancer disease sites. Having such information more readily available, and in one location, will help better inform clinical decision making.

Q: What are some of your other aspirations with respect to the field?

A: Academically, I hope to continue to actively support our ongoing clinical trials, particularly within hematologic malignancies and genitourinary malignancies. I also would like to see modern radiation oncology modalities, such as proton beam therapy, take center stage as the most innovative and sophisticated treatment options available in the world. This is a very exciting time for a young faculty member like myself, as the genomics of cancer medicine and every tool imaginable are at my fingertips to apply to what used to be just an ordinary patient encounter.

Q: As someone early on in his career paving the way for new approaches to medicine, who inspires you?

A: As a husband of a practicing radiation oncologist, and a father of a young daughter who can't seem to keep her "play" stethoscope down, family is forever inspiring. But at work, it is the young lymphoma patient, who endures months of painful systemic chemotherapy and radiation therapy, and comes to her annual visit two years later, now cancer-free, and with her 1 month old baby. ■

CANCER Connection

is published by
Rutgers Cancer Institute of New Jersey's
Office of Communications and Public Affairs
195 Little Albany Street • New Brunswick
New Jersey • 08903

Phone: 732-235-7940 • cinj.org

Director of Communications and
Public Affairs / Executive Editor:
Candace E. Botnick, MS

Managing Editor / Writer: Michele Fisher

Contributing Writer: Mary Ann Littell

Cover Photo: Nick Romanenko

Design: Barbara Walsh Graphic Design

Exploring Ovarian Cancer

According to the American Cancer Society, more than 22,000 new cases of ovarian cancer are expected in 2016 with 14,200 deaths. Ovarian cancer accounts for five percent of cancer deaths among women in the United States, causing more deaths than any other gynecologic cancer. Treatment typically includes surgery and chemotherapy. Targeted therapies have been used following standard treatment for ovarian cancer, but there has been little success in their use.

Rutgers Cancer Institute of New Jersey researcher **Michael L. Gatz, PhD** (below), has received a \$747,000 Pathway to Independence Award (R00-CA166228) from the National Cancer Institute to explore the mechanism behind the development of a



DEBBIE VOGEL

sub-type of ovarian cancer known as high-grade serous ovarian cancer. The aim is to identify what drives cell pathway activity so that novel therapeutic strategies

can be developed to treat this disease.

In this work, Dr. Gatz will analyze multiple forms of genetic data from human tumors in order to identify mutations and alterations that regulate oncogenic signaling, tumor development and progression, and response to therapy. "By identifying those genes and mutations that are required for tumor cell growth, we hope to translate these findings into the clinic by identifying biomarkers that can predict response to current therapies and identify new targets which could be used to develop new drugs and personalized therapeutic strategies," notes Gatz, who is part of Rutgers Cancer Institute's Genome Instability and Cancer Genetics Research Program and is an assistant professor of radiation oncology at Rutgers Robert Wood Johnson Medical School. ■

Clinical Trials Corner:

Making PROGRESS

The System Partner of Rutgers Cancer Institute of New Jersey, **Meridian Health** has joined with Rutgers Cancer Institute in offering access to a research study aimed at prostate cancer patients who are transitioning to survivorship. The research compares the effectiveness of print versus online materials in helping these patients cope with treatment related and psycho-social challenges once therapy has ended. Using results from the investigation—known as the **Prostate Cancer Online Guide and Resources for Electronic Survivorship Service (PROGRESS) trial**—researchers aim to understand which resource is more helpful to prostate cancer patients in adapting to life after treatment.

Following treatment for prostate cancer, a number of patients may experience difficulty with urinary and sexual functions and may be concerned with disease recurrence and how to handle follow-up medical care. Print educational materials are a main resource often given to patients to help address these issues. In the PROGRESS study, investigators are examining how prostate cancer survivors respond to web-based delivery of education materials using online-based elements including animation and videos of prostate cancer survivors and healthcare providers answering frequently asked questions.

Study participants will be placed into one of two groups. One group will receive printed materials that provide information on topics related to adapting to life after prostate cancer. Those in the second group will receive access to a web-based, virtual resource center designed as part of the



study to assist prostate cancer survivors. Participants will be contacted four times over a six-month period to complete follow-up assessments of the print or web material. The assessments—which will measure the effectiveness of these materials—will be conducted online, via mail or over the phone.

Individuals who have been diagnosed with prostate cancer and have undergone a radical prostatectomy and/or radiotherapy in the last year are eligible to participate, though other criteria also must be met. Within the Meridian system, patients will be referred from **Jersey Shore University Medical Center, Ocean Medical Center, Riverview Medical Center, Southern Ocean Medical Center, and Bayshore Community Hospital. Raritan Bay Medical Center** recently became part of Meridian Health and will soon be participating in clinical trials. *The study is sponsored by the National Cancer Institute and Rutgers Cancer Institute.* ■

For additional information on how to participate, individuals should call 732-743-3205. To learn more about other clinical trials at Rutgers Cancer Institute, visit cinj.org/clinical_trials.



New Army of Cancer Fighters

Being “female and a woman of color,” 70-year old **Gemma McMillan** remembers overcoming a number of challenges to climb the corporate ladder at the former Chase Manhattan Bank during a career with the company that spanned 35 years. She started with the financial giant as a secretary, taking on several roles through the years including positions in management and ending as a vice president of human resources in the Edison, New Jersey office when she retired 15 years ago. In the tumultuous corporate environment of restructuring, performance management and downsizing, she operated in a no-nonsense fashion and gained a unique strength and positive attitude that helped her “get the job done.” It’s that same strength she summoned and heavily relied upon when she was met with a diagnosis of stage IV lung cancer. She didn’t know it at that moment, but that resilience, coupled with advances being made at Rutgers Cancer Institute of New Jersey with a new form of cancer treatment known as immunotherapy, would help her face that challenge head on.

BY MICHELE FISHER • PORTRAITS BY NICK ROMANENKO



Early in her retirement, Gemma McMillan fulfilled a promise to her mother and moved back to her native

Trinidad, an island nation off the coast of Venezuela – a place she had not spent any significant amount of time since her childhood. After traveling for so many years for work and keeping up a frenetic pace with the banking industry, McMillan embraced the laid back culture of the island – lunching with friends, meticulously designing her own garden and renovating her “dream home.” McMillan had settled comfortably, even traveling every four months back to New Jersey to see her two daughters and son-in-law. “We’re a very close family,” notes McMillan. Because she visited so frequently, she continued to see her New Jersey doctors for checkups.

During a visit with her daughters in the fall of 2014, McMillan felt a “knot” on the left side of her buttocks. Active and fit, she thought she may have pulled a muscle during a workout. “After a while, I

couldn’t sit on that side. It was very uncomfortable.” The “knot” turned out to be a grapefruit-sized tumor underneath the surface. Her primary care physician decided surgery was needed. During pre-surgical testing, an X-ray showed a growth on her lung. At that point she was referred to Vadim Koshenkov, MD, a surgical oncologist at Rutgers Cancer Institute of New Jersey and assistant professor of surgery at Rutgers Robert Wood Johnson Medical School, who ordered a needle biopsy on both the affected areas on her buttocks and her lung. It was Dr. Koshenkov who delivered the news that McMillan had an adenocarcinoma most consistent with stage IV lung cancer that had spread to her pelvic lymph nodes and buttock.

Handling the Unexpected

Being relatively healthy her entire life, with the exception of high blood pressure and a thyroid condition,

and having no family history of cancer, McMillan was stunned. “I didn’t even have any issues leading up to finding the growth on my buttocks. I felt fine,” she says. Ironically, she had quit a 30-year smoking habit just six months earlier. While there is no way to know that smoking caused McMillan’s lung cancer, it is known as a major contributing factor to the development of the disease.

According to the National Cancer Institute, the overall five-year survival rate for lung cancer is 17 percent. The five-year survival rate for advanced stage lung cancer that has spread to other parts of the body, as in McMillan’s case with stage IV, is only about four percent. While chest X-rays, low-dose spiral CT scans and sputum cytology (viewing a phlegm sample under a microscope to check for cancer cells) are used to check for signs of lung cancer, more than half of all cases (64 percent) are diagnosed in an advanced stage, which can provide

treatment challenges.

Upon hearing the diagnosis, “I remember saying to my daughters, ‘at least you’re grown,’ and I just went into a complete fog,” recalls McMillan. Her thoughts then turned to her home in Trinidad and the prospect of selling it in order to be available for treatment in the United States. Managing that process took her mind off the “reality” of what was happening.

After receiving the news, McMillan’s daughter Nicole, a nurse



“In oncology, determining a course of treatment used to be like ordering from a menu — one from column A, one from column B and C. It was all empiric — we were trying to see what happened. Now, treatments have become more rational, derived from the ever-increasing science over the past 30 years,” notes Gemma McMillan’s doctor, Rutgers Cancer Institute medical oncologist Joseph Aisner, MD (above).



practitioner, stepped in and started inquiring about clinical trials. Koshenkov discussed McMillan's case with Joseph Aisner, MD, co-director of the Lung Cancer/Thoracic Oncology Program at Rutgers Cancer Institute, who thought she might be a good candidate for a clinical trial involving the immunotherapy drug avelumab. The drug is considered "investigational" – meaning it has not been approved by the U.S. Food and Drug administration. It is undergoing testing for safety and effectiveness.

Gemma McMillan encourages others to inquire about clinical trials. "All results are not the same for everyone, but if there is a clinical trial, don't turn it down. It's a chance. If it doesn't work, there are other options," she shares. She had never heard of immunotherapy prior to her treatment.

A New Defense

Immunotherapies are a new class of drugs that harness the body's own immune defenses to fight off disease.

T cells are a form of white blood cell that help the body combat infection, including cancer. A receptor known as programmed-death 1 (PD-1) is found on the surface of T cells. When this receptor binds with a protein called programmed-death ligand 1 (PD-L1), T cells are switched off, thus halting their ability to fight cancer cells. Immunotherapy agents block this interaction so that T cells can get back to work to naturally defend the body. Avelumab is a PD-L1 antibody currently being tested in phase I clinical trials for bladder, stomach, ovarian, kidney, and head and neck cancers, as well as mesothelioma. It is also being tested for non-small cell lung cancer and a form of melanoma known as Merkel cell carcinoma in more advanced trials. At Rutgers Cancer Institute, Dr. Aisner is the sub-investigator in a multi-national, phase I clinical trial examining avelumab in patients with locally advanced solid tumors or with tumors that have spread beyond the initial tumor site. With Rutgers Cancer Institute having the second largest patient accrual to the lung cohort with this trial, Aisner and team had the opportunity to see how this form of immunotherapy affects this particular population, even before offering chemotherapy.

"In oncology, determining a course of treatment used to be like ordering from a menu — one from column A, one from column B and C. It was all empiric — we were trying to see what happened. Now, treatments have become more rational, derived from the ever-increasing science over the past 30 years. Oncology research is driven by rational endpoints, and now there are rational ways of determining the best therapies," shares Aisner.

Instead of focusing on standard treatments for lung cancer, including platinum-based chemotherapy, Aisner explained to McMillan about the mechanism of action of avelumab. McMillan had never heard of immunotherapy up until this point. "I said 'why not?' I had full faith in Dr. Aisner," says McMillan. The physician scientist also explained that with this particular drug, in many cases, side effects were minimal to none.

McMillan notes the hardest part was the wait between the diagnosis and the start of the clinical trial, as she needed to undergo the necessary pre-testing to see if she was a candidate for the trial. Daughter Michelle — a licensed clinical social worker — helped her through some tough days by listening and providing guidance. McMillan continued to draw upon the strength gained through life

experiences and kept a positive attitude. "Being positive is so important. You have to fight this thing mentally." McMillan met the criteria and was accepted into the trial.

A Positive Outlook

After her first treatment, an infusion given over about an hour, she had a brief sharp pain at the tumor site on her buttocks, "I just thought it was the treatment doing its job." She recalls it was nothing significant and she continued to receive the infusion every two weeks with CT scans and electrocardiograms every six weeks to check her progress. After receiving the second dose, she was able to sit normally. By the fourth dose, McMillan was back to gardening. Aisner was elated with the response. "Each time we did a CT scan, the tumors on her buttock and lung got progressively smaller, and the masses in her lymph nodes disappeared," he says.

For McMillan, the simple act of being able to sit upright again meant a great deal. In March 2016, she was told her tumors had disappeared. She has not experienced any side effects up until this point and because of that is grateful that this was the treatment regimen recommended for her. McMillan will continue to receive the treatment through the spring of 2017. As far as the effect of the therapy beyond conclusion of her participation in the trial, Aisner says there is no firm answer. "We are now starting to see study results on those patients who completed similar treatment. Some patients, who after two years of completing therapy, show no signs of recurrence. And there are some four years post treatment that have not experienced a recurrence," he notes.

McMillan encourages others to inquire about clinical trials. "All results are not the same for everyone, but if there is a clinical trial, don't turn it down. It's a chance. If it doesn't work, there are other options," she shares. Once her treatment is completed, McMillan is looking forward to relocating to Florida. "It's just one day and one step at a time. Life is a journey," she projects. It's a journey she feels positive about thanks to the promise of immunotherapy — results Aisner and colleagues are happy to help bring forth. "With research, we need to continually ask ourselves 'how can we do better than we've done before?' and 'can we give patients a better quality of life and a longer life?'" notes Aisner. In McMillan's case, with immunotherapy, researchers are achieving those goals. ■



BY MICHELE FISHER

Working Backward

When researchers at Rutgers Cancer Institute of New Jersey learned of *Marcia Bird's* response to investigational treatment for a recurrence of endometrial cancer, they were intrigued. "We saw the response, then asked the question – and found out more than what we were looking for," recalls *Janice M. Mehnert, MD*, director of the Phase I/Investigational Therapeutics Program at Rutgers Cancer Institute of New Jersey. What they learned was that the presence of a particular mutated enzyme may help identify a subset of cancers that are more responsive to new forms of cancer treatment known as immunotherapy.

PORTRAIT BY NICK ROMANENKO



In 2010 when Marcia Bird experienced some slight, irregular gynecologic issues, she thought it may be related to menopause — after all, she had just turned 50. Busy with life as an instructor and administrator for the Cosmetology Program at Raritan Valley Community College and keeping up with friends, family and her tennis game, Bird didn't think much of it at the time. But by the summer of 2011 she was met with a diagnosis of stage IB endometrial cancer, a disease that affects the inner lining of the uterus and is the fourth most commonly diagnosed cancer among women in the United States, according to the National Cancer Institute. Stage IB means the cancer has spread to the muscle layer of the uterus. Treatment runs the gamut, and the disease is largely curable. After having a hysterectomy, chemotherapy and radiation, followed by clear scans through 2013, Bird thought the disease was behind her. She even enrolled in a support program for cancer survivors. It was a devastating blow to learn the cancer had metastasized to her neck and pelvic lymph nodes in the spring of 2014, and she found herself again trying to determine the appropriate therapy and where.

After doing extensive research and visiting various cancer centers and hospitals in New Jersey, New York and New England, she decided to remain in the region, close to her Somerset County home. "I only had three options," recalls Bird. "I could undergo the same chemother-

"I told the doctors 'I don't want to look sick, and I don't want to feel sick anymore,'" recalls Marcia Bird when first considering a clinical trial at Rutgers Cancer Institute. She feels grateful a clinical trial that was the right fit was available to her—and so close to home: "I am amazed that my case may be able to help others and take scientific research in this area to the next level."

apy treatment, try different chemotherapy or look for a clinical trial." She describes her initial chemotherapy regimen as "very aggressive," and due to hair loss and other side effects, "I knew I didn't want to go through that again. I had to believe there were other opportunities." Understanding that Bird did not want to endure additional chemotherapy, her oncologist strongly recommended that she have access to a clinical trial with the potential for a different form of treatment — she was referred to Rutgers Cancer Institute of New Jersey. "I told the doctors 'I don't want to look sick, and I don't want to feel sick anymore,'" Bird explains. Because of the comprehensive nature of Rutgers Cancer Institute, the Gynecologic Cancer Program and the Phase I/ Investigational Therapeutics Program worked together to find the right clinical trial for Bird.

Taking Aim

Immunotherapies, which manipulate parts of the immune system to attack cancer, represent a major advancement in cancer therapeutics which has now become an important cornerstone in the treatment plan of many patients. Therapies which target the programmed cell death protein one (PD-1), which is found on the surface of T cells, have been approved by the U.S. Food and Drug Administration for several tumor types, including melanoma and lung cancer. The Phase I team at Rutgers Cancer Institute was among the first to test the PD-1 inhibitor pembrolizumab in multiple rare tumor types as part of a clinical trial.

Pembrolizumab works by blocking the interaction between PD-1 and another protein known as PD-L1. The PD-1/PD-L1 interaction functions to keep the immune system in check, normally to avoid a hyperactive immune system that could cause autoimmune problems in healthy patients. However, in cancer patients, giving pembrolizumab can energize the immune system in a fashion that promotes destruction of tumor cells. Because pembrolizumab disrupts the PD-1/PD-L1 immune “checkpoints,” it is part of a classification of drugs known as immune checkpoint inhibitors.

New studies, including those at Rutgers Cancer Institute, are examining the impact of pembrolizumab in other tumors. Investigators also are taking a look at what happens if other drugs are added. “Is combination therapy the way to go? Possibly, but it is often associated with greater toxicities and financial cost. If you can find out up front which patients will respond to single-agent therapy, thus sparing them the need to have a second medication added to their treatment plans, that would be clinically meaningful,” says Dr. Mehnert, who is also an associate professor of medicine at Rutgers Robert Wood Johnson Medical School. But in order to do that, she says, biomarkers predicting response to immunotherapy need to be identified.

Research shows that patients whose tumors demonstrate higher PD-L1 expression may have a higher chance of responding to immune checkpoint therapies. With that, high expression of PD-L1 is being explored as a potential predictor of response to treatment, but Mehnert notes it is not that simple. “PD-L1 is tough to measure – it’s a challenging biomarker with no standardized method of assessment in existence. The research community agrees that high PD-L1 expression likely enriches the chances of response to therapy, but there’s more to it.” Because Bird’s tumors were found to have a high level of PD-L1 expression, she was eligible for one of the clinical trials examining pembrolizumab for patients with endometrial cancer. She was enrolled and began taking the study drug once every two weeks through an infusion that lasts approximately one hour.

Game Changer

Bird had been trying to keep up with her regular tennis game, even during treatment, having been playing the sport since college. “The ladies in the group that I play in were wonderful in trying to get me out there and keep me going, even if it was just for a short time,” she says. But the swelling in her ankles and lower extremities made it challenging to keep up. Therefore, she was thrilled when the swelling subsided after a few weeks on treatment, as it meant a return to her regular neighborhood game and some tournament play and more long walks with husband Eric and their dog Misty. A partial response was noted on CT scans performed after eight weeks of therapy, which was “very impressive” according to Mehnert, “It was the quality of the response that was unique in



“We’re managing the patient’s disease like a chronic illness, like diabetes, for instance. And that means an improved quality of life,” says Janice M. Mehnert, MD, director of the Phase I/ Investigational Therapeutics Program at Rutgers Cancer Institute, reflecting on a new class of drugs known as ‘checkpoint inhibitors.’

Adding to the Arsenal

According to the Centers for Disease Control and Prevention, 71,500 women are diagnosed with a gynecologic cancer each year in the United States. “Unfortunately, due to the lack of screening mechanisms for many gynecologic cancers, they are often diagnosed in an advanced stage, thus leading to poor treatment response with standard therapies in many cases. With that, it is imperative to identify alternate therapies for this population,” notes Rutgers Cancer Institute of New Jersey Precision Medicine Director **Lorna Rodríguez, MD, PhD**, who is a professor of obstetrics, gynecology and reproductive sciences at Rutgers Robert Wood Johnson Medical School. Dr. Rodríguez and colleagues recently examined the delivery of point-of-care management to patients with gynecologic malignancies through comprehensive genomic profiling and found this process can help identify alternate and targeted treatments.

As part of an ongoing clinical trial at Rutgers Cancer Institute exploring rare and poor prognosis cancers, investigators sought to identify genomic alterations in 69 patients with gynecologic cancers that were not responding to standard care. In collaboration with Foundation Medicine, Inc., tissue specimens were analyzed through Next Generation Sequencing technology. Study outcomes for 64 of the cases were available and showed an average 4.97 genomic alterations per tumor.

These abnormalities were reviewed by a panel of clinicians, scientists, statisticians, pathologists and other experts collectively known as a molecular tumor board. Either potential enrollment in a clinical trial, treatment with already-approved cancer therapies or treatment with therapies approved for other uses were considered and recommended to the treating physician. Thirty-nine percent of those patients had those recommendations implemented and a response or clinical benefit was seen in 56 percent of these patients.

“Through genomic profiling, we’re identifying alterations that may not have otherwise been visible through standard laboratory testing. Coupled with a review of these results by the molecular tumor board, the opportunity exists to identify novel therapies that would target specific abnormalities,” notes **Shridar Ganesan, MD, PhD**, associate director for translational science at Rutgers Cancer Institute and associate professor of medicine and pharmacology at Rutgers Robert Wood Johnson Medical School. ■

The work was presented at the 2016 Annual Meeting of the American Association for Cancer Research.

that it was rapid and durable,” she says. “They told me the tumors had shrunk by about 40 percent after that first scan. I only experienced a fever and slight rash over the course of treatment, and no hair loss,” adds Bird. “We’re managing the patient’s disease like a chronic illness, like diabetes, for instance. And that means an improved quality of life,” reflects Mehnert. Bird has been on the clinical trial since August 2014, and even though she received “clear scans” in February 2015, she will likely continue with the treatment until the summer of 2016 as mandated by the treatment protocol.

Especially since pembrolizumab has not been widely explored in endometrial cancer, there is no baseline for comparison. It was what Mehnert calls “that rapid and durable response” that made her and colleagues take pause. Starting to learn more about the mechanisms behind immunotherapy drugs through each clinical trial conducted at Rutgers Cancer Institute, the Phase I team wanted to know what was driving that response. They enlisted the help of the Institute’s Precision Medicine Program, and through another clinical trial examining difficult to treat cancers through genomic, or DNA, analysis, they aimed to add to their arsenal of knowledge. Two tissue samples of Bird’s tumor were sent out for sequencing — a process that looks for more than 200 known mutations or alterations. When the results came back, it was an ‘aha moment.’

Through the genomic analysis clinical trial, investigators have seen an average of four to five alterations for each tumor. There were more than 30 mutations in each of Bird’s samples. If these results were being used to determine treatment, that would mean potentially 30 more opportunities to match the right therapy to the right target or alteration. Out of all of the mutations, Shridar Ganesan, MD, PhD, director of translational science at Rutgers Cancer Institute and lead investigator of the genomic analysis clinical trial, zeroed in on one called polymerase epsilon, or POLE.

Unraveling the Response

“POLE is part of the DNA replication machinery in cells and has a critical function of ‘proofreading’ newly synthesized DNA — sort of like spell check on a computer, to prevent mistakes that can occur during the copying of DNA,” explains Mehnert. “During DNA replication which occurs when cells divide, billions of DNA bases must be copied accurately. Occasionally mistakes, like unintentional ‘typos’ can occur. The proofreading part of POLE will detect such mistakes and fix them. If mutations occur that disable the proofreading function of POLE, numerous mistakes can occur during DNA replication, leading to increased risk of cancer.”



"POLE mutations are seen in approximately 10 percent of endometrial cancers and are associated with a high burden of DNA mutations and increased expression of PD-1 and PD-L1. The high mutation burden associated with POLE mutations may stimulate the immune system, thus rendering these cancers vulnerable to immunotherapy. That knowledge coupled with what we are seeing in Mrs. Bird's case suggests the presence of POLE mutations may identify a subset of cancers that can be targeted with checkpoint therapy like pembrolizumab," notes Dr. Ganesan.

"Endometrial cancer is usually curable, however when it comes back as in Mrs. Bird's case, it is more difficult to keep under control. Given that she had multiple sites of recurrence, standard therapies are not encouraging for cure. The response to immunotherapy seen in Mrs. Bird's tumor is unexpectedly good. Given that we were able to figure out what was in her tumor that made it so sensitive to immunotherapy is a step forward for other women whose tumors harbor the POLE mutation," notes Lorna Rodriguez, MD, PhD, director of the Precision Medicine Program at Rutgers Cancer Institute and a professor of obstetrics, gynecology and reproductive sciences at Rutgers Robert Wood Johnson Medical School.

"Such results prompt us to ask more questions and probe even further. Marcia Bird's case in particular shows how the Precision Med-

Swelling in her ankles made it challenging for Marcia Bird to keep up with her tennis game, but after only a few weeks on treatment, the swelling subsided, and she was back to her regular neighborhood matchup and some tournament play.

icine and Phase I Programs interface and demonstrates the fertile crosstalk between clinic and laboratory here at Rutgers Cancer Institute. We are constantly communicating with each other, a process that allows us to quickly bring discoveries to light," adds Mehnert.

Having experienced the death of her father from a form of brain cancer in the mid-1970s, Bird recalls there weren't the types of treatments, let alone clinical trials, at that time that there are today. With that, she feels grateful a clinical trial opportunity was afforded to her and so close to home. "I am amazed that my case may be able to help others and take scientific research in this area to the next level," she says. Mehnert agrees, "We are in a period where all clinical trials are not created equal and groundbreaking results with immunotherapy are being seen. It used to be about 'laboratory bench to patient bedside,' but the results now being seen are prompting a shift in the work being conducted by the Phase I team, where we now go from 'bench to bedside...and back.' Times are definitely changing." ■

Fighting a 'One in a Million' Cancer

Colon cancer is the third most common cancer worldwide, striking more than a million people a year. The vast majority of those affected are adults. It hasn't been studied much in children, but one study* revealed that only 159 children were diagnosed with colon cancer between 1973 and 2005. That's less than one in a million.

With that knowledge in hand, imagine you've been diagnosed with colon cancer. And you are only 16 years old.

Yehudis Storch of Lakewood, New Jersey, is that one in a million. She's the 'baby' in a family of ten children—a stellar student and talented musician who plays three instruments. Lively and sociable, she enjoys taking on new activities and usually ends up running them. But the busy life she's fashioned is on hold as she fights a cancer so rare that there are no treatment models to follow.

Last summer the teen, known as 'Hudis' to her family and friends, prepared to start 11th grade at a girls' high school in Maryland. The school offers academics and religious instruction for observant Jewish students, who board

with local families. Going away to school for the first time was just the right move for this girl who loves challenge and adventure.

Before school started she visited a sister in Israel, another adventure she embraced. But something wasn't right. "I was excited to be in Israel but I didn't feel well," Storch recalls. "I had headaches and felt weak and lightheaded, like I was blacking out. We were right near the beach, and every morning I woke up and told myself I'd go. But I never made it there. I just had no energy."

B Y M A R Y A N N L I T T E L L
P O R T R A I T B Y J O D Y S O M E R S



Her sister noticed her malaise. "You need to tell mom about this," she said firmly. But when Storch returned home she said nothing, assuming her minor ailment would go away.

She began at her new school in mid-August. But just a short time after she arrived at her 'home away from home,' her host saw something was amiss. She asked her young guest if she needed to see a doctor, but Storch politely declined. "Maybe ask your mom to take you when you go home," suggested the woman.

Storch told her parents — mother Dina, a music teacher, and father Shalom, a rabbi — that she wasn't feeling well. "We thought maybe she needed new glasses and that was causing the headaches," says Dina Storch. The teen went to her pediatrician when she came home for Rosh Hashanah in early September. He immediately noticed she was jaundiced and took tests. The next day he called her parents to say that their daughter was dangerously anemic and needed to go to the emergency room right away.

Her parents took her to Robert Wood Johnson University Hospital, the flagship hospital of Rutgers Cancer Institute of New Jersey. Over a 24-hour period she had more tests, including an ultrasound and CT scan. The news wasn't good. The scans showed lesions on her liver and masses around her pancreas and intestine. No one mentioned the word cancer, but Susan Murphy, MD, a pediatric hematologist/oncologist at Rutgers Cancer Institute, was called in for an evaluation. Hudis Storch immediately texted her six sisters: "I have cancer."

In an Instant

A complete workup, including endoscopy, biopsies, and colonoscopy, confirmed that Storch had stage IV colon cancer that had metastasized to her liver and the lymph nodes around the pancreas. "In an instant our daughter went from being an active, healthy girl to someone who was seriously ill," says her father. "Of course we prayed."

The family felt the teen was in good hands with the expertise of the Rutgers Cancer Institute team caring for her, including surgeons, gastroenterologists, and both pediatric and adult hematologist/oncologists and medical oncologists. But the physicians were in uncharted territory. "Pediatric colon cancer is very difficult to treat because we have so little exposure to it, in this country and internationally," says Dr. Murphy, who is also a clinical assistant professor of pediatrics at Rutgers Robert Wood Johnson Medical School. "There are no open pediatric protocols testing medicines on these patients. So in treating these children we must look to adult protocols."

Making treatment more difficult, pediatric colon cancer is usually late-stage when it's discovered. "We routinely screen for colon cancer

in adults but there is no screening for children," explains Murphy. "By the time they show symptoms the cancer is advanced. Colon cancer in the pediatric group presents with abdominal pain, constipation, diarrhea, and blood in the stool. When an adolescent has these symptoms no one suspects colon cancer."

"Research-based decision-making allows us to provide the best care for Yehudis," notes Rutgers Cancer Institute pediatric hematologist/oncologist



Susan Murphy, MD, adding that Rutgers Cancer Institute participates in the Children's Oncology Group (COG) to study cancer's causes and treatments for children.

In retrospect, Storch says she had fatigue, intermittent abdominal pain and a loss of appetite going back a year. Like many teens she pushed her symptoms aside. She does not recall any rectal bleeding but says physicians told her it can be microscopic.

DNA tests ruled out Lynch syndrome, a disorder linked with increased risk of colon cancer and other cancers. The test results also indicated the teen might benefit from treatment with FOLFOX6, a standard chemotherapy for colon cancer. The goal was to shrink the



tumors so they could be resected, or surgically removed. “We monitored her very closely,” says Murphy. “She has two blood markers, CA-19 and CEA, seen in colon cancers. They were elevated at the time of her diagnosis. We measure the markers regularly to see how patients are responding, along with using CT scan and PET scan.”

Another Option

Storch responded to chemotherapy and the markers went down. Because the tumor was so rare the family agreed to participate in a clinical trial examining rare and poor prognosis cancers through genomic analysis. This research is part of the Precision Medicine Program at Rutgers Cancer Institute. It uses patients’ molecular and genomic information to identify changes in cancers that may influence therapy outcomes. Precision medicine individualizes a patient’s treatment by tailoring it to the genetic characteristics of the cancer.

Leading the trial is Shridar Ganesan, MD, PhD, associate director for translational science and chief of molecular oncology at Rutgers Cancer Institute. “Colon cancer in a 16-year-old is quite unusual, and we all immediately felt she should be enrolled in our sequencing protocol to determine if we could learn anything that may be helpful

Yehudis Storch gets a ‘real boost’ from a form of therapeutic horseback riding, known as ‘hippotherapy,’ at Chariot Riders in Manchester, New Jersey. Like a typical teenager she’s impatient—to finish her treatment, have whatever surgery she needs, and get back to school and to life.

in guiding treatment,” he explains. “Her tumor was sent for targeted sequencing, and this led to identification of a mutation in a gene called BRAF that has been found to be altered in a subset of adult colon cancers as well as other cancers.”

The results were presented to the Institute’s molecular tumor board, which includes both adult and pediatric oncologists who meet regularly to advance the precision medicine initiatives. “We reviewed the data on BRAF mutations that are now being treated with specific drug combinations, and made plans for that therapy even though Hudis was responding to chemotherapy,” says Murphy. The patient’s tumors began to shrink and the mass that appeared to envelop her pancreas was actually in the surrounding lymph nodes, and as those nodes shrank her pancreas function improved.



"My family is my rock. I don't know how I'd cope without them," says Yehudis Storch, above center, with her sisters Sara, left, and Malky, right.

Over 41 days in the hospital, the teen had ups and downs—the biggest 'down' being a colostomy. This procedure may be reversible depending on a patient's recovery. Another 'down' was a nasogastric feeding tube, inserted because she could not keep food down. Her family rallied around. Storch has three unmarried sisters and they stayed with her around the clock. "A nurse had to ask, 'Which one is the patient?' because my sisters were sitting in bed with me," she says. "My family is my rock. I don't know how I'd cope without them."

In January the tumor markers began to rise. "It was not entirely unexpected and meant she was relapsing," says Murphy. "But because of the testing we were ready with other potential treatments." Storch is currently receiving triple therapy: dabrafenib, a BRAF inhibitor; trametinib; and panitumumab. Individually these medicines haven't been effective in treating colon cancer. But given in combination, adult patients in clinical studies have shown a response. The therapy hasn't been tested in children so Storch's treatment is based on adult protocols.

Learning More

Murphy spoke with both adult and pediatric oncologists nationally to learn about their experiences, however limited, in treating pediatric patients like Storch. "Research-based decision-making allows us to provide the best care for her," notes Murphy, adding that Rutgers Cancer Institute participates in the Children's Oncology Group (COG) to study cancer's causes and treatments for children. "A goal of COG is to use these new agents in combination with regular chemotherapy to improve treatment outcomes."

"The ability to quickly get genomic information on a patient's individual cancer will become part of standard care some day," says Ganesan, who is also an associate professor of medicine and pharmacology at Rutgers Robert Wood Johnson Medical School. "Looking at Hudis' cancer under a microscope, there is nothing we could have seen that would have led us to this treatment."

The teen's markers are near normal levels and scans show a reduction in tumor size. She's having a few side effects, including a severe rash, but none are life threatening. "We want to get to a point where she has minimal disease and her liver is clear," says Murphy. "That will allow us to do additional surgery: possibly reversing her colostomy and removing any residual disease. Patients with colon

cancer have the best prognosis if they can be completely resected."

Storch feels stronger now. She's having physical therapy to improve strength and posture and a high point of her week is therapeutic horseback riding at Chariot Riders in Manchester, New Jersey. "Socks is my horse and I love him," she says. "The riding is so much fun. It gives me a real boost."

"The ability to quickly get genomic information on a patient's individual cancer will become part of standard



care some day," says Rutgers Cancer Institute Associate Director for Translational Science Shridhar Ganesan, MD, PhD.

Like a typical teenager she's impatient — to finish her treatment, have whatever surgery she needs, and get back to school and to life. But Murphy warns there is no timeline: "Doctors using these drugs on adult patients are still evaluating the length of time they should be treated. We're taking it day by day."

Storch's parents remain hopeful. Her father says he's never seen a more optimistic group of people than pediatric oncologists: "They don't run out of hope and I can see why. Every patient they save is significant, because that person has 70 or 80 more years to enjoy life." ■

PHOTO BY: DEBBIE VOGEL



More Help for the Youngest Patients

Shortly after the loss of their beloved son **Brady** (left) to a rare form of leukemia just shy of his second birthday, **Sherrie and Michael Wells** founded **Hugs for Brady Foundation**, a non-profit organization with the ultimate goal of eradicating pediatric cancer. In the past few years alone, the foundation has raised more than \$1 million in the fight against childhood cancer and has funded various pediatric cancer research efforts, including the **Precision Medicine Program at Rutgers Cancer Institute of New Jersey**.

A \$300,000 commitment from Hugs for Brady in 2013 has been helping physician-scientists at Rutgers Cancer Institute further explore rare and hard to treat pediatric cancers through genomic analysis. Just as this research helped identify targeted therapies for Yehudis Storch (see *adjacent story*), Sherrie Wells hopes the foundation's support will lead to additional treatment opportunities for children with cancer.

"While the five-year survival rate for pediatric cancer is relatively high, no family should have to endure such a devastating experience as a cancer diagnosis in a child," shares Wells. "By supporting the Precision Medicine Program at Rutgers Cancer Institute of New Jersey, Hugs for Brady is helping to arm these researchers with the tools necessary to identify more personalized and targeted therapies for those children who don't have any other option."

Rutgers Cancer Institute Precision Medicine Director **Lorna Rodriguez, MD, PhD**, notes her team is extremely grateful for the efforts of Hugs for Brady. "While a number of cancer centers are conducting research in precision medicine, a large percentage of the work involves the adult population and more common cancers. Thanks to the generous support of Hugs for Brady, the precision medicine team at Rutgers Cancer Institute has the opportunity to focus on the youngest of patients who may benefit from this research, thus expanding our knowledge in this area and helping inform treatment decisions."

"As I have always said, 'one hug, one child or one fundraiser at a time, Hugs for Brady is determined to help change the world.' With our commitment to precision medicine efforts at Rutgers Cancer Institute, we are pleased to see our supporters are helping to make such a tremendous difference," adds Wells. ■

To help support pediatric precision medicine efforts at Rutgers Cancer Institute, visit cinj.org/giving.

PHOTO BY: kd photography

Making A Difference

Taking Aim at Triple-Negative Breast Cancer

The precision medicine approach involving DNA sequencing to pinpoint specific alterations that can be targeted with anti-cancer therapies is becoming a potential treatment avenue for those with poor-responding cancers. But there are still some subsets of disease that are elusive to this approach. Such is the case for triple-negative breast cancer, but investigators in the **Precision Medicine Program at Rutgers Cancer Institute of New Jersey** are on track to change that, thanks to a \$50,000 gift from the **Val Skinner Foundation**.

The Val Skinner Foundation through the years has contributed just under \$5 million to Rutgers Cancer Institute including its **LIFE** (**L**adies Professional Golf Association Pros **I**n the **F**ight to **E**radicate Breast Cancer) **Center**, named in recognition of the advocacy put forth by the Foundation and its namesake, LPGA veteran **Val Skinner**. The LIFE Center provides treatment and programs designed to educate young women and their families about breast cancer and breast health. Other gifts from the Val Skinner Foundation have supported research tools and precision medicine research at Rutgers Cancer Institute. This latest gift to precision medicine was given in the name of Malaya Southern Kelly, a vibrant young woman, newlywed and member of her local roller derby team, who passed away from stage IV, triple-negative breast cancer in 2014 at the age of 34. She participated in numerous clinical trials, but unfortunately, standard genomic analysis of her tumor to identify potential drugable targets did not identify a viable treatment plan.



JODY SOMERS

"Despite the many advances made in the area of breast cancer through the years, and more recently through precision medicine, triple-negative breast cancer remains a very challenging disease that leads to the death of too many women. It is imperative that investigators are provided with the tools they need to find answers so that young women like Malaya no longer have to endure the devastating impact of triple-negative breast cancer," notes Foundation Chair Val Skinner. "Breast cancer research is a critical extension of the mission of the LIFE Center, and we are grateful that the Val Skinner Foundation recognizes and supports this very important work," adds **Deborah Toppmeyer, MD**,

Malaya Southern Kelly with her husband Sean and trusty companion Bentley in 2013.

chief medical officer and director of both the **LIFE Center** and **Stacy Goldstein Breast Cancer Center at Rutgers Cancer Institute**.

Researchers from Rutgers Cancer Institute have found that triple-negative breast cancer has mutations that are not easily found by standard sequencing technology. "What we see in triple-negative breast cancer is that it contains many complex genomic rearrangements – almost like shifting letters around in a sentence to make new words.

These new words will pass the ‘spell check,’ but now there is a whole new meaning to the sentence,” notes Associate Director for Translational Science **Shridar Ganesan, MD, PhD**, who will be leading the new project examining triple-negative breast cancer. “These resulting ‘fusion genes’ are powerful drivers of cancer growth but are often missed by standard genomic sequencing approaches. They can be targeted with the right therapies, but we need to identify them first. Initial results from our work indicate that triple-negative breast cancer may be prone to

harboring these ‘fusion genes.’”

Dr. Ganesan and colleagues aim to use and validate a new sequencing approach that would specifically look for these ‘fusion genes’ in triple-negative breast cancer samples. The expectation is that these ‘fusion genes’ might be found in ten to 15 percent of triple-negative breast cancer cases. “But even if these actionable genes are only found in a few percent of triple-negative cases, the clinical impact may still be quite powerful, and we can get to work on developing therapeutic clinical trials. We greatly appreciate the sup-

port of the Val Skinner Foundation in helping us continue with this work and remain on the cutting edge of discovering new treatments for our patients,” adds Ganesan.

Skinner notes that Ms. Southern Kelly was honored as a ‘LIFE Hero’ by the Val Skinner Foundation in 2013 — a symbol of all of those affected by breast cancer: “Malaya’s story is a reminder of how much work still needs to be done. Through the compassion, drive, expertise and dedication of those at Rutgers Cancer Institute, I remain hopeful that one day soon, we will have our answers.” ■

Driving to Decode Cancer

The Val Skinner Foundation continues its drive against breast cancer through the annual ‘LIFE Event.’ This charity golf outing raises \$250,000 each year for programs and services at the **LIFE Center** at **Rutgers Cancer Institute of New Jersey** (see adjacent story). Included is the support of the **Biology of Cancer Online Education Connecting Teens (BioCONNECT)** program, an interactive, breast cancer genetics curriculum designed for teachers to implement in high school biology classes. It was the Val Skinner Foundation that gave the initial funding for a fellow to help **Rutgers Cancer Institute** and **Rutgers School of Public Health** faculty identify and develop this unique curriculum. Through the aid of the annual LIFE Event, the Val Skinner Foundation continues with its longtime and consistent support of the BioCONNECT program.

Partnering with Discovery Education, a new effort is now bringing BioCONNECT to a broader audience through a digital platform called Decoding Cancer. Funded nationally

by the Val Skinner Foundation, Decoding Cancer provides standards-aligned, digital, interactive classroom resources to high school educators nationwide to facilitate meaningful discussion about cancer topics among students and their families. The effort features the BioCONNECT curriculum. “The ability to bring the content-rich curriculum of BioCONNECT — a program that started locally — to a national audience to educate about cancer awareness and prevention will help advance the public’s knowledge of this disease in a way that is meaningful and easy to understand,” notes **Deborah Toppmeyer, MD**, chief medical officer and director of both the LIFE Center and Stacy Goldstein Breast Cancer Center at Rutgers Cancer Institute. “Without the Val Skinner Foundation’s support of this national effort, we would not have an opportunity to reach so many.”

“By increasing science literacy in this young population, we are helping to ed-



ucate future generations about the importance of breast health, cancer prevention and an understanding of the direction of novel treatment strategies. I am pleased that so

many come out to support the LIFE Event, as the monies raised continue to result in the development of unique education opportunities like Decoding Cancer, as well as cutting-edge research including the genomic analysis work being done at Rutgers Cancer Institute into triple-negative breast cancer. These efforts are having a tremendous impact in the fight against cancer and are translating into lives saved,” notes Foundation Chair Val Skinner. ■

In the next edition of ‘Cancer Connection,’ we’ll take a closer look at the Decoding Cancer platform, its ability to reach millions of students, and its impact on families and public health education across the U.S. To learn more visit DecodingCancer.org.

Making A Difference

Combatting Resistance

Aside from skin cancer, prostate cancer is the most commonly diagnosed cancer in men and the second leading cause of cancer-related death in men in the United States, according to the American Cancer Society. "Although men with localized disease are largely curable with surgery and radiation, patients who succumb to prostate cancer invariably have two key features: resistance to hormonal therapies and spread of cancer to the bone," notes Rutgers Cancer Institute of New Jersey Chief of Urologic Oncology **Isaac Yi Kim, MD, PhD**. Thanks to a \$500,000 grant from **The Marion & Norman Tanzman Charitable Foundation**, Dr. Kim will be able to investigate a mechanism that links these two features, with an aim of developing future clinical trials for men with a type of prostate cancer known as castrate-resistant.

In men with prostate cancer that has spread to other parts of the body, chemical castration is the standard first-line treatment. Yet, treatment known as androgen ablation designed to suppress the male hormone testosterone is not curative, notes Kim, and castration-

resistant prostate cancer usually emerges within 18 to 24 months. "This limited clinical effectiveness, along with complications such as bone loss, suggests there is an advantage of delaying chemical castration as long as possible in men with prostate cancer," says Kim, who is also an associate professor of surgery at Rutgers Robert Wood Johnson Medical School.

In exploring the biological rationale behind these clinical observations, Kim examined a protein known as an androgen receptor, which serves as an on-off switch in regulating how the body responds to male hor-

Isaac Yi Kim, MD, PhD, is exploring a potential tumor suppressor in prostate cancer to help develop new treatments that could help those whose cancer is resistant to hormonal therapy.

mones. He found that one of these variants, known as AR-45, is associated with castration resistance. "With that, we

believe that AR-45 is a tumor suppressor that regulates an increase in the number of prostate cancer cells by modulating the response to androgens," notes Kim.

Preliminary evidence has suggested that AR-45 induces cell death and not an increase in the number of cells. In this new phase of research, Kim and colleagues will investigate the mechanism of cell death induced by AR-45. They also will explore the mechanism of how AR-45 is regulated in castrate-resistant prostate cancer cells.

"The impact of this laboratory work is anticipated to have great clinical implications. Identifying and characterizing AR-45 will further stratify patients who may not benefit from conventional androgen deprivation therapy. Based on our findings, we aim to develop clinical trials for men faced with castration-resistant prostate cancer. I am grateful for this support of The Marion & Norman Tanzman Charitable Foundation, as it will enable our team to help bring forth new discoveries and treatments for this population," says Kim. ■

With this latest gift, The Marion & Norman Tanzman Charitable Foundation has given nearly \$1 million to prostate cancer research at Rutgers Cancer Institute since 2012.

JOHN EMERSON



Giving Back

Many **Rutgers Cancer Institute of New Jersey** supporters choose to 'give back' by hosting their own fundraising event. Organizing a fundraising event is a fun way to be a part of the Rutgers Cancer Institute community while helping to advance cancer research, treatment, care and awareness. Events can range from bike rides, to hikes and even an art show!

To plan your own event or fundraising campaign, contact **Kaitlyn Woodward** at kwoodward@cinj-ruf.rutgers.edu to learn more about how to get started. ■

For a full list of current events and campaigns visit cinjfoundation.donordrive.com/.

Upcoming Events:



Sept. 18:
Century for the Cure



Oct. 3:
Steven A. Cox Charity Classic



Oct. 8:
Baldpate for a Cure

Exploring Gender Disparity in Lung Cancer

Lung cancer is the leading cause of cancer death in both men and women. Lung cancer diagnoses have more than doubled among females in the past 38 years, while having fallen 29 percent among males, according to the American Lung Association. Aiming to better understand gender differences in this disease, **Rutgers Cancer Institute of New Jersey** radiation oncologist **Sharad Goyal, MD**, is embarking on new research supported by an inaugural \$400,000 **LUNG FORCE Research Innovation Project: Lung Cancer in Women Award from the American Lung Association**. The work will explore whether radiation exposure from interventional cardiovascular procedures leads to increased risk of lung cancer in women as compared to men.

"This research will allow me to explore ques-

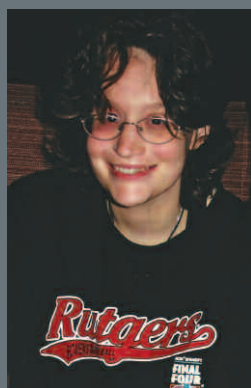


tions that are important to both lung cancer patients and the medical community, as our findings may help reduce lung cancer incidence and mortality," says Dr. Goyal, who is an associate professor of radiation oncology at Rutgers Robert Wood Johnson Medical School. "If our work is able to show a potential difference between men and women in response to these types of tests, patients will

have an opportunity to better understand the benefits and alternatives to medical imaging of the heart and will be better informed of their risk of developing lung cancer. I am grateful for this support from the American Lung Association."

Goyal will examine data from two statewide databases: the Myocardial Infarction Data Acquisition System and the New Jersey State Cancer Registry, the latter of which is housed in the New Jersey Department of Health and Rutgers Cancer Institute. In examining a cohort of nearly 800,000 patients exposed to ionizing radiation during specific heart procedures and more than 3.2 million unexposed patients, Goyal aims to define meaningful estimates of gender specific risk to developing lung cancer following radiation exposure. ■

A Special Thank You!



As you'll learn in Yehudis Storch's story on page 16, the cutting-edge treatment approach known as precision medicine is helping the youngest of patients at **Rutgers Cancer Institute of New Jersey**. While this research is driven by the expertise of our physician-scientists, the advances being made are not possible without the support of numerous collaborators and donors. **Kier's Kidz**, a 501(c)(3) nonprofit, is one of these supporters helping to make a difference. Named for **Kiersten ("Kier") Hickman-Perfetti** (left), who died at

age 22 in 2008 from a rare form of pediatric cancer known as rhabdomyosarcoma, **Kier's Kidz** has a mission to fund pediatric cancer research, assist children with cancer and their families financially and emotionally, and honor healthcare professionals who work with pediatric patients. **Kier's Kidz** is Hickman-Perfetti's legacy of love for children with cancer — a legacy that includes support of pediatric precision medicine efforts at Rutgers Cancer Institute. "Kier spent the last years of her life fighting her own cancer and thinking of ways to help children with cancer long after she was gone. Our family and our foundation are pleased to carry on Kier's work with the hope that one day, pediatric cancer will be as curable as the common cold," says her father **Larry Perfetti**, who is president of **Kier's Kidz**. ■

The LUNG FORCE Research Innovation Project: Lung Cancer in Women Award is funded through the American Lung Association's LUNG FORCE initiative, which raises awareness of lung cancer incidence in females and provides funding for lung cancer research. Rutgers Cancer Institute is the Signature Sponsor for the LUNG FORCE initiative in New Jersey.

Rutgers Cancer Institute of New Jersey

The Network Spotlight

Rutgers Cancer Institute of New Jersey Network of hospitals offers its 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.

Flagship Hospital:

- Robert Wood Johnson University Hospital

System Partner:

- Meridian Health (Jersey Shore University Medical Center, Ocean Medical Center, Riverview Medical Center, Southern Ocean Medical Center, and Bayshore Community Hospital)

Affiliate Hospitals:

- JFK Medical Center
- Robert Wood Johnson University Hospital Hamilton (Rutgers Cancer Institute of New Jersey Hamilton)
- Robert Wood Johnson University Hospital Somerset

Robert Wood Johnson University Hospital to Offer New Gamma Knife Technology



IMAGE COURTESY OF ELEKTA

In the fall, **Robert Wood Johnson University Hospital** will add a new technology to its broad range of neuro-oncology treatment options: **Elekta's Leksell Gamma Knife® Icon™**. The new technology allows RWJ to offer an improved treatment compared to prior models, including the Perfexion. Leksell Gamma Knife® is not a knife and no incisions are made. Gamma Knife surgery offers so-called "bloodless surgery" for previously untreatable deep-seated intracranial tumors, vascular malformations, functional disorders, and facial pain syndromes. Its highly focused beams of gamma radiation offer the precision of surgery, without the usual risks of surgery.

The alternative to treatment with Leksell Gamma Knife® includes traditional open surgery, which involves certain risks and complications. In many cases, it is impossible to surgically treat tumors that are deep-seated or situated close to sensitive parts of the brain. The Gamma Knife program is part of a broader

The Gamma Knife program at Robert Wood Johnson University Hospital is part of a broader neuroscience program which includes open surgery, advanced image guided surgery, and proton beam therapy. The addition of the Leksell Gamma Knife® Icon™ technology allows RWJ to offer a "bloodless surgery" option to patients.

neuroscience program which includes open surgery, advanced image guided surgery, proton beam therapy, and the necessary expertise. As a result, patients receive the appropriate treatment, not just the available treatment. Leksell Gamma Knife® has received considerable exposure as a treatment alternative for many patients. Patients are attracted by its non-invasive nature, outpatient workflow and documented clinical results. The patient often leaves the hospital the same day and returns to daily life. ■

New Program Director at Rutgers Cancer Institute of New Jersey Hamilton

Breast surgical oncologist **Firas Eladoumikdachi, MD, FACS** (below), has been named the new program director of the **Rutgers Cancer Institute of New Jersey at Hamilton**. The cancer center — located on the campus of **Robert Wood Johnson University Hospital (RWJ) Hamilton** — provides patients access to leading oncology specialists and clinical trials from Rutgers Cancer Institute of New Jersey in New Brunswick along with outpatient treatment and support services.

Dr. Eladoumikdachi joined Rutgers Cancer Institute of New Jersey in April of 2015. He completed his fellowship in breast surgery at the Lynn Sage Comprehensive Breast Center at Northwestern University in Chicago and his residency in general surgery at Baylor College of Medicine in Houston. He specializes in the treatment of benign and malignant tumors of the breast with a focus on breast conserving surgical techniques along with minimally invasive breast biopsy and sentinel node biopsy.

Eladoumikdachi, who sees patients at both the Rutgers Cancer Institute Hamilton and New Brunswick campuses, has received praise from both patients and colleagues for his knowledge, innovation and focus on patient-centered care, all of which have helped contribute to the growth of the program.

"Over the past year it has been my pleasure to be a part of a highly talented collaborative group of individuals with the shared focus on providing state-of-the-art cancer care for our patients," notes Eladoumikdachi, who is also an assistant professor of surgery at Rutgers Robert Wood Johnson Medical School. "As program di-

rector, I look forward to continuing this collaboration with the goal of providing comprehensive patient-centered care in the comfort and convenience of a community cancer treatment facility."

According to **Richard Freeman**, president and CEO of RWJ Hamilton, Eladoumikdachi's strong emphasis on patient-physician communication and his collaboration with other specialists in performing breast-conserving surgery "affords the high-level leadership quality required

in this role to work with others across various disciplines to meet the complex needs of our patients."

"It has been my pleasure to be a part of a highly talented collaborative group of individuals with the shared focus on providing state-of-the-art cancer care for our patients."

— **Firas Eladoumikdachi, MD, FACS**



GERALD PAGGIO

"Rutgers Cancer Institute of New Jersey has the ability to provide patients at affiliate locations like RWJ Hamilton access to unique oncology services that may not be available at traditional community hospitals. Dr. Eladoumikdachi's strong interest in clinical research and knowledge of both campuses will afford patients in the Hamilton region an opportunity to receive such services, as can only be provided by a National Cancer Institute-designated Comprehensive Cancer Center, while remaining close to home," adds Rutgers Cancer Institute Interim Director **Bruce G. Haffty, MD**, who is also professor and chair of the Department of Radiation Oncology at Rutgers Cancer Institute, Rutgers Robert Wood Johnson Medical School and Rutgers New Jersey Medical School. ■

Survivor's CORNER

Karla Guillen

A breast cancer diagnosis in her early 30s was something that Karla Guillen didn't expect — nor the financial challenges that accompanied it. But thanks to help from both the Stacy Goldstein Breast Cancer Center and the Social Work Department at Rutgers Cancer Institute of New Jersey, Guillen is feeling good and back in control.

Diagnosed in 2014, Guillen underwent three different forms of chemotherapy and surgery to treat her breast cancer. While her corporate cleaning job left her tired, the treatment she was receiving compounded that fatigue even more, leaving her exhausted and sensitive to light and noise. She pressed on though, as her boyfriend was not employed full-



DEBBIE VOGEL

"At Rutgers Cancer Institute, those on our social work team are trained to assess patient needs and connect them to available resources," says Sara Toth, LCSW, above.

time at that point, and they were raising Guillen's young daughter. Thankfully, Guillen's friends helped out at work. Other friends and family brought meals, and her younger sister came from Mexico when she had surgery to help with household needs. A full work schedule became more difficult for Guillen to keep, and finances were tight.

Having suffered hair loss during treatment, Guillen turned to social worker **Sara Toth, LCSW** at Rutgers Cancer Institute for assistance in securing a free wig. Toth put Guillen in



touch with an organization to help with this and other cancer-related needs. That led to another discussion about finances. "It can be difficult for our patients to talk openly about non-medical concerns, such as financial or emotional problems.

This may have to do with shame or embarrassment, or it may be because they believe that there are no resources for them. Sometimes patients don't realize that various forms of help are available. At **Rutgers Cancer**

Institute, those in our Social Work Department are trained to assess patient needs and connect them to available resources. These may include support groups, complementary programs such as yoga, relaxation and educational groups, transportation assistance, and other forms of financial help," notes Toth.

Thanks to the team's efforts, Guillen regained financial footing and even found a new circle of friends through the breast cancer organization that provided her wig. "We were really on a tight budget," recalls Guillen. "I think people don't have enough information to realize they can ask for this type of help. Assistance is available, and Sara helped our family a lot."



Guillen continues to take medication to prevent her cancer from recurring and notes she is feeling fine and is still working. She continues to meet with fellow survivors for a special project to make greeting cards to send to others with cancer. And while Guillen is physically active at her job, she looks forward to incorporating some 'fun' movement into her life this summer including Bollywood dancing and water wellness classes.

CANCER IS **STUBBORN.** BUT WE'RE **UNSTOPPABLE.**



WINNING IS EVERYTHING.

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.

At **Rutgers Cancer Institute of New Jersey**, we don't just treat the disease ...
WE'RE DEFEATING CANCER WITH SCIENCE.

RUTGERS
Cancer Institute
of New Jersey

195 Little Albany Street
New Brunswick, NJ 08903

Rutgers, The State University of New Jersey

Learn more and schedule an appointment!

CINJ.org/winning | 732.235.CINJ (2465)

RUTGERS
Cancer Institute
of New Jersey

Rutgers Biomedical and Health Sciences
Rutgers, The State University of New Jersey
195 Little Albany Street
New Brunswick, New Jersey 08903

Non-Profit Org.
U.S. Postage
PAID
New Brunswick, NJ
Permit No. 920



Follow us on social media : [facebook.com/TheCINJ](https://www.facebook.com/TheCINJ) : twitter.com/RutgersCancer : [linkedin.com/company/the-cancer-institute-of-new-jersey](https://www.linkedin.com/company/the-cancer-institute-of-new-jersey)

Pink Out!

Members of the Stacy Goldstein Breast Cancer Center at Rutgers Cancer Institute of New Jersey, including the Institute's Interim Director, Bruce Hafty, MD (top row, right), attended the recent 'Play 4Kay' Rutgers Women's Basketball game at the Rutgers Athletic Center to raise breast cancer awareness in the community. Doctors, nurses and social workers, as well as some of their patients, were honored on court at half-time during the special match-up.

PHOTOS, TOP RIGHT AND BOTTOM
BY: RUTGERS ATHLETICS

