

TURNING CANCER DISCOVERIES INTO TREATMENTS

FRONTIERS

PELOTONIA SPECIAL EDITION 2018



The James



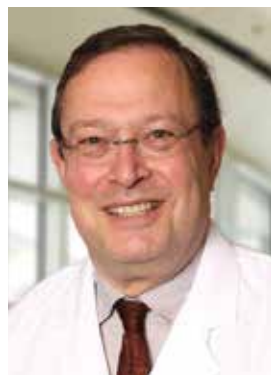
THE OHIO STATE UNIVERSITY
COMPREHENSIVE CANCER CENTER

NCI

**Comprehensive
Cancer Center**

A Cancer Center Designated by the
National Cancer Institute

THE DIRECTOR'S PERSPECTIVE



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MD, PHD**

DIRECTOR, THE OHIO STATE
UNIVERSITY COMPREHENSIVE
CANCER CENTER

**THE OHIO STATE UNIVERSITY
COMPREHENSIVE CANCER
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Here we are in 2018, the year to celebrate the 10th anniversary of Pelotonia, the annual grassroots cycling event that raises money for cancer research at Ohio State.

More importantly, we can celebrate what Pelotonia has enabled us to accomplish during this first decade. With federal cancer-research funding difficult to obtain, you have stepped up through Pelotonia as riders, virtual riders and donors and, as of Sept. 6, raised more than \$173 million since 2009. Here are examples of what we have accomplished together:

Pelotonia funds supported basic and clinical research at Ohio State that led to the approval of ibrutinib by the U.S. Food and Drug Administration. This remarkable drug is now available to thousands for the treatment of chronic lymphocytic leukemia.

The Ohio Colorectal Cancer Prevention Initiative (OCCPI) established a statewide network of 50 hospitals to screen newly diagnosed colorectal cancer patients and their biological relatives for an inherited condition that predisposes someone to colorectal, uterine and other cancers.

Beating Lung Cancer in Ohio (BLC-IO) is an Ohio-wide study to evaluate the effects of advanced gene testing and expert advice on lung cancer treatment and patient survival, smoking-cessation rates and quality of life.

Ohio Prevention and Treatment of Endometrial Cancer (OPTEC) is a statewide initiative to identify women with uterine cancer whose genetic makeup places them at risk for other types of cancer, and to help match women with uterine cancer to the best treatment.

Pelotonia funds helped establish Ohio State's Drug Development Institute to accelerate the translation of OSUCCC – James discoveries into new cancer treatments.

Ohio State has a growing digital archive of pathology specimens that is available to cancer investigators worldwide.

The OSUCCC – James co-founded and co-anchors the Oncology Research Information Exchange Network (ORIEN), a collaboration of 18 cancer centers that is speeding the development and delivery of more precise treatments, diagnostic tools and prevention strategies.

The Pelotonia Fellowship Program provides grants to promising undergraduate, graduate, professional and postdoctoral students for conducting cancer research in the labs of faculty mentors.

Pelotonia funds helped support clinical trials that seek better ways to prevent, detect and treat a variety of cancers.

I am grateful to all who play a part in Pelotonia. We look forward to experiencing this great event with you for decades to come and to all that we will accomplish together.

THE OSUCCC – JAMES INVITES YOU TO JOIN OUR ONLINE COMMUNITY.



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cancer.osu.edu/youtube



cancer.osu.edu/twitter



cancer.osu.edu/facebook



cancer.osu.edu/cancerconnect

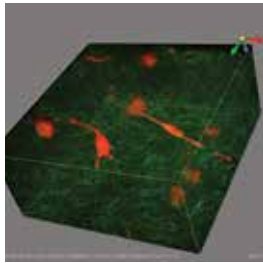


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FRONTIERS

PELOTONIA | A SPECIAL FRONTIERS REPORT 2018

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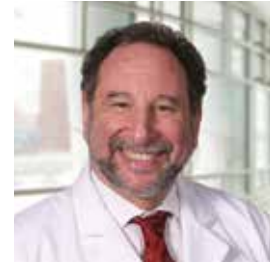
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Download Frontiers at cancer.osu.edu/Frontiers.


FINANCIAL REVIEW

Pelotonia Total Exceeds \$173 Million

2018 was Pelotonia’s 10th year, and the total amount raised by riders, virtual riders and volunteers since 2009 totaled more than \$173 million as of Sept. 6. In 2017, the annual event, which generates money for cancer research at Ohio State, raised a record \$26 million. (The total raised by the Aug. 4-5, 2018, event will not be known until November.)

Thanks to Pelotonia’s major sponsors—including L Brands Foundation, Huntington, Peggy and Richard Santulli, and the AEP Foundation—every dollar raised by riders, virtual riders and donors goes directly to cancer research at the OSUCCC – James. Pelotonia staff presented a check for the Pelotonia 17 total to OSUCCC – James leaders at a Nov. 16 event.

“The Pelotonia movement is proof that true social impact depends on a community of people working together,” Pelotonia President and CEO Doug Ulman said. “This year, our community rallied for our cause in an unprecedented fashion, breaking fundraising and participation records and living up to their name as the Greatest Team Ever. Their efforts are saving lives, and we owe them an abundance of gratitude.”

Pelotonia 17 drew 8,022 riders, 3,576 virtual riders and 3,042 volunteers. The riders, who represented 40 American states and 10 countries, participated in six routes that extended from 25 to 180 miles. The routes started in Columbus or New Albany and finished at one of three destinations: Pickerington, New Albany or Gambier, Ohio, the home of Kenyon College. 

KEY PELOTONIA FUNDING PARTNERS

MAJOR FUNDING PARTNERS

Huntington
L Brands Foundation
Peggy and Richard Santulli
AEP Foundation

SUPPORTING FUNDING PARTNERS

Lilly Oncology
Harold C. Schott Foundation

NOTABLE FUNDING PARTNERS

Cardinal Health
Nationwide
Diamond Hill Capital Management

PELOTONIA 17 NOTABLE NUMBERS

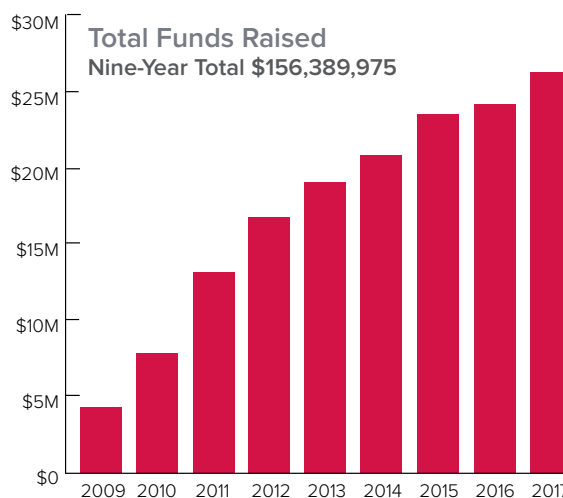
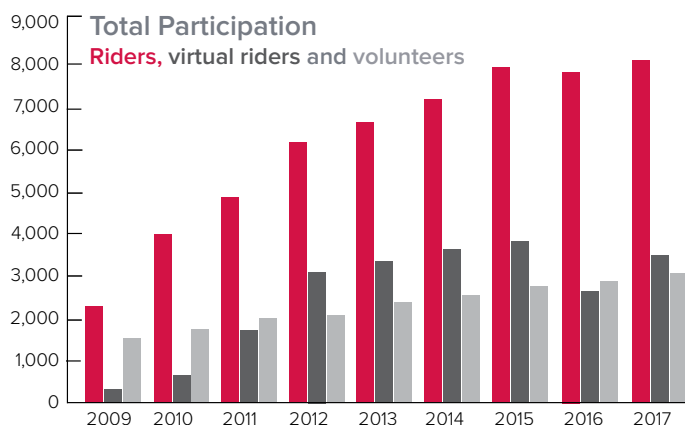
8,022 riders from 40 states, **3,576** virtual riders **3,042** volunteers **282** registered pelotons (riding groups)
10 countries

TEAM BUCKEYE, OHIO STATE’S OFFICIAL SUPERPELTON

1,850 members **1,200** riders **70** individual pelotons **418** virtual riders **232** volunteers

TEAM BUCKEYE FUNDRAISING TOTAL

\$2,726,531



9-Year Pelotonia Financial Summary

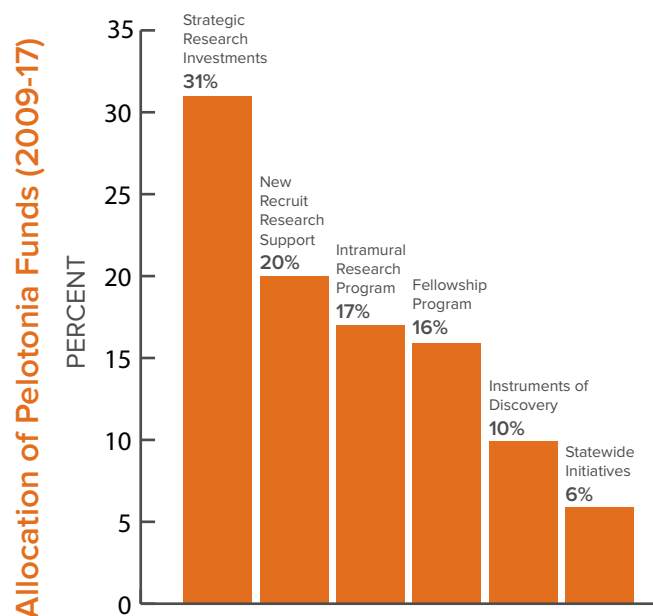
Pelotonia funding supports projects that address many aspects of cancer, including diagnosis, treatment, psychosocial issues, prevention, accelerated drug development and large initiatives to change the landscape of cancer care. Specifically, Pelotonia dollars support six areas:

- **Intramural Research Program** – This program funds Idea Grants, clinical trials and other initiatives proposed by teams of faculty researchers who need to gather early data for promising projects that may lead to larger external grants;
- **Fellowship Program** – This program enables Ohio State students in any discipline or level of scholarship to conduct cancer research with faculty mentors;
- **New Recruit Research** – Pelotonia funds can help newly recruited researchers continue their work upon arrival at Ohio State;
- **Instruments of Discovery** – This program supports purchases of sophisticated equipment needed for cutting-edge cancer research;
- **Statewide Initiatives** – These large projects take aim at specific cancer types by working with community hospitals throughout Ohio to promote prevention, early detection and better outcomes for patients;
- **Strategic Research Investments** – These investments support such initiatives at the OSUCCC – James as the Drug Development Institute, Digital Pathology and a Total Cancer Care® protocol. 

Bringing Knowledge to Bear in the Fight Against Cancer

Pelotonia research funding has been allocated to investigators in multiple colleges at Ohio State, as well as at Nationwide Children’s Hospital in Columbus and at Cincinnati Children’s Hospital Medical Center:

- College of Medicine
- College of Public Health
- College of Nursing
- College of Dentistry
- College of Pharmacy
- College of Veterinary Medicine
- College of Food, Agricultural and Environmental Sciences
- College of Law
- College of Education and Human Ecology
- College of Engineering
- College of Arts and Sciences



Research Highlights

Pelotonia-Funded Studies That Could Have Wide Impact



Investigating a Potential New Treatment for AML

Adult acute myeloid leukemia (AML) is an aggressive form of blood cancer in which large numbers of immature white blood cells accumulate in the bone marrow, the sponge-like tissue in the center of many bones where blood cells and platelets are produced.

Complex gene and chromosomal abnormalities lock AML cells into

a state of immaturity, while also pushing them to keep dividing and proliferating. Much has been learned about AML, but cures remain elusive. Treatments often fail, and older patients may be too frail to tolerate potent chemotherapy regimens.

Rosa Lapalombella, PhD, associate professor in the Division of Hematology, and John C. Byrd, MD, Distinguished University Professor of Medicine, Medicinal Chemistry, and Veterinary Biosciences, and the D. Warren Brown Designated Chair in Leukemia Research,

were awarded a Pelotonia Idea Grant to investigate a potential new targeted agent for AML. Their study grew from earlier discoveries they made at the OSUCCC – James, and their findings should provide important insights that could move the agent toward testing in a clinical trial.

The researchers are studying a new agent, called KPT-9274, that blocks a molecule in AML cells called NAMPT. The researchers say the preclinical study should provide important insights into the effects of this inhibitor.

“Unlike many targeted therapies that can be directed at only one subtype of AML, this drug might be useful for treating several AML subtypes that all depend on NAMPT,” Lapalombella says.

NAMPT is critical for the survival of AML cells in two ways. First, fast-growing AML cells consume more energy than slower-growing healthy cells. They make abnormally high levels of NAMPT to produce that energy, and the researchers believe that the new inhibitor will fatally starve the malignant cells of the energy they need to grow.

In addition, NAMPT is an essential part of a critical DNA-repair mechanism. Blocking the enzyme may cripple the ability of AML cells to repair DNA damage, which would make them more susceptible to chemotherapy. That might allow the use of lower doses of chemotherapy that older patients can better tolerate. The researchers are studying that question, also.

“Along with complex chromosome changes, the AML cells in patients can have many genetic differences among them,” Lapalombella says, “and there are many subtypes of AML. These complexities make it very difficult to identify molecules in AML cells that could be targets for potential new therapies. We are hoping this Pelotonia-supported research will help bring this promising agent to AML patients in a clinical trial.”

Understanding the Flow of Chemotherapy to a Tumor

A malignant tumor is much more than a mass of cancer cells. Cancerous tumors also include normal cells from the organ, immune cells and cells that form blood vessels. Also in the mix are cells called fibroblasts, which produce the scaffolding that holds the tumor together. Last, a meshwork of filaments and proteins called the extracellular matrix (ECM) cradles the cells within a tumor.

OSUCCC – James researcher Jonathan Song, PhD, assistant professor in the College of Engineering’s Division of Mechanical and Aerospace Engineering, received a Pelotonia Idea Grant to study how tumor fibroblasts alter the ECM in ways that impede the movement of chemotherapy drugs.

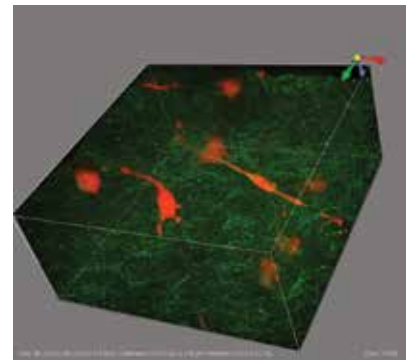
Using microtechnology, tissue engineering and 3-D imaging, Song and his collaborator Michael Ostrowski, PhD, at the Medical University of South Carolina, have developed a model that enables them to study molecular changes that alter the flow of fluid through the ECM. Such changes could affect the diffusion of chemotherapy drugs through the tumor.

The researchers are using fibroblasts from pancreatic

cancer patients to learn how flow conditions change when mutations are present in a gene called *PTEN*. Their work suggests when *PTEN* is silenced, the flow of fluid through the ECM is significantly reduced compared to the flow when using fibroblasts from healthy tissue.

“Our findings suggest that the loss of *PTEN* causes tumor fibroblasts to physically alter the ECM in ways that reduce the movement of fluid to and around tumor cells,” Song says, “and that could reduce the delivery of chemotherapy to malignant cells in the tumor, making the drugs less effective.”

Their findings, if verified in a larger study, also suggest that drugs that target changes in fibroblasts or other noncancerous tumor cells might block changes in the ECM and make chemotherapy more effective. **F**



A 3-D image of tumor-associated fibroblasts (red) within a network of collagen matrix fibers (green), as depicted by a model for studying the molecular flow of chemotherapy through the tissues.

Training the Next Generation

Pelotonia Fellowships Support & Encourage Young Cancer Researchers



Each year the Pelotonia Fellowship Program allots \$2 million to support promising Ohio State students in any discipline or level of scholarship who want to conduct cancer research under the guidance of faculty mentors at the OSUCCC – James.

Since the program began in 2010, it has awarded more than \$15 million in fellowships for

476 cancer research projects undertaken by students, including 223 undergraduates, 143 graduates, 104 postdoctoral fellows and six professional students. The program also has provided international research experiences for 21 Ohio undergrads in India and Brazil, and it has brought 14 students from India and Brazil to contribute to cancer research in Ohio State labs.

The fellowships are peer-reviewed and issued by a committee of faculty cancer researchers chaired by Joanna Groden, PhD, of the Molecular Biology and Cancer Genetics Program at the OSUCCC – James.

On the next two pages are profiles of three Pelotonia fellowship recipients.



Manuel Torres

Since discovering his passion for medicine and research, Manuel Torres' life goal has been to "make a real difference for under-represented cancer patients."

The Pelotonia Fellowship Program gave him his first opportunity to do that.

Working in the lab of David Carbone, MD, PhD, director of the Thoracic Oncology Program at the OSUCCC – James, Torres focused on studying the Brazilian lung cancer population in partnership with the National Cancer Institute of Brazil (NCIB) and Luis Araujo, MD, who leads the NCIB study.

"The Brazilian population has a diverse genetic history that represents a range of people from across the world, making it a great model to study the interaction between genetic ancestry and the incidence of cancer-driving mutations in lung cancer patients," says Torres, a native of Puerto Rico who earned his undergraduate degree in Molecular Genetics at Ohio State and recently joined Northwestern University's Medical Scientist Training Program in pursuit of an MD/PhD.

"Understanding how patients with diverse genetic backgrounds are differentially predisposed to cancer after acquiring

these mutations could (enable doctors to provide) them and many others with personalized therapies tailored to their genetic history," Torres says.

His project involved receiving and processing tumor samples from Brazilian patients on a rolling basis at Ohio State. The researchers used DNA sequencing technology to look for correlations between "ancestry-informative genetic markers" and mutations that drive cancer progression in the samples. They hoped to uncover associations that might be used in the clinical setting.

Torres is grateful for the time he spent in Carbone's lab. "I received exposure to tasks such as grant writing and publishing that will be important later," he says. "That this exposure came from such talented, driven scientists and physicians was a blessing in itself."

He hopes eventually to return home and help train the next generation of Puerto Rican scientists—and perhaps someday lead the University of Puerto Rico Comprehensive Cancer Center—but those are long-term dreams. "First, I want to treat the Latino community in the mainland and gain the experience required to achieve my goals."

As a Team Buckeye rider in Pelotonia, his most memorable moment was just before the start of the event, "when I got to see the uncountable amount of people who were excited to participate in such a good cause. It was inspiring and humbling."



Luxi Chen

Luxi Chen's Pelotonia fellowship project yielded a discovery that could result in new ways to boost the immune system's ability to fight cancer.

"We found a novel precursor of natural killer (NK) cells, which are immune cells that can directly target and kill cancer cells," says Chen, a fourth-year doctoral student who is a native of China but grew up in Canada and San Jose, Calif. She earned her undergraduate degree in biochemistry at UCLA.

"By studying how this precursor develops into a mature NK cell, we can find new ways to boost our immune system to fight cancer," she adds, noting that her study focuses on acute myeloid leukemia but could apply to other cancers. "The idea of having a wide range of applications for this knowledge, and of possibly finding cures, is deeply fulfilling, both professionally and personally."

Chen is mentored on her project by former OSUCCC Director and James CEO Michael A. Caligiuri, MD, who is now at City of Hope National Medical Center in Duarte, Calif., but remains her adviser on record. Aharon Freud, MD, PhD, of the Leukemia Research Program at the OSUCCC – James, is her co-adviser.

Their study resulted in a paper that has been submitted for publication in the journal *Immunity* with Chen as first author, and Caligiuri and Freud as corresponding authors.

Chen is on track to earn her PhD in 2019. She plans to return to medical school for two years after that to earn her MD. “I would like to become a physician-scientist and pursue a career in hematology/oncology,” she says.

2018 marks Chen’s fifth straight year of participating in Pelotonia with Buckeye Student Riders, a group within the Team Buckeye superpeloton. This year she chose the route from Columbus to Pickerington. A well-rounded athlete who enjoys outdoor and indoor cycling, swimming, running and tennis, she looks forward to each Pelotonia.

“My favorite part of the ride is hearing the resounding cheers of families, friends and supporters in the middle of an otherwise quiet country road as riders pass by,” Chen says. “This connection between community and rider inspires and encourages my research endeavors.”



Lindsey Brinton, PhD

Lindsey Brinton’s intense curiosity about how things work—and why they sometimes don’t—has fueled her career in cancer research.

“I was always an inquisitive child,” Brinton says. “I have a strong passion for math and science, and a fascination with how the body functions and malfunctions, so I was easily taken in by the challenge of better understanding how cancer works.”

After earning her PhD in biomedical engineering at the University of Virginia, Brinton came to Ohio State in 2016 to serve as a postdoctoral fellow with Rosa Lapalombella, PhD, John C. Byrd, MD, and James S. Blachly, MD—all members of the Leukemia Research Program at the OSUCCC – James. Brinton studies the DNA of patients with leukemia, focusing on a gene called *BIRC6* that has been found to be different in some patients and thus represents a promising therapeutic target.

With support from her Pelotonia fellowship, Brinton is “testing to see how many of our patients were born with this change and how many acquired it later. I want to understand how this gene contributes to leukemia and how we can use this information to better treat patients.”

Lapalombella is her mentor for this work.

Brinton says her team uses a genomic engineering technology called CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) “to create an endless supply of cells to study that have the same changes as our patients, so we can discover which functions are disrupted. We also test how the cells respond to different chemotherapy drugs, and we find characteristics that we may be able to exploit for new therapies.”

Brinton hopes to one day lead her own laboratory, but for now she is happy working with her team at Ohio State and grateful for the support she receives from Pelotonia.

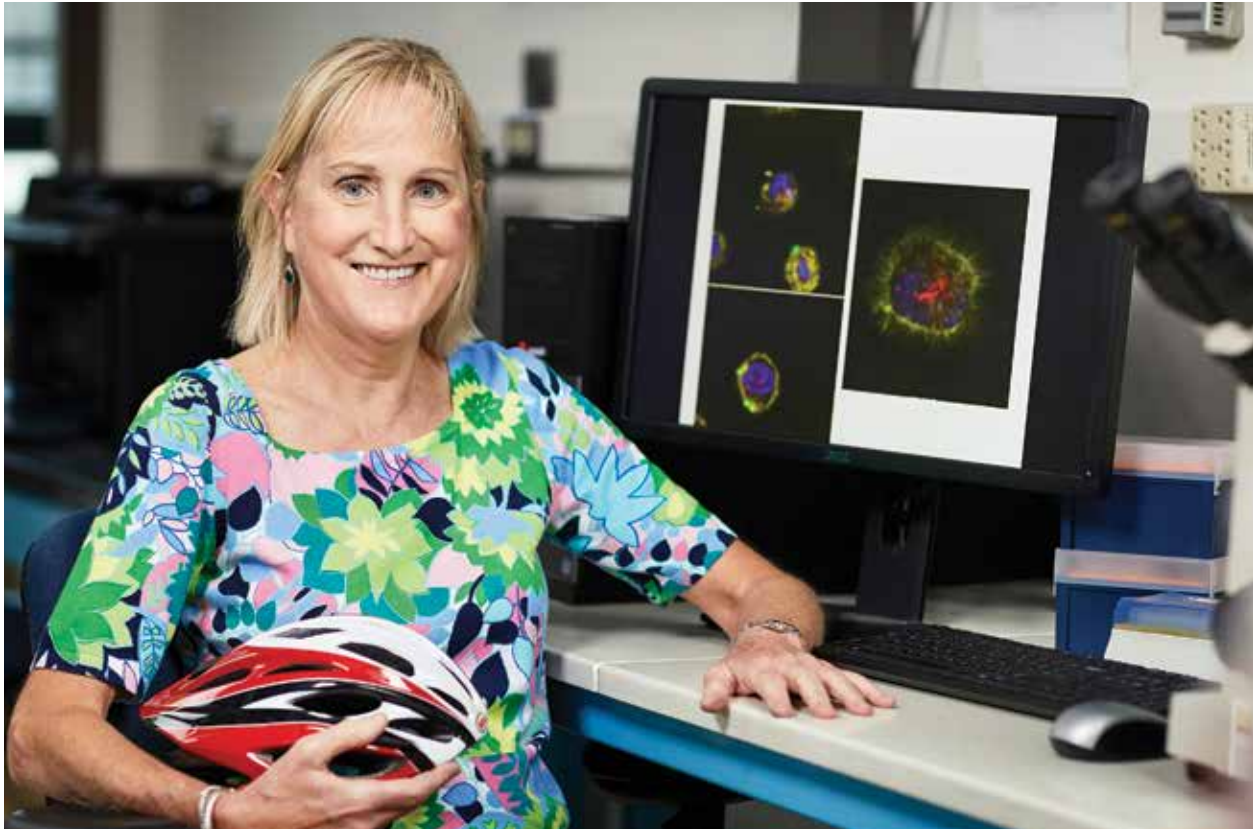
She rode in Pelotonia 17, but this year she was a virtual rider because she recently had a baby. (She and her husband Travis have three children, including a 5- and a 2-year-old.)

Her zest for understanding cancer mechanics also bears a personal dimension.

“Since I began researching cancer, I have lost both of my grandpas to this disease, as well as a friend who lived his life to the fullest and died way too young,” she explains. “So for me, it comes down to channeling my curiosity into helping patients and their loved ones by creating better treatments.” ■

RESEARCHER PROFILE: SUSAN MALLERY, DDS, MS, PHD

Clinical Dental Researcher Rides to Help Patients



Researcher Susan Mallery is a lifelong Buckeye. She earned four degrees at Ohio State—a bachelor's in zoology in 1976, a master's in exercise physiology in '78, a doctor of dental surgery in '81 and a PhD in pathology in '90.

Then she joined the College of Dentistry faculty, specializing in oral pathology, which involves using a microscope to diagnose diseases of the mouth, jaw and face. Today she is a professor and chairs the college's Division of Oral and Maxillofacial Pathology and Radiology.

Research has always been an important part of her life. "My ultimate goal is to advance an idea that will help patients, ideally by preventing a certain disease," says Mallery, who is a member of the Molecular Carcinogenesis and Chemoprevention Program at Ohio State's Comprehensive Cancer Center – James Cancer Hospital and Solove

Research Institute (OSUCCC – James).

"My father died of small-cell lung cancer while I was in dental school, one of my sisters died of Hodgkin lymphoma and another sister died of systemic lupus erythematosus. All this happened within a year and a half," Mallery says. "I think that's why research is so important to me."

She chose Ohio State early on because she wanted good academic training and a chance to participate in competitive sports at a time when few opportunities existed for women athletes.

As an undergraduate, she excelled as a distance runner. Running track and field for Ohio State, Mallery had three top-10 finishes at the Association for Intercollegiate Athletics for Women (AIAW) nationals and earned a second-place finish in the three-mile at the 1976 inaugural Women's Big



Ten Track and Field Championships. Her NCAA rankings qualified her as an All-American.

Off-season, she ran for the Ohio Track Club, where she met Jesse Owens. “He was a tremendously wonderful and gracious man,” she says.

While in graduate school, she won the 1976 and 1977 women’s division of the Marine Corps Marathon in Washington, D.C. She was one of the first women to run a marathon in under two hours fifty-five minutes, and she ranked among the top 20 women in the world in track and field.

In 2007, she was inducted into the Varsity “O” Hall of Fame, Ohio State’s athletic hall of fame. In 2015, she received the Archie M. Griffin Professional Achievement Award from the Ohio State Alumni Association. The award notes that Mallery’s career includes several teaching awards, and that, in 1999, she became the first recipient of the Field Faculty Award recognizing excellence in teaching and research.

Mallery recalls her many achievements modestly, but they describe a level of drive needed for successful medical research, from finding funding to publishing the results.

She has spent much of her career developing methods for preventing oral cancer, a disease that can devastate a person’s quality of life and is often fatal, particularly when caused by tobacco and alcohol use. She is especially interested in chemoprevention approaches that use local delivery formulations to apply natural products and biologics directly to the affected site on the oral epithelial.

This year she applied for and received a Pelotonia Idea Grant. She and her collaborators


are developing nanoparticles that carry two complementary chemopreventive agents. The particles are designed to adhere to and be taken up by cells lining the mouth.

The researchers will then formulate the nanoparticles into lozenges. In the mouth, the lozenges will dissolve, bathing the cells of the mouth with the nanoparticles. Once inside the cells, the nanoparticles will release the two chemopreventive agents, which will inhibit molecular signals that push cells to grow and divide. The goal is to keep precancerous cells that are present from developing into full-blown oral cancer.

“This field-coverage approach delivers these chemopreventive agents to precancerous cells throughout the entire mouth,” Mallery says.

The Pelotonia Idea Grant is enabling the researchers to test the chemopreventive nanoparticles released from a gel in an animal model, which will provide data they need for approval to study the lozenges in a clinical trial.

Mallery has been a dedicated Pelotonia donor from the start, but she ordinarily isn’t a bike rider, she says. 2018 was her first year to ride the event, and she registered for the 50-mile route. She works out aerobically almost daily and rides her bike when she can, preferring her mountain bike with its heavier tires for training rides, and taking it up hills.

Mallery says she rode for her father and sisters, and for a good friend who lost two children to cancer. “I’m joining with the other riders for a common goal: to annihilate cancer.” 

Inspiring Innovation

Pelotonia Idea Grants Help Researchers Pursue Fresh Approaches

Bold, insightful ideas fuel cancer research, but those ideas will go no further than a researcher's notebook without funding. Unfortunately, funding for innovative ideas can be difficult to acquire.

For researchers at the OSUCCC – James, Pelotonia-funded Idea Grants help to resolve that dilemma.

Idea Grants encourage teams of faculty scientists to pursue original ideas and break new ground in research-based treatment. Researchers can apply twice a year for funds to support studies that test their hypotheses and produce data needed to apply later for larger grants from such external sources as the National Cancer Institute.

Over the past eight years, 134 OSUCCC – James research teams have received Pelotonia-funded Idea Grants collectively totaling \$13.8 million. These competitive grants provide support for two years and for up to \$200,000 each. The awards represent the work of researchers across eight colleges at Ohio State plus Nationwide Children's Hospital and Cincinnati Children's Hospital Medical Center.

“We are able to maintain momentum in moving strong emerging research ideas forward thanks in large part to funds raised by the dedicated community of Pelotonia riders, virtual riders, volunteers and corporate sponsors,” says OSUCCC Director Raphael

Pollock, MD, PhD, a medical scientist who also rides in Pelotonia.

Here are examples of Pelotonia Idea Grants awarded in a recent funding cycle. They are listed along with their principal investigators.

Biomarkers to Predict Endometrial Cancer Recurrence



Ashley Felix, PhD, MPH, College of Public Health; OSUCCC – James Cancer Control Program

Endometrial (uterine) cancer is the most common cancer of the female reproductive tract. Following primary treatment, women are at risk of the cancer returning, most commonly in the vagina.

Clinicians need tools to predict which women will experience a vaginal recurrence so they can provide the most appropriate treatment, but no such prediction tools exist. In this study, OSUCCC – James researchers are trying to identify molecular biomarkers for disease recurrence by studying vaginal tampon blood samples from patients diagnosed with endometrial cancer.

Understanding Pathways to Treatment Resistance



Anne Strohecker, PhD, College of Medicine, Department of Cancer Biology and Genetics; OSUCCC – James Molecular Biology and Cancer Genetics Program

Scientists know that cancer cells exploit the body's natural cellular process of breaking down and recycling cellular material—a process called autophagy—to meet their increased energy needs.

Through laboratory experiments, this study seeks to understand autophagy pathways that disrupt and undermine the effectiveness of cancer treatment regimens. These researchers will look at the impact of “turning off” a specific gene involved in autophagy in an established model of non-small cell lung cancer.

IDEA GRANTS

Drug Therapy to Stop Severe Muscle Loss in Patients



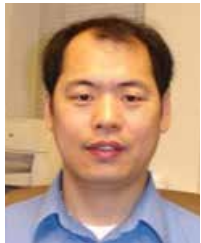
Christopher Coss, PhD, College of Pharmacy; OSUCCC – James Molecular Carcinogenesis and Chemoprevention Program

The involuntary loss of skeletal muscle and fat tissue associated with many types of cancer is called cancer cachexia. This occurs in more than half of advanced cancer cases, reducing both the quality and length of a patient's life.

There are no U.S. Food and Drug Administration-approved treatments to combat cachexia, but OSUCCC – James researchers have discovered a combination of drugs that shows promise in treating it. In this project, scientists seek to understand how to make this combination most effective while also reducing potential side effects.

The drugs have already undergone some clinical evaluation, and the scientists hope this work will result in an early-stage clinical trial to test this combination therapy in patients with advanced cancer.

Deepen Understanding of Suppressor Cells' Role in Cancer Therapy



Xue-feng Bai, PhD, College of Medicine, Department of Pathology; OSUCCC – James Translational Therapeutics Program

Cells of the immune system called myeloid-derived suppressor cells (MDSC) can inhibit the body's immune response to foreign and transformed cells. Scientists therefore believe that MDSC play an important role in cancer progression.

Researchers designed this study to gain insights into the role of MDSC and a natural antitumor substance called IL-27 in cancer progression. They also hope to identify molecular targets for the development of therapies that will capitalize on both mechanisms and ultimately improve cancer treatment.

Improving Immune-Based Treatments for Cancer



William Carson, MD, College of Medicine, Department of Surgery; OSUCCC – James Translational Therapeutics Program

This project focuses on understanding and improving mechanisms by which the immune system can recognize and eliminate cancer cells. This research team will look at how immune-suppressor cells function and which suppressor cells are elevated in cancer patients.

The researchers hypothesize that the effectiveness of immune-based anticancer treatments could be improved by eliminating or "turning off" these suppressor cells. Information gleaned from this study may help scientists reduce the side effects that patients experience as a result of current and new immunotherapies.



Medical Oncologist's Ride Targets Top Cancer Killer



Greg Otterson, MD, a medical oncologist and researcher specializing in lung cancer at the OSUCCC – James, is encouraged by recent progress against this disease, the No. 1 cancer killer worldwide.

Despite this progress, he is bothered by a lack of overall attention paid to lung cancer by media, funding agencies and the public compared to some other forms of cancer.

Otterson attributes these problems to a lingering stigma against the disease. He notes that many consider it a “self-inflicted” illness caused by tobacco use, even though some 20 percent of patients have never used tobacco. He said other factors that contribute to the lack of attention

include a more elderly patient population, late-stage diagnosis, lower survival rates and a lack of compelling spokespersons for lung cancer awareness.

To assuage his frustrations, Otterson hits the road each year for Pelotonia, working to help change the lung cancer landscape for his patients and their families. Since the first Pelotonia cycling event in 2009, he has ridden every year but one, when a schedule conflict forced him to be a virtual rider instead.

“The purpose of Pelotonia is to end cancer by raising money for research,” says Otterson, a professor in the Division of Medical Oncology at Ohio State and member of the Translational

Therapeutics Program at the OSUCCC – James. “Everyone who’s been doing research of any duration recognizes that there’s been a shrinkage of federal monies, so getting finances to support research in whatever ways we can is important.

“On a personal level,” he adds, “I ride to honor my patients and families for all they have to go through.”

He thinks of them often during his usual 100-mile ride from Columbus to Gambier, especially in the second 50 miles, when every pedal stroke is hard. “The first year, I thought, ‘Oh, I can do a 100-mile ride, lots of people can do that,’” he recalls. “I’ve discovered over the past 10 years that it’s actually pretty tough. But so is going through treatment for cancer, so I draw inspiration from my patients.”

Otterson is captain of the Team Lung peloton (riding group), which is part of the Team Buckeye superpeloton representing Ohio State. His team has some 15 members, including several of his colleagues, at least one of his patients and a few family members of patients—not to mention his wife, Mary Ann Murphy, who’s ridden with him every year that he’s ridden in the event.

But not mile for mile. “She usually beats me,” Otterson says. “She’s a much better athlete and has a lot more endurance. She’ll stick with me for the first 50 miles, and then she takes off.”

Despite his frustration over impediments to progress against lung cancer, he is encouraged by dramatic improvements in caring for these patients over the past decade.

“One advance has been the advent of immunotherapy (enhancing the body’s natural ability to combat cancer) through new agents,” he says. “The real question now is, ‘What can we do when patients either don’t respond to immunotherapy or when their cancer progresses again after immunotherapy?’ There’s a new generation of clinical trials looking at next steps for patients, and that’s one of the biggest areas of our research.”

Also transforming cancer care over the past 10-15 years, he says, has been the rise of targeted therapies. “Some of these are amazingly effective—we used to call them ‘Lazarus drugs’—but they’re not ‘forever drugs,’” Otterson says. “Many patients develop resistance, so finding the next targeted therapy is a compelling need.”

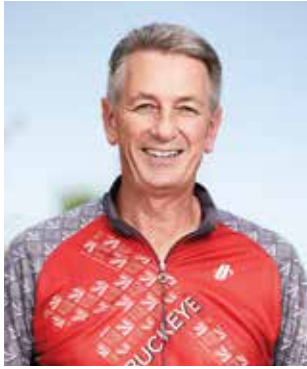
Which is another reason he rode again in 2018, although somewhat apprehensively because his training was slowed by an inclement early spring. But he stepped it up and completed his ride, fueled by patients, families, funding needs and the cheering multitudes he saw along the way.

He notes that, in Pelotonia 17, he was pleased to ride awhile with Clara D. Bloomfield, MD, a Distinguished University Professor who also serves as cancer scholar and senior adviser to the OSUCCC – James. At 76, she still rides 25 miles each year.

“She was on a tandem bike with one of her postdoctoral fellows,” Otterson says, “and that was inspiring. She helps ignite the fire in my belly, anyway. I see her out there and think, ‘All right, I can do this.’” **F**



Survivor Shuns Silence to Share Success Story



After being diagnosed with prostate cancer in May 2013 and having it treated with a robotic prostatectomy at the OSUCCC – James, Marc Zehnder of Vandalia, Ohio, had one goal: to “just go on living” while

telling his story to almost no one.

That changed when he attended a March 2014 memorial service for Emily Marsh-Fleming, a former national champion synchronized swimmer and four-time All-American at Ohio State who had lost her battle with metastatic breast cancer. (She was profiled in the spring 2014 issue of *Frontiers*.)

Zehnder’s wife Kim, a yoga instructor, had met Emily while teaching at Wright-Patterson Air Force Base, where Emily worked. When Emily indicated that her impending cancer treatment would thwart her yoga routine, Kim offered a private and gentler routine for her at the Zehnder home. Emily followed that routine until three weeks before her death.

Although the Zehnders knew that Emily had ridden in three Pelotonias, Marc says he had never considered riding until the day of Emily’s service.

“My inspiration came when her husband, Scott, their family and others told of Emily’s life and accomplishments as an athlete, of her battle with cancer and what riding in Pelotonia meant to her,” Zehnder recalls. “They made it clear she would want others to carry on the fight. Kim and I also wanted to make a difference in someone’s life, as Emily’s story continues to do.”

So his goal to silently go on living morphed into Pelotonia’s “One Goal” to end cancer. Pelotonia 18 marks the Zehnders’ fifth year as riders. In the first four, they raised more than \$35,000; this year they’ll raise several thousand more.

“This is a big year for Pelotonia, which is celebrating its 10th anniversary, and for me,” says Marc, noting

that on June 24 he celebrated five years of being cancer-free.

He attributes his outcome to “early diagnosis and the successful surgery and after-care that I received at The James,” where he was monitored as an outpatient for a year before returning to primary care.

Zehnder, 59, rode 100 miles in his first two years and 180 in the next two. This year he rode 180 again. He and Kim are in the Bikers for Brutus peloton, part of Team Buckeye.

“I’ve been blessed with an amazing wife who has supported me through challenging times, and with many family members and friends who have generously donated to this cause,” says Zehnder, who will carry the names of more than 300 people on his ride.

“Our group does an annual fundraiser in which we ask participants to write the names of people who have been touched by cancer,” he explains. “I fold those papers into a bag to carry in my jersey pocket.”

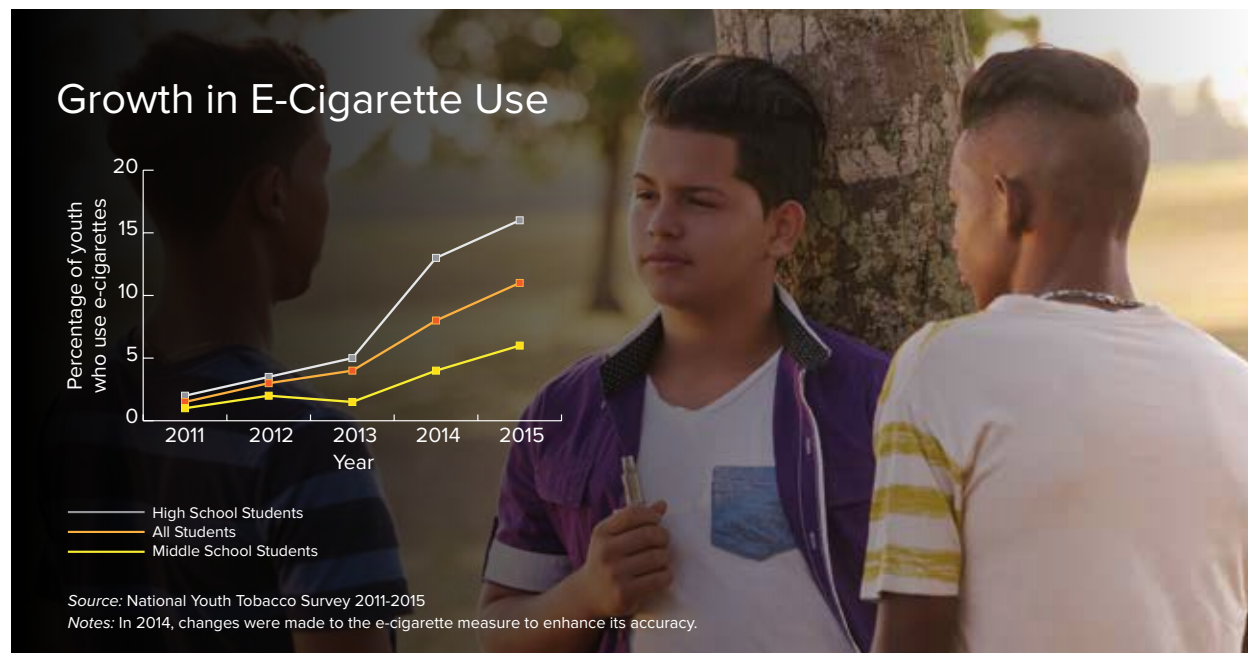
On his ride he thinks of those names often as the miles accumulate. “I think of Emily’s story and of people we’ve met at our events and their stories,” he says. “Then I feel those names I’m carrying and remember that I’m doing this in memory of so many who weren’t as fortunate as I, and in hopes that someday no one will have to do this ride.”

He especially hopes that today’s children, including his granddaughter and great-niece—toddlers Lola and Lucy, respectively—“will never understand the word ‘cancer.’”

Zehnder also is an informational resource for others with prostate cancer.

“Since going public I’ve had inquiries about my treatment choices,” he says. “I share my story with whomever I can. I feel fortunate to have a world-class cancer center virtually in my backyard. I would have traveled thousands of miles for the best treatment. Luckily, I didn’t have to.” ■

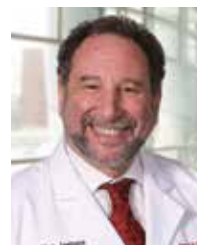
Groundbreaking Answers to Practical Questions



Pelotonia funds support studies by OSUCCC – James researchers that will improve cancer prevention and treatment. Here are two examples.

Pelotonia dollars support study to learn how electronic cigarettes affect lung health in young people and formerly never-smokers

OSUCCC – James researchers Peter Shields, MD, and Mark Wewers, MD, want to learn how electronic cigarettes, or e-cigs, affect lung health compared with traditional cigarettes. They want to know, for example, whether smokers who turn to e-cigs instead of just quitting are harmed by them, and whether e-cigs harm kids who were never smokers. Pelotonia funds are helping them and their colleagues find the answers.



Peter Shields, MD



Mark Wewers, MD

“E-cigs are likely to be safer than cigarettes for long-term use, but we don’t know how much safer,” says Shields, a thoracic oncologist, cancer control researcher and deputy director of Ohio State’s Comprehensive

Cancer Center. “Are they similar to cigarettes or very different? Can they be used like nicotine replacement therapy and other conventional aids to help people quit cigarettes? How harmful are they for adolescents, young adults and others who were nonsmokers but start using e-cigs? We need to know the answers to such questions.”

The study involves 72 participants who fit into one of three categories: current cigarette smokers, e-cig users or non-smokers.

The researchers are using bronchoscopy to directly assess the effects of tobacco and e-cig use on the lungs of the volunteers. During this outpatient procedure, a doctor inserts a thin tube through the nose or mouth to view the airways. A sample of lung cells is collected from fluid in the lungs to evaluate differences among the groups. Participants also provide their demographic information, medical history and tobacco history.

Non-smoker volunteers are asked to use nicotine- and flavor-free e-cigs for one month, and then they undergo a second bronchoscopy so the researchers can observe the effects, if any, of e-cigs on the lungs.

“Using bronchoscopy, we can see in real time how the lung tissue of non-smokers, e-cig users and traditional cigarette smokers differs,” Shields says. “And Pelotonia is helping us to gain this knowledge. We’re using Pelotonia funds to help support the critical bronchoscopy portion of the study.”

The researchers are also looking at how e-cig use affects the immune system. “This could be an important indicator of negative health impacts and give us clues about the changes in lung tissue that lead to future lung diseases,” Shields says.

“Anyone thinking about using e-cigs should have the information about risks and benefits, information that is not known today,” he says. Knowledge gained from Shields’ and Wewers’ study will help the FDA develop policies to make e-cigs safer and to regulate their marketing.

Idea Grant Leads to a Clinical Test That Detects Fusion Genes



Sameek Roychowdhury, MD, PhD

A Pelotonia Idea Grant has helped researchers at the OSUCCC – James to develop an assay that identifies a peculiar but important change that often contributes to cancer growth.

The assay is called OSU-SpARKFuse (Ohio State University-Spanning Actionable RNA Kinase Fusions), and it detects a change in cancer cells called gene fusions.

Gene fusions happen when a chromosome breaks apart and a piece of it becomes attached to another chromosome. Sometimes, such chromosome “translocations” join two genes together, resulting in one abnormal gene that plays

a predominant role in driving cancer-cell and tumor growth.

For this reason, drugs are being developed that block fusion-gene activity, and assays are available to detect their presence in biopsied tumor tissue. These tests, however, require knowledge about the genes that are involved in the fusion. OSU-SpARKFuse, on the other hand, is capable of detecting fusions even when only one of the two genes is known, so the assay can discover previously novel fusions.

“We designed OSU-SpARKFuse to identify patients who are eligible for new therapies that target gene fusions,” says Sameek Roychowdhury, MD, PhD, associate professor in the Division of Medical Oncology at Ohio State, who led development of the assay. “It is an accurate, reproducible, cost-effective assay that detects fusions across many genes and from the small samples of tumor tissue obtained by biopsy. Pelotonia funding was critical to the development of SpARKFuse, and it helped our team obtain a four-year grant from the National Cancer Institute. This has subsequently helped patients become eligible for clinical trials at The James—and that’s why we ride in Pelotonia, for patients.”

OSU-SpARKFuse can provide other genetic information as well, including gene-expression data, single-nucleotide changes, alternative splicing events and resistance genes.

“We believe the clinical use of OSU-SpARKFuse will help expand our knowledge of gene fusions in solid tumors, and it could improve patient care by detecting fusions that we can target therapeutically,” Roychowdhury says. ■

New Hope

Pelotonia Supports Clinical Research at the OSUCCC – James



Clinical research is research that studies people. It includes clinical trials, which investigate the safety and effectiveness of new therapies, and studies that make observations of people to better understand and ultimately solve a medical problem. In this way, clinical research

improves cancer care. Here are two examples of clinical research at the OSUCCC – James that are supported by Pelotonia funds. To learn more about clinical studies available at Ohio State, call The James Line at 800-293-5066 or visit cancer.osu.edu.

Learning How Women With Breast Cancer Make a Critical Decision

A growing number of women who develop cancer in one breast are choosing to have the unaffected breast removed also. The procedure is called contralateral prophylactic mastectomy (CPM). It is typically appropriate for women at high risk for breast cancer, such as

those with a strong family history of the disease or with a mutation in a breast cancer gene.

But a rising number of women with sporadic (nonhereditary) breast cancer are also requesting it. Over the past decade, rates rose to 12 percent, up from 2 percent, among early-stage breast cancer patients, and to 33 percent among younger breast cancer patients. Women say they choose the procedure to reduce fears of developing cancer in the second breast and for greater control over appearance.

What is unclear is how well women understand the risks of CPM, which can include surgical complications, a longer recovery time, a more far-reaching altered body image, impaired sexual experiences and greater financial cost. It's also unknown whether the procedure improves a woman's quality of life or how it affects survival.

Clara Lee, MD, associate professor of Plastic Surgery and a member of the OSUCCC – James Cancer Control Program, is leading a Pelotonia-funded clinical study to better understand how women choose to have the procedure.

“We want to understand how patients make decisions about CPM, and how patients and providers communicate about the procedure,” Lee says. “Patients appear to be the ones who initiate the discussion about CPM, and healthcare providers seem somewhat reluctant to discuss or offer it. But we don't really know what patients and providers are actually saying to each other.”

Lee and her colleagues are studying how women with early-stage breast cancer make treatment decisions and how discussions they have with their oncologists affect their decision. They are also examining the women's knowledge about CPM, their treatment preferences and their quality-of-life expectations.

The two-year study involves 77 women undergoing treatment for breast cancer. The researchers are developing and testing a smart-phone application that study participants are using to record the conversations they have with their oncologists. The researchers will evaluate those discussions for informed decision-making and for patient and provider interaction.

“Past studies like this were done by having a researcher record the conversations,” Lee says. “Empowering patients to do the recordings themselves enables us to do two things—to include patients from all kinds of places, not just academic centers, and to include a wider range of oncology specialists. Those are both critical things for doing more-valid research.”

Lee's collaborators include specialists in surgical oncology, radiation oncology and bioinformatics, and faculty in integrated systems engineering in the College of Engineering, in the College of Public Health and in the School of Communication.

Ultimately, Lee and her colleagues believe their findings will help clinicians better assist patients in making an informed decision about their care.

Improving an Alternative Treatment for Early Lung Cancer

Lung cancer is the leading cause of cancer-related deaths in the United States and worldwide. Of the more than 200,000 new lung-cancer cases diagnosed each year in this country, about 85 percent are a type called non-small cell lung cancers (NSCLCs).

About 15 percent of NSCLC cases are diagnosed at an early stage. Surgery is the best treatment option for these early cases, and 60-70 percent of patients are alive after five years. Sometimes, though, surgery isn't an option for these patients, such as those who are medically frail. These patients are typically treated with radiation therapy, but their survival rates tend to be lower than for those treated with surgery. This is likely due to pre-existing medical conditions that limit their life expectancy.

The problem is that the dose of radiation delivered to many lung tumors must be reduced to protect nearby vital structures, such as the heart and aorta. “This results in lower rates of tumor control and poorer clinical outcomes,” says Terence Williams, MD, PhD, associate professor of Radiation Oncology. Williams and Nicholas Denko, PhD, MD, professor of Radiation Oncology, have designed a Pelotonia-funded phase I clinical trial to address the problem. They are testing the use of a drug that makes lung tumors more sensitive to lower doses of radiation. If it works as planned, it will enable lower-dose radiation to kill more tumor cells.

The researchers call it “biologic dose-escalation.”

“We are using a drug to make the tumor more sensitive to radiation as a novel way to improve tumor control in patients who cannot have full-dose treatment,” Williams says.


The drug Williams and Denko are studying is an FDA-approved agent called papaverine. It’s a muscle relaxant that has been used for more than 100 years and has an excellent safety profile. Earlier laboratory studies by Denko had shown that papaverine reduces oxygen consumption in cancer cells, making it more available in the tumor microenvironment. Low

oxygen levels are an established mechanism by which radiation works less effectively.

The researchers believe that the drug will help overcome a form of resistance to radiation that occurs in solid tumors. It happens because solid tumors have poor blood circulation, which leaves many areas of a tumor poorly oxygenated, or “hypoxic,” and low-oxygen levels protect cancer cells from being killed by radiation. In fact, it can take a radiation dose that is two to three times higher to kill hypoxic cancer cells compared with fully oxygenated cancer cells.

“Based on our preclinical studies

of papaverine, we proposed a phase I trial in patients with NSCLC to test the safety of the drug in combination with radiation,” Williams says. “We believe papaverine could dramatically improve tumor control after radiation, with minimal damage to normal tissue. Thanks to Pelotonia, we can test our hypothesis.”

Williams’ and Denko’s study could have broad implications. “If we can reverse the effects of tumor-induced hypoxia and improve the success of radiotherapy in these NSCLC patients,” Williams says, “it might also apply to many other tumor types.” 



Statewide Initiatives

Pelotonia Dollars Help OSUCCC – James Target Colorectal, Endometrial and Lung Cancers in Ohio



Pelotonia funds are helping the OSUCCC – James change the landscape of cancer care by supporting three major statewide initiatives that promote early detection and better outcomes for patients with colorectal, lung and endometrial (uterine) cancers in Ohio.

These initiatives extend the OSUCCC – James' individualized screenings, education and care throughout the state via partnerships with a network of 50 community hospitals. The overall goal is to elevate cancer care and reduce healthcare costs while saving lives.

Beating Lung Cancer – In Ohio (BLC-IO)

BLC-IO has two aims: to evaluate the effect of advanced gene testing combined with expert advice on lung cancer treatment and patient survival, and to improve smoking-cessation rates among smokers with lung cancer and their family members and improve patients' quality of life. BLC-IO is funded with \$3 million in Pelotonia money.

The effort is led by Peter Shields, MD, deputy director of the OSUCCC, David Carbone, MD, PhD, director the Thoracic Oncology Center at the OSUCCC – James, Mary Ellen Wewers, RN, PhD, MPH, and Barbara Andersen, PhD. Wewers and Andersen are in the Cancer Control Program at the OSUCCC – James.

A three-year period of patient recruitment began in March 2017. Project leaders anticipate that more than 2,000 newly diagnosed patients with stage IV non-small cell lung cancer will enroll in BLC-IO via the community hospital network. Each enrollee will receive free testing for more than 300 genes in their cancer specimens, and the local physicians who treat them will receive expert support for interpreting test results and determining treatments.

In addition, the BLC-IO will provide smoking-cessation support for up to three years to all participating lung cancer patients and family members. Researchers will test different models for smoking-cessation support in collaboration with primary care physicians.

Ohio Prevention & Treatment of Endometrial Cancer (OPTEC)

Women with LS (described at right) have a 40-60 percent lifetime risk of endometrial cancer. OPTEC aims to recruit up to 700 women with endometrial cancer from at least 25 partner hospitals and to screen them for LS and other inherited genetic mutations that raise the risk of endometrial and other cancers. Tumor samples will undergo molecular profiling to guide and personalize treatment according to each patient's tumor characteristics.

OPTEC was launched by the OSUCCC – James in 2017 and is being funded through \$1.25 million in Pelotonia dollars. The initiative is led by David Cohn, MD, director of the Division of Gynecologic Oncology, and geneticist Paul Goodfellow, PhD, with multiple collaborators from the OSUCCC – James and Nationwide Children's Research Institute.

Patients identified with LS and their at-risk family members will be educated about the importance of genetic testing and cancer-prevention strategies based on their highest risk of LS-associated cancers. Those whose tumors have defective DNA mismatch repair will be considered for immunotherapy clinical trials for endometrial cancer.

OPTEC will conduct its LS screening with a novel one-step genetic sequencing technique developed by Goodfellow and Elaine Mardis, PhD, a geneticist at Nationwide Children's Research Institute. Genomic profiling also will help identify patients most likely to benefit from new medical therapies, including immunotherapy drugs that target certain proteins.

Ohio Colorectal Cancer Prevention Initiative (OCCPI)

The OCCPI began in 2013 and has involved \$4.3 million in Pelotonia funds over five years to establish the 50-hospital network—which also serves the other initiatives—and to set the stage for screening newly diagnosed colorectal cancer (CRC) patients and their biological relatives for Lynch syndrome (LS), a cancer-causing condition that occurs when a person inherits a mutation in one of four genes.

People with LS are very likely to develop CRC, endometrial, ovarian, stomach or other cancers. The OCCPI screenings were designed to identify patients and family members who may be at risk of developing these cancers so they can take precautionary measures, including heightened surveillance for early detection.

“Increased monitoring of these patients, through such procedures as annual

colonoscopies starting at age 20 to 25, can save lives by catching precancerous polyps early and removing them before cancer develops,” says OCCPI principal investigator Heather Hampel, MS, LGC, associate director of the Division of Human Genetics at Ohio State.

The OCCPI technically has ended, but Pelotonia money is still covering some costs through 2018 to collect and analyze data and to officially close the project. Hampel says the screening effort enrolled 3,346 newly diagnosed CRC patients, of whom 143 tested positive for LS. She also reports that 204 of their relatives tested positive, while an additional 101 CRC patients were found to have a hereditary cancer syndrome other than LS.

She and colleagues estimate the OCCPI will save about 1,000 years of life and provide some \$32 million in benefit to the community because of the lives it has saved in Ohio through early diagnosis of LS and, consequently, a reduced need for cancer treatment.

“Our study findings demonstrate the need and value of screening early-onset CRC patients,” Hampel says, noting that she and colleagues are working to launch this screening approach nationally. “We believe the OCCPI can serve as a roadmap for other states to implement LS screening as well.” ■



Instruments of Discovery

Digital Pathology Update

Traditionally, pathologists diagnosed cancer by placing biopsy specimens on glass slides and examining them under a microscope. But glass slides are difficult to store, retrieve, transport and share with colleagues.

In 2017, the OSUCCC – James initiated a comprehensive digital pathology program. Digital pathology involves taking tissue mounted on microscope slides and scanning them to produce digital images that have the same diagnostic detail as the original slide. With a few clicks, an OSUCCC – James pathologist can call up a patient’s virtual biopsy, paired with clinical information, to quickly get an integrated picture of the patient’s unique cancer, allowing faster delivery of optimal therapy.

In addition, Pelotonia funds have enabled the digital pathology service to scan more than 570,000 tumor sections stored on glass slides from 50,000 past cancer cases. This digital archive, which includes associated clinical data minus all identifying patient information, is now available to cancer researchers worldwide.


“Thanks to Pelotonia, those specimens will see new life and contribute to the discovery of new biomarkers and new ways to more accurately diagnose cancer,” says Anil Parwani, MD, PhD, MBA, who leads the digital pathology project for the OSUCCC – James and the Department of Pathology, and directs anatomic pathology at Ohio State’s Department of Pathology.

Stacking the 570,000 slides digitized by the Digital Pathology Service would create a column 19 times taller than The James.

In a related project, Wendy Frankel, MD, chair of Pathology, is using a Pelotonia Idea Grant to develop image-analysis techniques that will accurately assess tumor budding in digital images of colorectal cancer tissue sections.

Tumor budding happens when individual or small clusters of tumor cells pinch off, or bud, from the front edge of an invading tumor. Colorectal cancers that show cancer-cell budding may be aggressive, spread to lymph nodes, recur and have worse outcomes.

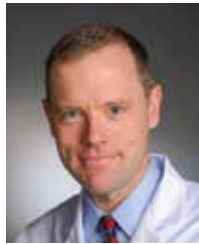
“Tumor budding can be an independent prognostic factor in colorectal cancer and help determine a patient’s treatment,” says Frankel, whose research team includes other pathologists, image analysis scientists and a biostatistician.

Frankel and her colleagues will also compare their computer-assisted evaluation of tumor budding with manual evaluation. Last, they will correlate tumor budding with clinical and pathological features already collected by the Ohio Colorectal Cancer Prevention Initiative, a statewide Pelotonia-supported project that involved 50 Ohio hospitals. 



Bringing the Best Research to Ohio State

Some of the brightest minds in cancer research are attracted to the OSUCCC – James and its vast array of resources. Pelotonia dollars help these researchers continue their groundbreaking work when they arrive. Among the many recent recruits are these prominent scientists:



Brad Blaser, MD, PhD, is an assistant professor in the College of Medicine, Department of Internal Medicine, Division of Hematology. He also is a member of the Leukemia Research Program at the OSUCCC – James. He is a medical scientist whose research interest involves identifying factors in the hematopoietic niche that promote the development of myeloid neoplasia.



Edmund Folefac, MBCHB, is an assistant professor in the College of Medicine, Department of Internal Medicine, Division of Medical Oncology. He specializes in genitourinary cancers, melanomas and lung cancers. His research focuses on smoking cessation in the context of preventing lung cancer,

and on screening, healthcare efficiency, cancer and aging, and personalized medicine.



Nicole Grieselhuber, MD, PhD, is an assistant professor in the College of Medicine, Department of Internal Medicine, Division of Hematology and Division of Medical Oncology, where she conducts research in acute myeloid leukemia (AML). Her research interests include molecular mechanisms of leukemogenesis, pharmacology of targeted inhibitors and applying genomic technologies to patient care.



Amanda Hummon, PhD, is an associate professor in the College of Arts and Sciences, Department of Chemistry and Biochemistry. Her research interests involve

analytical chemistry and chemical biology, with a focus on cancer biology. Her team develops analytical methods to evaluate the transcriptome and the proteome in cancer cells, while exploring deregulation in cancer-associated signal transduction pathways.



Zachary Schultz, PhD, is an associate professor in the College of Arts and Sciences, Department of Chemistry and Biochemistry. His team focuses on developing tools for identifying molecules relevant to biomedical diagnostics and other applications. To do this, the team builds and develops instrumentation that takes advantage of chemical properties to characterize complex biologic samples.



Hiral Shah, MD, is an assistant professor in the College of Medicine, Department of Internal Medicine, Division of Medical Oncology, where she specializes in treating patients with melanoma and other cutaneous malignancies. Her research focuses on early-phase clinical trials using immunotherapy for treatment of cutaneous malignancies. She also works to identify predictive biomarkers in melanoma patients who develop brain metastasis.



Gina Sizemore, PhD, is an assistant professor in the Department of Radiation Oncology and member of the OSUCCC – James Molecular Biology and Cancer Genetics Program. Her research integrates *in vitro* and *in vivo* modeling of the brain metastatic tumor microenvironment (TME) to provide mechanistic insight into how the brain metastatic TME contributes to breast cancer metastatic progression. Current studies aim to elucidate whether platelet-derived growth factor receptor-beta (PDGFR β) signaling is a promising pathway for diagnostic and/or therapeutic purposes for metastatic breast cancer patients.



Steven Sizemore, PhD, is an assistant professor in the Department of Radiation Oncology and member of the OSUCCC – James Molecular Biology and Cancer Genetics Program. His research focuses on elucidating the mechanisms of cancer metastasis and developing therapies to improve outcomes for patients with metastatic disease. Metastatic breast cancer and metastatic soft tissue sarcoma are the areas of concentration for his research.



Philip Tschlis, MD, is a professor in the College of Medicine, Department of Cancer Biology and Genetics. He also serves as co-leader of the Molecular Biology and Cancer Genetics Program at the OSUCCC – James. His lab focuses on using insertional mutagenesis and other genetic strategies to identify genes involved in causing cancer or regulating phenotypic changes in tumor cells. Tschlis and colleagues have identified and exploited a number of genes implicated in cancer, including *Akt1*, *Tpl2*, *Gfi-1* and *Gfi-1B*.



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INSIDE THE NEXT FRONTIERS

THE OSUCCC'S NEW LEADER

Raphael Pollock, MD, PhD, a globally respected cancer surgeon, researcher and educator, became the new director of The Ohio State University Comprehensive Cancer Center (OSUCCC) in November 2017. He was recruited to Ohio State in 2013 from The University of Texas MD Anderson Cancer Center, where he had worked for 31 years and held several leadership positions. In the next issue of *Frontiers*, Pollock will relate his vision for propelling Ohio State's cancer program forward, including the development of innovative centers and initiatives.