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On the cover: Jessica Hawley, MD, assistant professor of medicine and member of the Herbert Irving Comprehensive Cancer Center, was re-deployed to the hospital during the start of the pandemic in New York City in the spring of 2020.
The Herbert Irving Comprehensive Cancer Center (HICCC) has a wide-ranging portfolio of basic, clinical, and population science research supported by funding from government, foundation, and industry sources.
The nearly 200 researchers and physicians that are members of the HICCC are dedicated to understanding the complex biology behind cancer, from before it begins to its evolution and spread. The HICCC has four formal research programs that organize our membership.
DIRECTOR’S MESSAGE

Anil K. Rustgi, MD

Director, Herbert Irving Comprehensive Cancer Center
Associate Dean for Oncology and Irving Professor of Medicine
Vagelos College of Physicians and Surgeons
Chief, Cancer Service, NewYork-Presbyterian/Columbia University Irving Medical Center
Interim Executive Vice President and Dean of the Faculties of Health Sciences and Medicine
Columbia University Irving Medical Center

The COVID-19 pandemic hit our city and our hospital with a relentless force. In the face of this challenge, however, we are continuously encouraged and inspired to see the overwhelming response of our Columbia and NewYork-Presbyterian communities. We have observed nothing short of heroism from our physicians, advanced practice providers, nurses, fellows, residents, students and countless other frontline healthcare staff working around the clock. Our patients have remained our steadfast priority, and every day, our frontline workers tirelessly provide top care to all those walking through our doors. We will never be able to say thank you enough to all of the first responders to this global crisis.

Our research community has also mounted a remarkable complementary response to the pandemic. Our members are involved in a variety of projects geared to discover new ways to treat or protect against the virus. These innovative projects cut across campuses, schools, disciplines, and programs, highlighting the importance of such scientific collaboration that the HICCC fosters. From developing an app to help track and predict new COVID-19 hotspots, to finding ways to rapidly test hundreds of potential therapies, to deploying a “crack team” of scientist volunteers across the medical center, our HICCC members are leading COVID-19 research efforts across the board.

While the pandemic necessarily shifted some of our efforts, our members have also forged ahead in our vision to end cancer everywhere. Despite the logistical challenges of operating remotely, researchers across Columbia have come together, building new pathways between disciplines to solve cancer. Our teams of clinicians and scientists are rapidly translating the discoveries made in our labs directly to lifesaving treatments for our patients, and bringing learnings from our patients back to our labs. We have expanded outreach into our communities through new virtual venues allowing us to reach more people in new ways.

In August 2020, the HICCC was competitively renewed again as a designated Comprehensive Cancer Center by the National Cancer Institute (NCI), the largest funder of cancer research in the world. The redesignation comes with a five-year support grant of $26.5 million—an increase of nearly 40% in funding over the previous support grant. The HICCC was one of the original NCI designated cancer centers in 1971, and this most recent renewal marks more than 40 years since the HICCC has maintained its status as a comprehensive cancer center, reaffirming our place among the top cancer centers in the United States.

Columbia’s Vagelos College of Physicians and Surgeons is projecting to be fifth in the nation for total NIH funding for the federal fiscal year 2020. Nature Index ranked Columbia University Irving Medical Center as the #2 health care institution in the world for scientific research in 2020, a reflection of the quality and impact of our research publications in leading journals. We take equal pride in NewYork-Presbyterian Hospital’s ranking as the #4 hospital in the nation in the 2020 US News and World Report. The HICCC is immersed in an exceptional environment of patient care, community engagement and outreach, biomedical research, and education and training. Now, more than ever, we are steadfast in our mission to reduce the burden of cancer for our patients, our community, and the world.

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Anil K. Rustgi, MD

Photo: Anil K. Rustgi, MD
IN THE FACE OF A PANDEMIC

HICCCC RESEARCHERS ADDRESS COVID-19

Deemed an epicenter of the COVID-19 pandemic in March 2020, New York City summoned clinicians across the city and the country to the front lines of the pandemic.

At the same time, the scientific community mobilized and converged its diverse areas of expertise to problem-solve a cure for the virus in real-time. We witnessed an incredible outpouring of rapid response by academic researchers to aid in a cure or uncover the fundamental biology driving the novel coronavirus, including from our own cancer researchers at the Herbert Irving Comprehensive Cancer Center. That momentum has not waned.

Alex Chavez, MD, PhD
Rapid Antiviral Drug Development

Viruses use tiny molecular scissors called proteases to process their proteins. By identifying drugs that block these molecular scissors, scientists have created a slew of breakthrough antiviral therapies, most notably to treat HIV and viral hepatitis.

For the past two years, Alex Chavez, MD, PhD, a member of the HICCC’s Precision Oncology and Systems Biology program and assistant professor of cell biology and pathology, has worked with his lab on innovative methods to rapidly identify protease inhibitors to viruses.

Their method enables them to investigate multiple viral proteases at once, including those from over a dozen different coronaviruses, to identify inhibitors to block them. By looking at multiple coronavirus proteases at a time, their group, as early as March, began working to identify a novel pan-coronavirus protease inhibitor. They have since identified three structurally diverse compounds with the ability to inhibit proteases from multiple coronaviruses, including the SARS-CoV-2 3CL protease.

The Chavez lab is actively investigating these compounds as they can lead to the basis for antiviral drug development. While the need is pressing for a treatment that works specifically against COVID-19, Dr. Chavez stresses, “This is the third time we’ve seen a coronavirus strain cause a public health crisis. We know this will continue to happen, and it’s time once and for all we identify a compound that has broad activity against coronavirus, not just COVID-19.” Dr. Chavez is working as part of a collaborative effort at Columbia to identify antiviral drugs for novel coronavirus, led by David Ho, MD, scientific director of the Aaron Diamond AIDS Research Center and professor of medicine at Columbia, and with Brent Stockwell, PhD, professor of biological sciences and chemistry.

“This is an opportunity for us to show our value as scientists to society in a very clear and concrete way. It has been a terrible time for all of us but also it’s been a joyous time seeing how people are coming together, especially the scientific community. The level of mobilization is unprecedented. There is such a dissemination of ideas right now.”

—Alex Chavez, MD, PhD

David Brenner, PhD
A Safe Type of UV Light that Kills Airborne Coronaviruses

In the age of COVID-19, gathering in indoor spaces—public transportation, schools, office buildings, and restaurants—have been designated riskier due to the probability for more person-to-person contact and potential for transmission of infected droplets. David Brenner, PhD, and his team at Columbia’s Center for Radiological Research, has a game-changing solution to address this, one that can not only protect us from today’s coronavirus outbreak but future pandemics as well.
The team has developed a novel approach using a particular type of ultraviolet light called single-wavelength far-ultraviolet light, or far-UVC light, that has the ability to inactivate viruses and bacteria, without inducing any harmful exposure to humans.

“The approach is based on the biophysically-based principle that far-UVC light, because of its very limited penetration in biological materials, can traverse and kill viruses and bacteria which are typically micrometer dimensions or smaller, but it cannot penetrate even the outer dead-cell layers of human skin, nor the outer tear layer of the human eye,” says Dr. Brenner, a member of the HICCC and professor of radiation biophysics at Columbia.

In a paper published in Scientific Reports, the researchers demonstrated that more than 99.9% of seasonal coronaviruses present in airborne droplets were killed when exposed to far-UVC light. The sensitivity of the coronaviruses to far-UVC light suggests that it may be feasible and safe to use overhead far-UVC lamps in occupied indoor public places to markedly reduce the risk of transmission of coronaviruses. The Brenner lab has previously shown that far-UVC light can safely kill airborne influenza virus. In an ongoing study, they are testing the efficacy of far-UVC light against airborne SARS-CoV-2, and preliminary data suggest that it is just as effective at killing the novel coronavirus.

Far-UVC light technology, says Dr. Brenner, is now being implemented in various locations, including in the elevators at the Seattle Space Needle, Boeing planes, and Bluestone Lane chain of restaurants.

“Far-UVC light really does have the potential to be a powerful tool in our battle against COVID-19,” says Dr. Brenner, “and I might add not just that, but against influenza and against the next pandemic virus if and when it comes.”

“*The approach is based on the biophysically-based principle that far-UVC light, because of its very limited penetration in biological materials, can traverse and kill viruses and bacteria which are typically micrometer dimensions or smaller, but it cannot penetrate even the outer dead-cell layers of human skin, nor the outer tear layer of the human eye.***”

—David Brenner, PhD

Jessica Hawley, MD

**Uncovering the Clinical Impact of COVID-19 on Patients with Cancer**

At the start of the COVID-19 pandemic, cancer patients were advised to stay home and isolate in order to minimize risk of infection. There was little known at the time about the novel SARS-CoV-2 virus that leads to the disease COVID-19, including its causes and clinical outcomes, particularly across patients with underlying conditions, like cancer. What was undeniable was its precipitous spread and the devastating health effects.

The COVID-19 & Cancer Consortium (CCC19), which includes the Herbert Irving Comprehensive Cancer Center, grew from a grassroots “call-to-action” via Twitter by scientists motivated to better understand the COVID-19 impact on the cancer patient population. Advised by Drs. Dawn Hershman, Gary Schwartz, and Jason Wright, Dr. Jessica Hawley, who was redeployed to treat COVID-19 patients at NewYork-Presbyterian in the height of the New York City surge, began contributing data to the consortium within 10 days of that “call.” The CCC19’s registry was conceived and developed in less than a month.

“These efforts by COVID-19 & Cancer Consortium are so important now, as the pandemic continues to spread across the country and globe. Hopefully everyone can learn from our patients’ collective experiences.”

—Jessica Hawley, MD

“Early on, we knew New York City was trending towards becoming the next epicenter, after China and Italy, and our team felt it was important to be a good citizen and contribute Columbia’s cases to national efforts for a broader understanding of the disease patterns, mortality, and other outcomes,” says Dr. Hawley, assistant professor of medicine.

As a result of the data being generated by the CCC19, several studies are underway to analyze it by various treatment subgroups. One CCC19 study, published in Lancet, found that cancer patients with COVID-19 are twice as likely than the general patient population to die or become severely ill from COVID-19. Other ongoing studies are looking at health disparities in COVID-19 care and the impact of COVID-19 on cancer immunotherapy patients. The consortium now comprises over 120 cancer centers and other organizations worldwide.

“These efforts by CCC19 are so important now, as the pandemic continues to spread across the country and globe,” says Dr. Hawley, “Hopefully everyone can learn from our patients’ collective experiences.”
IN THE FACE OF A PANDEMIC

CRACKING DOWN ON COVID-19

When New York City shut down due to the COVID-19 outbreak in the spring, many college campuses across the U.S. also had to temporarily shut down their non-essential lab operations and research, including at Columbia University Irving Medical Center.

Suddenly, active researchers in academia found themselves with an abrupt shift to their daily routines. That shift mobilized a team of volunteers to respond to COVID-19.

Columbia University Researchers Against COVID-19, or CRAC for short, launched with a team of nearly 400 volunteers of mostly students, postdocs, and staff scientists. (It grew to up to 750 volunteers). CRAC quickly came together to assist with numerous projects ranging from supporting clinical efforts to science research and assisting with data management to logistical support.

“We felt that even though we weren’t on the front lines of patient care, as researchers, our expertise and skill sets are a valuable resource that could be tapped into in a number of ways,” says the group’s faculty adviser Kenneth Olive, PhD a member of the Herbert Irving Comprehensive Cancer Center (HICCC) and associate professor of medicine. “The idea behind CRAC was to pool our collective expertise and develop a streamlined process to deploy it across areas of need.”

CRAC is assisting Columbia’s Institutional Review Board with database management and in monitoring the status of nearly 6,000 clinical studies and building a database of all COVID-19 efforts at Columbia. The team helped process thousands of COVID-19 patient samples, including plasma, serum, and nasopharyngeal swabs, enabling critical research at CUIMC.

The idea for CRAC started with a Columbia research scientist, Álvaro Cuesta-Domínguez, PhD, seeking help to expand diagnostic testing capacity at NewYork-Presbyterian Hospital and CUIMC and from there, it rapidly grew in scope and vision to assist many COVID-19 research efforts. Says Dr. Cuesta-Domínguez, “This initiative sends out a message of cooperation, solidarity, and commitment that speaks volumes about the Columbia research community.”

“Besides the good coming out of the projects themselves, having well-oiled volunteering organizations on campus has given us all a chance to share good news and feel hopeful as a community.”

—Natalie Steinemann, PhD
IN THE FACE OF A PANDEMIC

FACES OF THE FRONTLINE

The spring of 2020 in New York City marked a challenging time as our city became an early epicenter of the COVID-19 pandemic.

With the world reeling from the rapid spread of COVID-19, here at Columbia University Irving Medical Center, physicians, nurses, clinical staff, students, and administrators sprang into action on the frontline. Many across the HICCC and CUIMC stepped up to serve in the crisis, caring for COVID-19 patients or assisting in relief efforts. We pay tribute to them for their fearless dedication then, and their ongoing courage now.

“I was motivated to assist during the COVID-19 crisis by one simple concept: We cannot allow a preventable death to occur due to a lack of personnel. With a shortage of PPE, nurses, doctors, and respiratory techs, it seemed critical that any able-bodied medically trained professional should come to the aid of both New Yorkers in need, as well as our colleagues in need. It was vitally important for members of the CUIHC leadership team to join the effort to care for patients to set an example that would rally the faculty, house staff, and nurses and demonstrate that they would not be asked to do anything that we were not willing to do ourselves.”

James McKiernan, MD

“When COVID-19 hit New York City, it was a frightening time for us all. In spite of this fear, we felt called to protect our cancer patients, allow our health care workers to continue to function in a safe work environment, and provide a sense of hope that we would all get through this together. We found that even at our lowest moment we can rally together and still provide the best cancer care anywhere.”

Gary Schwartz, MD

“My patients are immune suppressed and are at high risk. I had a personal desire to protect them from exposure to and possibly contracting COVID-19, and I felt an overwhelming need to make sure that they were as safe as possible when coming to get care for their cancer diagnosis. As a nurse practitioner, caring for patients is a calling, not just a job. This was a public health crisis never seen before in my life and I knew I could help in some small way. It was super important to offer my skills and use them to the fullest to protect our patients who know us and trust us.”

Maura Abbott, PhD, CPNP
"As the COVID-19 case numbers rose in the city and the risks were still so unknowable, I wasn’t sure I had it in me to put myself and my family aside to walk into the maelstrom. That was something I imagined firefighters doing, not me. But I knew Columbia had trained me for this, and had prepared me well. I had a duty to serve my city. And frankly, I couldn’t imagine myself anywhere else but on the frontlines.”

Jessica Hawley, MD

“In crisis, I feel like my flight or fright response kicks in and I run towards the crisis. I was scared that working on the frontline would expose me to the COVID-19 virus, but I knew I had skills that could be useful to assist during the crisis. I could not just sit home and do nothing when I knew people were out there suffering and dying every day. I particularly felt it was important to volunteer to assist with the COVID-19 plasma research study because I wanted to be part of a project that was going to save lives.”

Kellie Bryant, DNP

“I’ve seen so much incredible solidarity amongst my colleagues. Everyone who shows up every day in the hospital to help provide the best quality of care to people in one of their most vulnerable and sickest points in their life. We’re happy to be on the frontlines during this devastating pandemic, and we will be here as long as necessary to take care of everyone in our community and anyone else around this country and around the world that needs our care. We’ll be here for you.”

Craig Spencer, MD

“We are all connected. The COVID-19 pandemic has shown us the negative effects of this interconnectedness. Yet the creative human spirit has shown how we can use our interconnectedness to uplift and support each other and remain resilient. I’ve learned that honesty, empathy, authenticity, and consistency are key to facilitating the healing process and ensure those we encounter, especially our workforce, get the best care.”

Krystelle Pring, RN, OCN

“While members of my physician and nursing teams have bravely volunteered to help care for the many ICU patients—including COVID patients on ventilators—my charge has largely been to keep our staff and patients safe. We’ve made many positive changes, including incorporating tele-radiation oncology visits, that will ultimately make us more efficient and effective. The crisis has been an opportunity for team-building, culture change, and program improvement. My team is awesome and they’ve stepped up during these difficult times. What we have accomplished together is truly amazing.”

Lisa Kachnic, MD

“I’ve learned that interdisciplinary collaboration is essential for positive health outcomes. Throughout my redeployment, I worked directly with nurses, medical assistants, security guards, physicians, infectious disease specialists, specimen runners, laboratory specialists, custodians... every single member of our team is invaluable. Diverse perspectives solve complex problems, and that has been quite evident this year.”

Claire Brieva, DNP

Photo: Claire Brieva, DNP
In fact, it was their co-mentee and student, Chowdhury, who got this dream team together in the first place.

Inspired by the explosion of cancer immunotherapy studies, Chowdhury, a PhD student in the Integrated Program at Columbia’s Vagelos College of Physicians & Surgeons, began brainstorming ways to couple his interest in synthetic biology with cancer immunotherapy. At the time, Chowdhury had been rotating in the Danino lab, and Dr. Danino, associate professor of biomedical engineering and member of the Herbert Irving Comprehensive Cancer Center (HICCC), had been investigating strains of bacteria for a programmable delivery system to kill cancer cells.

“I wondered whether we could use these programmable bacteria to home to tumors, grow, and release waves of potent immunotherapeutics exclusively within the cores of tumors,” says Chowdhury. “The hope was that we could sustainably deliver high-dose immunotherapy within the tumor, while preventing off-target toxicity and side effects. For this, Tal and I both knew we needed an expert in immunology.”

The beauty of Columbia’s Integrated Program in Cellular, Molecular, and Biomedical Studies (CMBS), is that it allows for graduate students in their first year to rotate in any Columbia lab involved in biomedicine broadly, and that’s precisely what Chowdhury did. A module of the course was taught by Dr. Arpaia, assistant professor of microbiology and immunology and member of the HICCC. Chowdhury began learning more about Dr. Arpaia’s research, including his graduate work in understanding immune factors governing virulence of pathogens and his postdoctoral work on the diverse roles of regulatory T cells in health and disease.

“Inspired by Nick’s papers and lectures in immunology, I brought up the idea of setting up a meeting between the three of us. Tal is super supportive of his trainees forging new research directions for the lab so he instantly agreed,” says Chowdhury.

The three have since formed a tightly knit research team, with their eyes set on cutting-edge cancer research. Both Drs. Arpaia and Danino lean to out-of-the-box ideas that meld bacterial cancer therapy and immunotherapy in a way to increase its efficacy as a therapeutic and also enhance its safety.

In the Nature Medicine paper, the researchers demonstrated a novel engineered system to deliver immunotherapy from bacteria, which is priming the patient’s own immune system to fight the cancer. In a mouse model of lymphoma, the therapy led not only to complete regression of treated tumors, but also demonstrated it could prime the immune system to seek and treat distant untreated tumors.

The team recently developed engineered probiotics to safely deliver immunotherapies within tumors, work that was published February 2020 in Science Translational Medicine. These include nanobodies against two proven therapeutic targets—PD-L1 and CTLA-4. Through this platform, drugs are continuously released by bacteria and continue to attack the tumor after just one dose, facilitating an immune response that ultimately results in tumor regression. The versatile probiotic system, say the researchers, can also be used to deliver multiple immunotherapies simultaneously, enabling the release of effective therapeutic combinations within the tumor for more difficult-to-treat cancers like colorectal cancer.
While true for many research fields, investigating a complex problem like cancer requires expertise from multiple disciplines. Says Dr. Arpaia, “In order to have a successful multidisciplinary collaboration, you have to have trainees who are committed to doing research in a truly interdisciplinary fashion.”

Trust plays a big role.

“I don’t know everything Tal knows about synthetic biology, and I’m not going to. And Tal isn’t going to know everything I know about immunology,” says Dr. Arpaia. “Our collaboration is us agreeably trusting each other for our own expertise. And, we’re jointly making sure that we have our bases covered but also explaining to each other the cool parts about our fields.”

The team is working on optimizing their bacteria-based cancer immunotherapy to eventually test in the clinic, and have had conversations about therapeutic dosing and toxicity with Gary Schwartz, MD, deputy director of the HICCC, an oncologist, and visionary in targeted cancer therapy. At the end of the day, adds Dr. Arpaia, “We are all equally committed to doing impactful science the best way we can.”

“I’m so happy that Nick and Tal are writing and winning multiple grants together and involving more members of both labs on collaborative projects,” says Chowdhury. “They’re pretty close friends now, and I’m happy to have been the catalyst.”
There has been strong evidence linking a high risk of cancer to patients who have oral diseases, such as periodontal disease, so we know the connection is there,” says Dr. Momen-Heravi, “but there is a lot of research that we need to do in order to study those pathways and try and determine what some of those risk factors are for our dental patients with oral disease.”

Dr. Momen-Heravi, a member of the Tumor Biology and Microenvironment research program at the Herbert Irving Comprehensive Cancer Center (HICCC), dedicates time to patient care in CDM’s teaching clinics and teaches didactic courses. In addition to investigating the biology behind head and neck cancer, the Momen-Heravi lab has active collaborations across departments to explore novel therapeutic delivery and investigate the molecular mechanisms of head and neck cancer and its link to other diseases, including diabetes and periodontal disease.

Her lab has a particular interest in the role of small vesicles, called exosomes, and non-coding RNAs in the pathogenesis of cancer and inflammation-related diseases. Dr. Momen-Heravi and collaborators use advanced tools of biochemistry, molecular biology, and synthetic biology to identify and investigate the key players and mechanistic principles underlying these intercellular communications. They also utilize the CRISPR-CAS system to edit the cancer, tumor microenvironment, and activate immune cells in the immune system to be able to engineer tumor associated macrophages to combat cancer.

In a project with fellow HICCC member Akiva Mintz, MD, PhD, division chief of nuclear medicine at Columbia, Dr. Momen-Heravi is developing a genome-editing platform using engineered exosomes to target the KRAS mutation in lung cancer. The work, which was recently awarded a Translational Therapeutics Accelerator grant, supported in partnership by the HICCC and the Irving Institute for Clinical and Translational Research, is utilizing exosomes—the body’s natural transport system—as a delivery mechanism for targeted gene editing in the lung to deliver targeted treatment for non-small cell lung cancer (NSCLC), the most common type of lung cancer.

“What we are doing is programming them to deliver a specific drug or message that we want carried out to the tumor or to the tumor microenvironment in a very cell specific way,” she says. “It’s very exciting work.”

Dr. Momen-Heravi is a big proponent of collaborating with colleagues from diverse fields to address problems in cancer. “We’re very much about ‘team science.’ We can’t go at these research projects alone.”

Another joint project with Alison Taylor, PhD, a HICCC member and assistant professor of pathology and cell biology at Columbia, is tackling racial disparities in cancer research. The two are working closely to identify the genomic and molecular profile of head and neck cancer in Black and Hispanic patient cohorts from the HICCC catchment area.

“When we set out to conduct more research in head and neck cancer and we turned to the Cancer Genome Atlas database of mutations and molecular information of these patients,
there was very little known about these patient populations,” says Dr. Momen-Heravi. “This presents a big problem in precision medicine and in our aim to provide personalized therapy to all cancer patients.”

This ongoing work, say the researchers, will help them build a more complete picture of cancer in historically underrepresented groups in research and enable them to conduct more thorough investigations on specific molecular drivers of cancer across a racially diverse patient set and develop personalized cancer treatment for those patients. In their initial analysis, they identified molecular changes and mutations in patients with African ancestry that have not yet been reported.

“We’re very much about ‘team science’. We can’t go at these research projects alone.”

—Flora Momen-Heravi, DDS

Drs. Momen-Heravi and Taylor plan to work with the HICCC Cancer Population Science research group to expand this work. “This is something that’s very close to my heart and this is something that can really change and address a disparity in cancer research,” says Dr. Momen-Heravi. “Knowing the biological basis of cancer in a diverse spectrum of patients, in collaboration with population health, could really move things forward in the field of precision therapy and ultimately benefit the individual patient.”

Dr. Momen-Heravi, a native of Tehran, Iran, moved to Boston after dental college to focus on basic science research at Harvard Medical School. She has a PhD in molecular biology and biotechnology and an MPH in quantitative methods and biostatistics. As a periodontist who specializes in head and neck cancer research, Dr. Momen-Heravi finds that the dovetailing of the two fields not only fits her own professional interests but also provides a wide coffer of complex problems in cancer to address.

“That is the beauty of science—you get interested in one thing and that leads to a question that leads to many more questions,” she says. “My own curiosity often leads me to the research problems I work on.”
There is hardly a person whose life hasn’t been touched by cancer in some way. Cancer, however, does not affect people equally.

As physicians and researchers explore causes and treatments for cancer, they are also uncovering significant differences, or ‘disparities,’ in the number of cases of cancer and outcomes of cancer based on race and ethnicity, on gender and age, on a patient’s geographic location, or on their personal financial means. In breast cancer, a building body of research has revealed multitude of cancer care disparities, and patients who are among the minority underserved demographic are hit the hardest.

The overall breast cancer incidence among Black and Latino populations has continued to grow even while breast cancer mortality rates have declined in some populations. Studies have shown a disproportionate number of Black women in the U.S. continue to receive late-stage breast cancer diagnoses, a point where treatment options become limited and expensive and survival rate is poor. To date, breast cancer mortality is about 40 percent higher for Black women in the U.S. than white women, despite the many advances and improvements in screenings and breast cancer treatment and care.

“Cancer health disparities is not only about finding differences in cancer care or mortality, but also addressing outcomes that are disproportionately affecting groups or individuals that face greater challenges to protecting their health for reasons linked to longstanding social, economic and healthcare inequities,” says Parisa Tehranifar, DrPH, a member of the Herbert Irving Comprehensive Cancer Center (HICCC) and associate professor of epidemiology at the Mailman School of Public Health. “As a result, many racial and ethnic minority, low income and immigrant populations carry a heavy cancer burden.”

Researchers from a range of disciplines and expertise areas at the HICCC are investigating different segments of breast cancer disparities. Many are focusing on discerning the ‘why’ behind specific disparities with the ultimate goal of proposing ‘how’ to implement change or eliminate the gaps to those in underserved populations who are disproportionately affected. In the HICCC catchment area, where 65% of cancer patients are underrepresented minorities, data has shown that disparities persist. The HICCC’s catchment area encompasses the five New York City boroughs and three neighboring counties in New York and New Jersey.

“Looking at the HICCC catchment area there is a big difference—we have a lower incidence of breast cancer than the U.S. but higher mortality rates in some areas of the catchment area like Washington Heights and the Bronx,” says Mary Beth Terry, PhD, a professor of epidemiology at Mailman who co-leads the HICCC’s Cancer Population Science program. “Why is that? Why are fewer women in...
Washington Heights and Inwood being diagnosed with breast cancer but of those who are diagnosed, more are dying from the disease? These cancer health inequities need to be addressed.” Dr. Terry and her research team focus on the role of environmental exposures and specifically endocrine disrupting chemicals in affecting breast cancer risk particularly in young women.

Dr. Terry also directs the Community Outreach and Engagement Office (COE) at the HICCC which strives to reduce the burden of cancer for HICCC cancer patients and their families by bringing together researchers, clinicians, and community health educators to address access barriers to cancer prevention, screening, treatment and survivorship services.

Identifying racial disparities in breast cancer represent just one piece of a complicated and challenging puzzle, and the approaches to tackle the layered components in health disparities research require a multidisciplinary one.

“Identifying racial disparities in breast cancer represent just one piece of a complicated and challenging puzzle, and the approaches to tackle the layered components in health disparities research require a multidisciplinary one.

“Changes in breast tissue, as measured through mammographic breast density—a strong risk factor for breast cancer—have shown to be associated with changes in breast cancer risk. This suggests that examining these changes in breast tissue can provide fundamental mechanistic data,” says Dr. McDonald. “Our goal is to understand what those factors are that are contributing to increased risk of breast cancer in postpartum women.”

How some HICCC researchers are tackling different corners of health disparities:

What’s Behind Postpartum Breast Cancer?

Jasmine McDonald, PhD, who specializes in maternal health research and is a member of the HICCC’s Cancer Population Science program, is interested in understanding what drives postpartum breast cancer. Research has shown that after giving birth, women are at an increased risk of developing breast cancer, up to 10 years postpartum. A new study by Dr. McDonald and her collaborators is attempting to uncover the reasons behind this link.

For this pilot study, researchers are investigating women’s breast biology using a non-invasive imaging technique to track and measure changes in the breast during a set period postpartum. Named MAMA BOSS, which stands for the Milk Associated Markers and Breast Optical Spectroscopy Study, the project focuses on minority women during two time points—within six weeks of their first full-term pregnancy and birth.

The researchers are also examining breast milk of women who are nursing their newborns, attempting to understand why breastfeeding mothers appear at less risk for developing breast cancer. Breastfeeding is known to mitigate cancer, including its most aggressive forms, but it is still unclear how breastfeeding practices impact the physical and structural changes in breast tissue composition.

“We know that Black women are getting more aggressive breast cancers and have higher mortality because of their differences in reproductive behavior,” says Dr. McDonald, noting that Black women breastfeed their babies at lower rates than white women. “The idea that more Black women don’t breastfeed, could that be contributing to their increased risk? How does breastfeeding protect you from cancer?”

MAMA BOSS will aim to examine the breast microenvironment while simultaneously contributing to the dearth of knowledge on postpartum breast biology.

The Toxic Side Effect of the Costs of Cancer

Defined as the harmful personal financial burden faced by patients receiving cancer treatment, the idea of financial toxicity is relatively new but becoming more of an accepted adverse “side effect” of cancer care. Patients could be hit hard by out-of-pocket costs, transportation costs, co-pays, or a potential loss of employment while undergoing cancer treatment.

A new study, led by Dawn Hershman, MD, MS, and Melissa Beauchemin, PhD, RN, is investigating financial toxicities of cancer treatment, including in breast, gynecologic, and pediatric cancers. The researchers’ goal is to develop a multi-level intervention that would address a patient’s financial burden or potential financial burden early on in their treatment, such as through effective financial screenings and financial navigation programs that can help reduce or mitigate financial toxicity.

“You can imagine, conceptually, as we learn more about
financial toxicity we could both predict patients who are at risk for it but also identify high financial toxicity in the same type of way that we grade a toxicity of a drug in treatment,” says Dr. Beauchemin, a postdoctoral research fellow and program director of Columbia's Minority Underserved NCI Community Oncology Research Program. “We worry about the families who are doing okay financially until they are hit with breast cancer and the costs of treatment and everything else that goes along with a diagnosis.”

Drs. Hershman and Beauchemin, along with collaborators in Columbia’s Departments of Obstetrics and Gynecology, Pediatrics, and the Mailman School of Public Health, will explore ways to collect and integrate patient-reported financial hardship and financial worry into the electronic health record system. Their project will test the feasibility of implementing a brief financial toxicity screening survey and will measure the effect on social work and financial support referrals. This type of system-level intervention is not yet well established at institutions, say the researchers, but could ultimately narrow the healthcare disparity in a sub-group of patients who are hit the hardest financially from their diagnosis.

“Everyone who is diagnosed with cancer is at risk for financial toxicity,” adds Dr. Beauchemin. “But the population who is at risk for disparate care—the minority underserved population—is at an even higher risk. Financial toxicity screening of cancer is not yet part of routine care but it should be.”

Ancestry, Biology, and Breast Cancer Survival

Women of African heritage suffer a higher breast cancer mortality compared to their European counterparts but there is little known yet about the biological basis for these disparities, and they remain poorly defined. In new research, Kevin Gardner, MD, PhD, professor of pathology and cell biology, and a team of collaborators are investigating molecular attributes that play a role in worse breast cancer survival based on race.

“Women of African ancestry in the United States have a 40% higher mortality from breast cancer than women of European ancestry,” says Dr. Gardner, “and we want to know what are the key biological drivers for this disparity.”

In earlier observations, scientists studying a cohort of breast cancer patients of West African descent determined that a transcriptional factor that drives gene expression, called Kaiso, seemed to have higher expression or higher activity in triple-negative breast cancer, one of the more lethal forms of breast cancer that recurs earlier and is often more resistant to treatment. Triple-negative breast cancer occurs at nearly double the rate in women of West African ancestry compared to women of European heritage.

In this project, Dr. Gardner is taking a deep dive into the role Kaiso plays, both in the nucleus and cytoplasm of breast cancer cells, and its association with racial differences in survival outcome in several epithelial cancers. Together with a multi-disciplinary team of breast cancer pathologists, cancer biologists, computer scientists, biostatisticians, bioinformaticians and data scientists, Dr. Gardner will aim to define new prognostic and predictive biomarkers that link Kaiso to tumor progression, the immune tumor microenvironment, breast cancer outcome, and how their association differs by race.

“Although health disparities research is much more prominent in public health and population sciences, pathologists were quick to recognize the importance of social and environmental factors in disease. Discussions on this realization date back to the early 19th Century and are reflected in the work and writing of Rudolf Virchow who acknowledged the essential role played by epidemiology in understanding the etiology and pathology of disease,’” says Dr. Gardner, a member of the HICCC’s Cancer Population Science program and chief officer for diversity and inclusion at the HICCC.

“Though the major focus of health disparities research is driven by the social and behavioral sciences, the elucidation of the role played by biology and how that role may be differentially influenced by genetic ancestry will be essential for improving the diagnosis, treatment, and prevention of breast cancer health disparities.”

Optimizing Mammography Screening in Older Women

Mammography screening is the cornerstone of breast cancer prevention and the frequency of mammographies can be optimized based on a woman’s risk for breast cancer, health status, and personal preferences. Professional guidelines do not support routine mammography screening in older women (75 years or older), and recommend that older women are informed about the benefits and harms of mammography. Yet, older women continue to undergo routine frequent screenings and are seldom informed or engaged in decision making around mammography with their healthcare providers.

A study led by Parisa Tehranifar, DrPh, a breast cancer epidemiologist and cancer health disparities researcher, will
assess and adapt strategies currently in place for shared
decision making among low-income and racial and ethnically
diverse populations in the HICCC’s local patient community,
and will investigate—through interviews and focus groups
with providers and decision-makers—how to reduce
mammography overuse and how to culturally adapt and test
existing patient educational and decision-making tools for
mammography screenings among older Hispanic women.

“This is an understudied population and a population that has
really been left out of the conversation,” says Dr. Tehranifar.
“One of the things that we want to support is informed
decision making for older women, an age group where the
question of screening frequency or cessation has to be really
individualized to the woman.”

Dr. Tehranifar, who is a member of the HICCC’s Cancer
Population Science program, has assembled a multi-PI team
funded by Velocity, Columbia’s ride to end cancer, that
includes Rachel Shelton, ScD, MPH, a social and behavioral
scientist with expertise in implementation science, health
equity, and community-engaged research, and Nathalie
Moise, MD, MS, implementation science expert and primary
care provider dedicated to treating predominantly low
income, racial minority and older adults.

“At their core, cancer health disparities are social problems
that have biological and health consequences. They are
complex and multi-level, and manifest in different ways,
depending on what dimension of disparity or specific health
outcome we’re considering,” says Dr. Tehranifar. “So in all our
cancer care research and services, we need to be vigilant
and prepared to not only reduce the burden of cancer but
reduce, and ultimately, eliminate cancer health disparities.
Our commitment is to do both.”

Sources: Surveillance, Epidemiology, and End
Results (SEER) Program; Division of Cancer
Prevention and Control, Centers for Disease
Control and Prevention.
RESEARCHERS ON THE CUTTING EDGE

HITTING PANCREATIC CANCER WHERE IT HURTS

Dr. Olive’s Laboratory Works on Finding New Strategies For Treatment

Columbia University biologist Kenneth Olive, PhD, isn’t afraid to tackle a hard problem. He has dedicated his life to finding a cure for pancreatic cancer, one of the toughest types of cancer to treat. Ninety percent of patients in the U.S. diagnosed with this deadly disease will die within just five years, making it the cancer with the lowest overall survival rate.

“What it comes down to is that pancreatic cancer doesn’t respond well to existing drugs,” says Dr. Olive, associate professor of medicine and member of the Precision Oncology and Systems Biology research program at the Herbert Irving Comprehensive Cancer Center (HICCC). “We take the entire arsenal that has been deployed against other cancers, test it on pancreatic cancer, and there is little effect.”

His laboratory works on finding new strategies for treatment that target aspects of biology needed by pancreatic cancer to survive. In other words, Dr. Olive and his colleagues look for an Achilles’ heel—called a targetable critical dependency—and see how well a certain drug or combination of drugs works to exploit that weakness.

Recently, they discovered that a drug in development for a rare kidney stone disease acts on one of these targetable critical dependencies for pancreatic cancer. Cancer cells have a detoxification system that allows them to get rid of reactive oxygen species (ROS), which left uncontrolled, will wreak havoc on DNA and key proteins. When tumors grow, they create an excess of ROS, and it needs to be cleared by the detoxification system.

The researchers wondered if dismantling this detoxification system and letting ROS run wild in tumor cells would prove effective against pancreatic cancer. They decided to inhibit a particular transporter that brings an amino acid called cysteine—a key resource needed for the detox process—inside the cell. To test their hunch, Dr. Olive and his colleagues genetically engineered mice in which the transporter could be suddenly deleted and found that this caused their tumors to stop growing or regress.

“Of course, we’re not going to genetically engineer patients, so we needed a drug to do the same thing,” he says. “We encountered a paper reporting on an artificial enzyme that could break down cysteine in the blood. We thought, this seems appropriate—fortuitous, in fact.”

They obtained the enzyme, which is being developed for the treatment of cystinuria, a genetic disorder that leads to high levels of cysteine in the urine. When given to mice with pancreatic tumors, the cancer cells began to die. This work, helmed by Dr. Olive’s former graduate student Michael A. Badgley, PhD, was published by Science in April.

While his research continued during the pandemic, Dr. Olive took on another challenging role. He helped launch an organization, Columbia Researchers Against COVID-19, which connected volunteers with hospitals and labs that needed help responding to the pandemic. Columbia students, postdocs, and technicians forced to stay out of the labs during lockdown gave their free time to aid local hospitals and COVID-19 research efforts.

“We ended up with 750 volunteers who wanted to contribute. The largest project was a deployment of over 150 volunteers to the NewYork-Presbyterian Hospitals at the height of the pandemic,” says Dr. Olive, who also directs the Oncology Precision Therapeutics and Imaging Core at the HICCC. “We staffed four hospitals for three shifts, 24 hours a day, seven days a week providing manual labor, folding scrubs, and handing out meals.”
Since the university’s reopening, his lab has kept busy while exercising safety precautions like rotating shifts and social distancing. His focus has returned to solving the puzzle of pancreatic cancer, and despite the difficulty it poses, Dr. Olive remains hopeful that survival rates will improve. He gives the example of malignant melanoma, a once-lethal cancer that has an improved outlook today due to a wave of new treatments.

“When I started my career 20 years ago, malignant melanoma was almost uniformly lethal. But over the years, a combined immunotherapy approach has led to frequent major responses to the disease,” says Dr. Olive. “That’s a really great archetype to reach for pancreatic cancer, and we’re beginning to see examples of drugs or drug combinations that produce more frequent minor responses. So I’m optimistic.”
COMMANDING KILLER T CELLS
Tissue-resident T Cells Act as Sentries, Ready to Attack Invading Pathogens

Despite being a type of white blood cell, the T cells that immunologist Donna Farber, PhD, studies aren't found in the bloodstream. Instead, these immune cells remain stationed in the lungs and other organs like soldiers, ready to attack invading pathogens, including tumor cells.

Her investigations of these tissue-resident T cells, as they're called, have larger implications for treating cancer with immunotherapy as well as better understanding diseases like COVID-19.

“We typically think of immune cells in humans as being in blood, but in fact, the majority of your immune cells are in tissues,” says Dr. Farber, a member of the Herbert Irving Comprehensive Cancer Center and professor of surgical sciences and of microbiology & immunology at Columbia’s Vagelos College of Physicians and Surgeons. “Cancer will tend to arise within tissue, and there’s a growing realization that these tissue-resident T cells are playing a role in anti-tumor immunity at the site.”

While immune cells are studied most often through blood samples, sampling immune cells in blood does not include the many types of non-circulating immune cells based in tissues. In fact, most of the body’s lymphocytes—the type of white blood cell that includes T cells—take up residence in places like the lungs, intestines, liver, and skin rather than in the bloodstream.

Previously, Dr. Farber and her colleagues discovered a new subset of tissue-resident T cells that appeared in the lungs of mice after influenza infection. These virus-specific T cells killed all the infected cells in the lung, clearing out the infection—and unexpectedly stuck around afterward.

“The T cells stayed exactly where they needed to be, around the airways and just remained there like sentries. When re-challenged with the virus, the mice were fully protected, and the virus was cleared very quickly,” she says. “In other words, you have your immune response exactly where you need it, and it’s all ready for action.”

To go beyond animal studies, Dr. Farber and her colleagues established a first-of-its-kind collaboration with the organ procurement organization for the New York Metropolitan area, LiveOnNY, to obtain healthy human tissue samples for research on the human immune system. If an individual has consented to have any tissue or organs used for research, a transplant surgeon from NewYork-Presbyterian Hospitals will go to the site of acquisition to gather the donated samples and bring them back to Columbia. Other research institutions around the world have since adopted this same type of arrangement.

This approach also allows the Farber lab to study multiple tissues from a single person to produce maps of how the immune system is organized throughout the body. These maps generate a new baseline for a healthy immune response in tissue, which can be used to understand how that situation changes when it comes to cancer.

When the pandemic hit New York City in March, Dr. Farber decided to pivot her research and use her expertise in immunology to study COVID-19. Her laboratory analyzed respiratory secretions of patients with COVID-19, which contain tissue-resident T cells, and compared them to blood samples.

“What we found correlated with survival was what was happening in the airway, not in the blood. So more T cells in the airway correlated with a better outcome, whereas the proportion of T cells in the blood didn’t correlate,” says Dr. Farber, who recently received a grant from the Chan Zuckerberg Initiative for this line of research.

In addition, she is applying her knowledge of how the immune system changes with age to another COVID-19 puzzle. Children are often asymptomatic, while older adults remain at risk for developing serious complications. Why does this large discrepancy exist? Dr. Farber says one reason
is that the number of naïve T cells, which learn to recognize new pathogens, declines sharply with age.

“Older people really don’t have many naïve T cells left, and that is a known phenomenon, but we were able to show that you lose them in tissues as well,” she says. “Normally the lack of naïve T cells in adults does not affect responses to pathogens that we regularly encounter because adults have already established efficient immunological memory responses and one rarely encounters pathogens that are completely new, like SARS-CoV-2. Children, however, have ample supplies of naïve T cells to respond to newly encountered pathogens and therefore are faring better overall.”
**ELECTION TO NATIONAL ACADEMIES**

HICCC Members Elected to the National Academies for Pioneering Work in Cancer

Congratulations to four members of the Herbert Irving Comprehensive Cancer Center (HICCC) for their election to the National Academy of Medicine and the National Academy of Science. Election into these prestigious groups underscore individual achievements in the fields of health, medicine, and scientific research.

**Andrea Baccarelli, MD, PhD**  
**National Academy of Medicine**

Andrea Baccarelli, MD, PhD, is a member of the HICCC’s Cancer Population Science research program and chair of the Department of Environmental Health Sciences at the Mailman School of Public Health. The National Academy of Medicine is recognizing him for his “pioneering work showing that environmental chemicals and lifestyle risk factors adversely affect the human epigenome, thereby producing adverse lifetime health consequences.” As an epigeneticist and clinical endocrinologist, Dr. Baccarelli explores epigenetic and molecular mechanisms as potential functional pathways linking exposures to environmental pollutants to human disease.

**Wendy Chung, MD, PhD**  
**National Academy of Medicine**

Wendy Chung, MD, PhD, a member of the HICCC’s Cancer Genomics and Epigenomics research program, is professor of pediatrics and of medicine at Columbia’s Vagelos College of Physicians & Surgeons. The National Academy of Medicine is honoring her for “identifying the genetic basis for over 45 monogenic conditions (two of which bear her name) across a wide range of diseases, and leading the pivotal study of newborn screening for spinal muscular atrophy.” The academy also is distinguishing Dr. Chung for her role as the original plaintiff in the Supreme Court case that overturned the ability to patent genes. Dr. Chung has extensive experience mapping and cloning genes in humans, and describing the clinical characteristics and natural history of novel genetic conditions and characterizing the spectrum of disease. Her expertise also is in developing tailored care and treatments for rare genetic diseases.

**Angela Christiano, PhD**  
**National Academy of Science**

An expert in alopecia areata, an autoimmune form of hair loss, Angela Christiano, PhD, is a member of the HICCC’s Cancer Genomics and Epigenomics research program, professor of dermatology, and professor of genetics and development at the Vagelos College of Physicians and Surgeons. She focuses on understanding the genetic and molecular mechanisms that underlie inherited skin and hair disorders in humans, and her lab’s research has led to the identification of potential therapeutic targets for this disorder, in particular, the use of JAK inhibitors for the treatment of alopecia areata. Most recently, Dr. Christiano and her collaborators have begun applying the lessons learned from autoimmune mechanisms in alopecia toward improving anti-tumor immune responses in melanoma.

**Lorraine Symington, PhD**  
**National Academy of Science**

Lorraine Symington, PhD, a member of the Cancer Genomics and Epigenomics research program and professor of microbiology and immunology at Columbia, studies how the cell repairs harmful DNA damage. When both strands of DNA break, homologous recombination is the main mechanism for repair, and defects in this repair mechanism have been associated with increased mutagenesis and cancer. The Symington lab investigates this important pathway using budding yeast as a model system. They have developed innovative genetic assays to identify the genes that function in this pathway and used molecular tools to investigate their mechanism of action. Her research has led to new insights into the role of homologous recombination in maintaining genome integrity and suppression of tumorigenesis.
A SUMMER “CURE” FOR BUDDING SCIENTISTS

The transition from high school to college can be an overwhelming experience for many, and for Beatriz Duran-Becerra it was that, plus a dose of self-doubt. As the daughter of Mexican immigrants and the first to attend college in her family, Duran-Becerra, who navigated the college admission process mostly on her own, felt out of place when she first arrived at Columbia University in the fall of 2014. She sought support and guidance from a program, called CURE, which helped give students with a knack for science the boost they needed to blaze their own trail.

“The CURE program was a highlight of my time at Columbia. The program helped build my self-confidence and also pushed me to think of even bigger goals to set for myself.”

—Beatriz Duran-Becerra

The Herbert Irving Comprehensive Cancer Center (HICCC) has offered CURE, which stands for Continuing Umbrella of Research Experiences, to Columbia freshmen and local high school students, with an emphasis on under-represented people of color, low socioeconomic status, or first-generation college, as a way to expose them to hands-on experiences in science, medicine, and research. The two-year program provides resources that benefit all young students, including mentorship and assistance with the college application process.

CURE is typically offered to up to 12 qualified students—six undergraduates and six high schoolers—who gain direct experience working in a lab, participate in current scientific research, connect with a Columbia faculty mentor, and get exposed to guest speakers who are leading scientists and physicians. Last summer, CURE operated a bit differently due to the COVID-19 pandemic.

When COVID-19 hit New York City in the spring many people, including school-age children, were forced to turn to online learning, and they continued to do so through the summer with virtual camps and activities.

Last June, Community Outreach and Engagement Office (COE) and Cancer Research Career Enhancement Core (CRCE) of the HICCC partnered to hold an online-only science, humanities, and career enrichment week and in July, a month-long program that mirrored the CURE program. Over 120 students registered for this program and approximately 100 students logged on daily for a variety of courses, including how to develop a hypothesis and design a scientific study, and programming centered on career advice in science and medicine. The students were also exposed to lectures about cancer research, cancer health inequities, and COVID-19.

“We didn’t expect to see that many students consistently each day. They were so engaged,” says Jasmine McDonald, PhD, assistant professor of epidemiology at Columbia’s Mailman School of Public Health and co-director of CURE. “These are students who love science, who love research and perhaps don’t get enough hands-on opportunities at their schools.”

One high school participant says she appreciated learning from a diverse set of guest speakers. “All of my science teachers have been men except for fifth grade,” says aspiring doctor Oriana Parsa, a high school sophomore. “It was powerful to see that there are so many women in the cancer research field.”

Through its programming, COE, directed by Mary Beth Terry, PhD, underscores the benefits of exposing young students to science and research, giving them an authentic experience of what the field is like, either as a college student or as a career choice.

For Duran-Becerra, who worked full-time as an outreach navigator at COE following graduation, CURE helped her solidify science as a career choice. In the fall, she started a master’s degree program in public health at Yale.

“Drs. Terry and McDonald were intentional with their mentorship—always following up and checking in on my progress,” adds Duran-Becerra. “They would constantly remind us that we had a place in research and that our voices are important.”

Photo: Beatriz Duran-Becerra
NEWFOUND HOPE WITH CELL THERAPY

Jenna Strickland has checked in and out of multiple hospitals and doctors’ offices since childhood. Born with cystic fibrosis, a chronic genetic disorder that debilitates the lungs and other organs, Jenna knows too well the pain of suffering from chronic illness and the daily fight to regain her health. Two years ago, she overcame a battle that at times she did not think she could win: non-Hodgkin lymphoma, and she did it with a revolutionary treatment known as T-cell immunotherapy—when the immune system rallies to fight the cancer.

Jenna, 31, found herself on a lung transplant waiting list in 2015 after suffering long periods of illnesses and difficulty breathing related to the cystic fibrosis. At the time, her lungs were functioning at just 18% of normal capacity. She had just started graduate school for a master’s degree in social work, and had to put that and other life plans on hold. That summer, she underwent a double lung transplant, a 10-hour surgery, conducted at NewYork-Presbyterian/Columbia University Irving Medical Center.

“The transplant was a very rough recovery,” says Jenna, “but after three weeks, I regained my strength, felt healthier, began exercising again, and things started to look up.”

In January 2016, six months after her surgery, Jenna began experiencing severe sore throat that required prescription pain medication. It wasn’t too long after that she was diagnosed with non-Hodgkin lymphoma, specifically post-transplant lymphoproliferative disorder, or PTLD. PTLDs are lymphomas that can develop in patients who are taking immune-suppressant drugs after a transplant.

Under the care of lymphoma specialist Dr. Changchun Deng, Jenna underwent chemotherapy that eradicated the cancer, but a year later the cancer came back. Jenna experienced a toxic reaction to aggressive second-line chemotherapy that was needed to eliminate her cancer.

“I thought I was going to die,” she says. “I knew I couldn’t go back to chemo. I knew that the cancer was still there and that I was in pain. And, I was only 27. My family and I were so worried.”

When Jenna met with Dr. Ran Reshef, medical director for the CAR-T Cell Program at Columbia University Irving Medical Center, to discuss a cell therapy clinical trial, she and her family regained hope. Jenna was scared, and knew little about this new form of treatment but also decided that this was her chance for a cure.

In recent years, cutting-edge cancer immunotherapies have shown success in treating a wide range of cancers; still, many approaches to immunotherapy are in the research phase and only a few immunotherapies are FDA approved. Jenna received cytotoxic T-cells called Tabelecleucel, or tab-cel, immune cells that are directed against Epstein-Barr Virus (EBV)—the main driver of lymphoma that appears after transplant.

Now over two years after her tab-cel treatment, Jenna remains cancer-free. “This therapy saved my life,” she says.

“Cell therapy is an amazing lifeline for patients like Jenna who have overcome a life-long struggle with a debilitating disease, only to encounter a bad type of lymphoma that arises in patients who received an organ transplant,” says Dr. Reshef, a member of the Herbert Irving Comprehensive Cancer Center. “EBV-targeting T-cells allow patients to avoid the severe side effects of chemotherapy and eliminate lymphoma with the power of the immune system alone.”

For Jenna, her Columbia care team is synonymous with family. They made her feel safe over the years and would often lift her spirits, especially on more challenging days.

“Dr. Reshef could easily pick up when I’d be anxious or really stressed out,” she adds. “He knew just what to say and how to ease my concerns. At Columbia, I let the experts do their jobs. I place so much trust in my doctors.”

Last February marked Jenna’s final follow-up visit for the cell therapy. While some days are more of a struggle than others, what matters most to Jenna is her new outlook on life.

“I appreciate every single day. I am thankful for my parents and enjoying life,” she says. “I know that I’m out here fighting for everyone around me, not just myself.”

“Cell therapy saved my life. At Columbia, I let the experts do their jobs. I place so much trust in my doctors…I appreciate every single day. I know that I’m out here fighting for everyone around me, not just myself.”

—Jenna Strickland

Photo: Ran Reshef, MD
A pediatric cancer patient got a fun surprise during a treatment session when her care team transformed the radiation machine overnight into a cheerful, smiling unicorn. The five-year-old patient, who was intimidated by the large machine, was so happy about the adorably decorated “unicorn machine” that she ran into the treatment room with excitement the next day.

Adeline Li is the artist behind the whimsical unicorn, and she finds that bringing a sense of fun and imagination to cancer treatments can make all the difference.

“Getting daily radiation treatments can be tiring and intimidating for patients of all ages. For our younger patients, it can be even more terrifying because they don’t have a full understanding of the treatments,” says Li, a radiation therapist at NewYork-Presbyterian/Columbia. “Changing what’s scaring them into something familiar helps them tolerate and even look forward to their treatments.”

“I’m very grateful that I am able to use my craftiness to make their treatments a little more exciting and a little less scary.”

—Adeline Li, radiation therapist

The COVID-19 pandemic didn’t stop the momentum of Velocity: Columbia’s Ride to End Cancer, and the energy and enthusiasm surrounding this annual fundraiser was as strong as ever. In its fourth year, over 500 participants came together virtually to raise more than $1.1 million to support cancer care and research, a new class of Velocity Fellows, and COVID-19 recovery efforts at Columbia’s Herbert Irving Comprehensive Cancer Center.

This year’s program adopted a personal approach called Your Velocity, engaging participants to complete any activity of their choice—including cycling, spinning, running, hiking, and yoga. Many shared videos and photos of their activities throughout Velocity Day, which took place on October 4 and included a special live Velocity Day Broadcast to celebrate and support everyone involved.

“The many ways our community came together to support Your Velocity are inspirational and heartwarming. The outpouring of support for the cancer programs at our Herbert Irving Comprehensive Cancer Center and our COVID-19 recovery efforts has been remarkable.”

—Anil Rustgi, MD, director of the HICCC

Contributions to Your Velocity were bolstered by a matching gift from the Crimson Lion/Lavine Family Foundation and support from generous participants, sponsors, and donors.

Join us for Velocity 2021 in October. Save your spot by visiting velocityride.org.
Our sincere gratitude goes to our dedicated advisors and donors.

We would like to thank the members of our advisory committees, who help us in our mission to reduce the burden of cancer on patients, families, and communities.

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CONTACT US

NewYork-Presbyterian Hudson Valley Hospital
1980 Crompond Rd Cortland, NY 10567
914.293.8400

NewYork-Presbyterian Lawrence Hospital
55 Palmer Avenue, Bronxville, NY 10708
914.787.1000

Herbert Irving Comprehensive Cancer Center (HICCC) at NewYork-Presbyterian/Columbia University Irving Medical Center
1130 St. Nicholas Ave, New York, NY 10032
212.305.5098

ColumbiaDoctors Midtown
51 West 51st Street, New York, NY 10019
212.326.8500

Website:
cancer.columbia.edu

Facebook:
facebook.com/ColumbiaCancer

Twitter:
@columbiacancer
Cover
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Director's Message
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A “CURE” for Budding Scientists
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Unicorns in the Treatment Rooms
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