funding discovery

to defeat cancer

CANCER RESEARCH INSTITUTE®

2019 ANNUAL REPORT

OUR MISSION:
SAVE MORE LIVES

by fueling the discovery and development of powerful immunotherapies for all types of cancer.

Founded in 1953, the Cancer Research Institute (CRI) is a 501(c)(3) nonprofit organization dedicated to funding laboratory and clinical research aimed at harnessing our immune system's power to treat and potentially cure all cancers.

This work has led to a revolutionary new class of cancer treatments called immunotherapy, which today is giving millions of cancer patients a better chance at living longer.

Cover photo: A dendritic cell presenting antigen to T cells.

Rikki Rockett

immunotherapy patient
and oral cancer survivor

In June 2015, Rikki visited his primary care doctor with a chronic sore throat. His doctor found a small malignant tumor at the base of his tongue. Nine rounds of chemotherapy and 37 sessions of radiation therapy followed. The tumor initially responded but returned three months later, spreading to his lymph nodes.

Rikki then enrolled in an immunotherapy clinical trial. He responded immediately. Just over two months into the trial, a scan revealed that his tumor had shrunk over 90 percent. Today Rikki is cancer-free, enjoys playing drums with his rock band, Poison, caring for his two children, planning his wedding, and practicing Brazilian jiu-jitsu.

Watch Rikki's immunotherapy story at **cancerresearch.org/rikki**

i'm the answer to cancer

The world learned that James P. Allison, Ph.D., director of the Cancer Research Institute Scientific Advisory Council, had won the 2018 Nobel Prize in Physiology or Medicine before the scientist himself got the news.

It wasn't until his son, Robert, tracked him down a couple hours later in his hotel at CRI's immunotherapy conference in New York City that he learned about the important announcement.

In recent years, Allison has received plenty of accolades and glowing profiles in the media, and had many emotional meetings with members of the growing legion of grateful patients who are alive thanks to his discoveries. Even so, Allison, it seems, found it a little hard to believe that his work had finally won him science's ultimate international honor.

But, of course, we at CRI weren't surprised. Allison has always understood that the path to defeating cancer lies in basic science aimed at learning how the human immune system functions. He didn't start out attempting to cure any disease. Rather he focused first on decoding the mysterious T cell and how it worked. It was only after he began to understand how these crucial players in the immune system operated that he considered how he might apply his insights to fighting cancer.

That's been our approach at the Cancer Research Institute, too, and Allison's scientific journey parallels those of others we have funded over the decades.

In this year's report, we are showing this approach in action by highlighting some of the most exciting current developments in the field of cancer immunology—and then tracing their scientific roots to show how CRI and its generous donors have helped lay the foundation for the treatment successes of today as well as the lifesaving cancer immunotherapies of tomorrow.

James P. Allison, Ph.D. receives the 2018 Nobel Prize at a ceremony in Stockholm

From CRI's Leadership

On the heels of last year's momentous news that Cancer Research Institute (CRI) Scientific Advisory Council Director James P. Allison, Ph.D., was awarded the 2018 Nobel Prize in Physiology or Medicine jointly with Japanese immunologist Tasuku Honjo, M.D., Ph.D., for discovering how to unleash our immune system to attack cancer, the field of cancer immunotherapy is more vibrant and active than ever. Emboldened by the remarkable successes seen in some patients with previously untreatable cancers, the quest to exploit these therapies to save more lives has been embraced with zeal by academic institutions, pharmaceutical companies, and nonprofits alike.

There is an unprecedented number of clinical trials testing immunotherapy across almost all tumor types today—more than 3,400 trials according to our most recent analysis of the global immuno-oncology landscape. These trials aim to bring the benefits of immunotherapy to as many people as possible, as quickly as possible. In laboratories around the world, scientists are focused on solving the fundamental mysteries of the immune system. Their goal is twofold: improve the effectiveness of existing immunotherapies and discover new ways to tap our body's natural ability to protect us from cancer.

The revolution in cancer treatment that we at CRI have envisioned and worked toward for decades is finally here. Yet while we celebrate this validation of our vision and mission that originated more than 120 years ago in the pioneering work of Dr. William B. Coley, the "Father of Cancer Immunotherapy," our eyes remain fixed on the horizon.

Despite the amazing results seen today in some patients, immunotherapy does not yet work for everyone. We are confident that it one day will, but it is going to take time and a lot more research to get there. Our record of selecting the best and brightest scientists pursuing the most promising research underscores CRI's role as an engine of innovation pushing this new class of cancer treatment to its fullest potential.

Thanks to our donors, whose generosity fuels our mission, this past fiscal year (July 1, 2018, to June 30, 2019) we were able to provide $36.4 million in grants, fellowships, and awards to 67 scientists and clinicians working to solve the toughest questions in the field.

The collective efforts of CRI's international network of immunologists and physician-scientists span the spectrum of discovery, from inquiry into the basic components and mechanisms of our immune system to novel applications in science-driven clinical trials. This clinical work is enriched by sophisticated correlative studies designed to help us learn the most from each cancer patient. Linking lab and clinic in this way accelerates discovery and hastens delivery of effective treatments to the global community of cancer patients, which is predicted to exceed more than 20 million new cases annually by the end of the next decade.

As ever, we remain deeply grateful for the support of our donors, without whom we could not carry out this important work. It is a privilege to serve as stewards of their trust, and we remain committed to magnifying their impact through the expert-guided investment in science, operational efficiency, and effective management that has earned CRI the highest ratings from charity watchdog organizations.

Every donation helps to fund scientific discovery that brings us closer to defeating this disease once and for all. Together, we are creating a Future Immune to Cancer™.

PAUL C. SHIVERICK
Co-Chairman of the
Board of Trustees

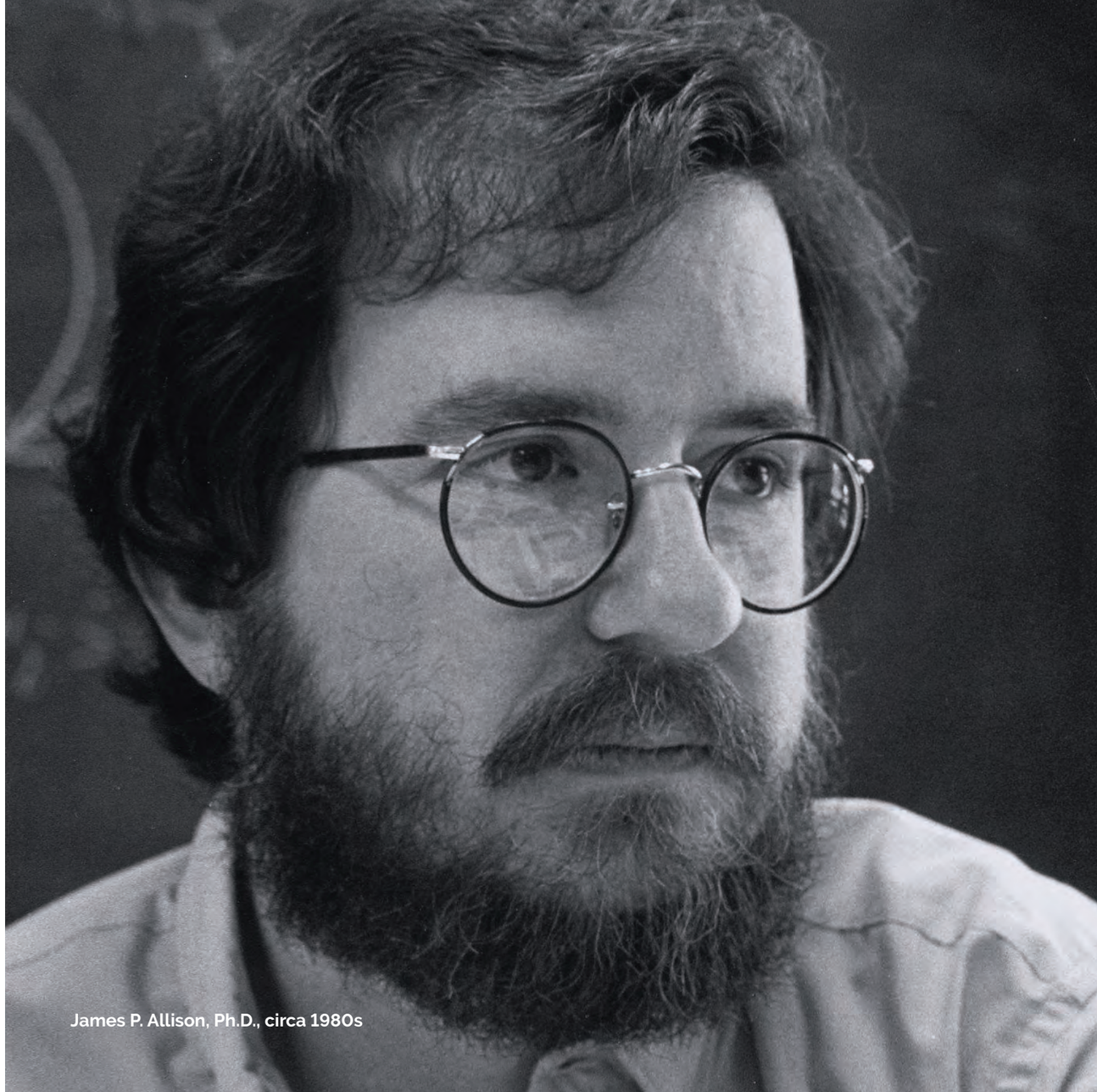
ANDREW K. TSAI
Co-Chairman of the
Board of Trustees

JAMES P. ALLISON, PH.D.
Director, Scientific
Advisory Council
2018 Nobel Prize Winner

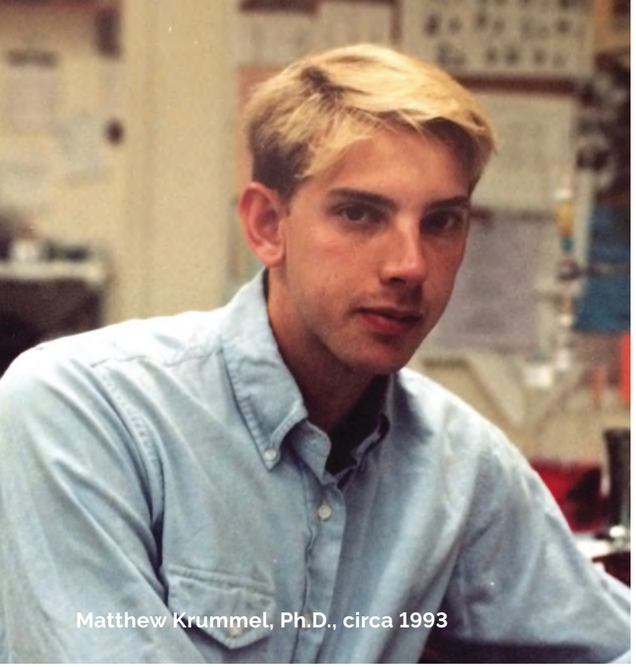
JILL O'DONNELL-TORMEY, PH.D.
Chief Executive Officer and
Director of Scientific Affairs

From Bench to Bedside: Jim Allison, Checkpoints, & Beyond

James Allison—Jim to most who know him—learned early about the ruthless and deadly reach of cancer. At 10, he held the hand of his mother, Constance, in tiny Alice, Texas, as she lay on her deathbed, her body riddled with tumors. By the time he was 15, cancer had also taken two of his uncles.



James P. Allison, Ph.D., circa 1980s



Matthew Krummel, Ph.D., circa 1993

Allison, like many at the time, was interested in the basic questions: what was it that turned these tiny cellular warriors on—and off?

Even so, it was the lure of basic science—and exciting new developments in the then nascent field of immunology—that initially drew Allison to the field in the early 1970s. Back then, T cells had only recently been discovered. Allison was fascinated by the idea that the body had its own tiny soldiers capable of searching out and destroying invading bacteria, viruses, and other dangerous threats. "If they see something wrong, they just deal with it," he would later tell an interviewer. "What could be cooler than that?"

Allison, like many at the time, was interested in the basic questions: what was it that turned these tiny cellular warriors on—and off? To find out, Allison began studying the tiny proteins on their surface known as "receptors." Like a car, T cells have ignition switches, too. One of these is a protein called CD8. But because the body's lymphocytes are such powerful, potentially destructive weapons, evolution has built in numerous fail-safes and other protections to prevent them from over-attacking. Activating T cells requires a second key to bind another receptor simultaneously. Allison's first big contribution was to discover that receptor, known as CD28.

By 1992, Allison and the rest of the field realized there was still an important piece of the puzzle missing. Even when the right proteins bound to CD8 and CD28, T cells didn't always attack. At other times, their attacks were short-lived, petering out quickly. Allison and others suspected that a third receptor might be involved, and the race was on to find it.

CRI was already pouring resources into the hunt. Things began to come into focus in the lab of Arlene Sharpe, M.D., Ph.D., at Harvard Medical School, where CRI postdoctoral fellow **Frank Borriello, M.D., Ph.D.**, (1993–1996) was among those who helped engineer mice without a receptor called CTLA-4. Allison, Sharpe, and others had begun to suspect CTLA-4 played a role, but it was Sharpe, Borriello, and their collaborators who made the next key discovery—the one that would set up Allison's ultimate triumph. CTLA-4, they showed, was not an "on" switch like CD8 and CD28—rather, it was an important "off" switch, a circuit breaker that prevented the body's T cells from destroying healthy cells. Put another way, CTLA-4 was a molecular brake, the first of a whole new class of cellular safety switches called "checkpoints."

For Borriello's mice, the lack of these important receptors proved fatal. Without anything to check them, the T cells in the mice laid waste to healthy tissues and organs. Most of the mice died within weeks of their birth, devastated by massive autoimmune reactions.

To some, the findings immediately suggested the potential for drugs that worked on checkpoints to suppress the immune system, helping organ transplant patients or others suffering from autoimmune diseases. Allison, however, recognized another possible use: might targeting these new "checkpoints" with a drug actually help T cells sustain an attack and defeat cancer?

One of Allison's graduate students, **Matthew Krummel, Ph.D.**, (CRI Investigator, 2004–2008) had already developed an antibody able to stick to a T cell's CTLA-4 receptor, essentially jamming the off-switch. Allison instructed a postdoc to inject the antibody into mice riddled with tumors. The results, he would later recall, "were spectacular." The tumors disappeared. Every single mouse survived.

CRI IRVINGTON POSTDOCTORAL FELLOWSHIP PROGRAM

2019 Fast Facts

- 31 new fellowship recipients
- $5.38 million awarded
- 60+ research papers published in top peer-reviewed journals

Did You Know?

- 1,450+ fellows funded since 1971
- 3x more citations of fellows' published research than their peers
- 7x more likely than peers to obtain faculty positions

Supports laboratory research and furthers career development of promising young scientists working under the mentorship of leading immunologists.

Click here for a list of all 124 active postdoctoral fellows.

Sharon Belvin with her children, James and Lillybeth

Human studies with Allison's CTLA-4-blocking drug began around 2000 in 14 patients stricken with inoperable metastatic melanoma. After the trials began, three patients saw their tumors shrink and, miraculously, survived.

Sharon Belvin was a 20-something newlywed when doctors discovered melanoma in her lungs, liver, and brain. She was terminal when she signed up for a phase 2 clinical trial. By the time Allison met her in 2004, she'd been in remission a year. It was the first time he'd met a patient treated with his drug. At the meeting, everybody sobbed and hugged. A new era had begun.

The drug, manufactured by Bristol-Myers Squibb and marketed as Yervoy® (ipilimumab), received FDA approval in 2011 to treat metastatic melanoma. It was soon followed by other "checkpoint inhibitors," a class of drugs now recognized as the most important advance in cancer treatment since chemotherapy.

Throughout this period, CRI funded a number of postdocs in Allison's labs at Memorial Sloan Kettering Cancer Center and, later, MD Anderson Cancer Center. CRI also played a key role in supporting the research that followed.

Almost as soon as Allison, Sharpe, and others demonstrated the power of CTLA-4, the hunt was on for more checkpoints like it.

As those initial trials for ipilimumab got under way in New York City, down at the Emory University lab of **Rafi Ahmed, Ph.D.**, two CRI postdoctoral fellows—**E. John Wherry, Ph.D.**, (2000–2003) and **David Masopust, Ph.D.**, (2002–2005)—were honing in on a second powerful checkpoint target called "PD-1" (for "programmed death-1").

Many healthy cells express a protein known as "PD-L1" on their surface, which signals "don't attack me" when it binds to the PD-1 receptor on T cells. Some cancers have evolved to protect themselves by also expressing PD-L1, tricking the immune system into ignoring them.

Ahmed, Masopust, and Wherry showed that blocking PD-1 could keep T cells in fighting shape and enable them to attack virus-infected cells. The approach was shown to work against cancer, too, spurring the development of a number of PD-1/PD-L1 checkpoint immunotherapies.

In 2014, three years after Yervoy's groundbreaking approval, the FDA approved two PD-1 inhibitors—Merck's Keytruda® (pembrolizumab) and BMS's Opdivo® (nivolumab). Today, seven checkpoint inhibitors are FDA-approved for more than ten types of cancer, and nearly half of U.S. cancer patients are now eligible for them as part of their treatment.

Even as these breakthroughs have catalyzed the field, there is still much work to do. Fewer than one in five patients currently respond to checkpoint inhibitors. We know that we can—and must—do better than that. The fastest route lies in finding new combinations that can augment checkpoint inhibition—including standard treatments like chemotherapy or radiation, targeted therapies, or other drugs that act on the immune system.

“After immunotherapy... they didn’t find any cancer at all."

Former U.S. President Jimmy Carter

SOME PATIENTS HAVE REMARKABLE RECOVERIES

In August 2015, former U.S. President Jimmy Carter announced he had metastatic melanoma that had spread to his liver and brain, and many assumed he was terminal. Carter’s doctors, however, bombarded his cancer with radiation. Then, as the damaged and dying cancer cells began to attract his immune system’s attention, they administered a PD-1 immunotherapy. In December, just three months after Carter first began receiving immunotherapy, the then-91-year-old found that all his tumors were gone.

Crafting Drug Combinations That Work

Pancreatic cancer is the third leading cause of cancer deaths in the U.S., and seventh worldwide. Usually discovered at advanced stages, it is especially hard to treat. Fewer than one in ten patients with the most common form of pancreatic cancer survives beyond five years. It's a dismal prognosis and a reason we chose to launch a clinical trial of promising immunotherapy combinations for these patients. Exciting interim trial results released earlier this year signal new hope for patients with pancreatic and other hard-to-treat cancers.

Robert H. Vonderheide, M.D., D.Phil.
University of Pennsylvania

ANNA-MARIA KELLEN CLINICAL ACCELERATOR

This unique academic-nonprofit-industry collaboration model, supported in part through CRI's venture philanthropy fund, serves as an incubator delivering multi-center clinical trials of promising new immunotherapy combinations.

2019 Fast Facts

- 4 clinical trials launched and 2 expanded
- 43 participating trial sites across the U.S., Canada, Australia, and Europe
- $20.4 million invested in trials and supporting initiatives
- 3 analyses of global immunotherapy development published

Did You Know?

- 600+ patients treated in CRI clinical trials to date
- 1,000+ tumor tissue samples currently being analyzed to identify why some patients respond to immunotherapy and others do not

Click here for more information on Clinical Accelerator trials, partnerships, and drug portfolio.

Nina Bhardwaj, M.D., Ph.D.
Icahn School of Medicine at Mount Sinai

The clinical trial, nicknamed "PRINCE," was designed by members of the CRI Anna-Maria Kellen Clinical Accelerator in collaboration with the Parker Institute for Cancer Immunotherapy (PICI), Apexigen, Bristol-Myers Squibb, and seven leading U.S. academic institutions. It blends two standard-of-care chemotherapies with a PD-1 inhibitor, building on the CRI-funded work of Ahmed, Masopust, Wherry, and others described previously. It also introduces a fourth drug that we have good reason to believe may interact powerfully with the others to elicit a potent immune response by targeting a molecule known as CD40.

Unlike checkpoints, which affect T cell activity, this CD40-targeting drug interacts with dendritic cells—important communicators of the immune system that alert our T cells to the presence of dangers like infection or cancer. Just as CRI played a role in funding the work of Allison and his collaborators working in T cells, CRI also has a long history of backing basic science aimed at understanding how dendritic cells and other antigen-presenting cells like them work.

Dendritic cells were discovered in the early 1970s by Rockefeller University's **Ralph Steinman, M.D.**, and CRI was an ardent supporter of his first efforts to apply this discovery to treating cancer. In addition to financing Steinman's own work, CRI also backed some of his most prominent and productive early postdoctoral fellows.

CRI fellow **Jonathan Austyn, D.Phil.**, (1982–1983) was one of the first. Together, Austyn and Steinman showed definitively that dendritic cells are central to T cell expansion. Soon after, CRI fellow **Nina Bhardwaj, M.D., Ph.D.**, (1985–1988), now a CRI Clinical Accelerator investigator at the Icahn School of Medicine at Mount Sinai, helped Steinman show how this process happens in two phases: first, dendritic cells present antigen protein fragments to T cells—essentially putting the body's cellular assassins onto the scent of their new quarry; second, these T cells mobilize other immune cells to attack. Later, two other CRI fellows, **William Heath, Ph.D.**, (1990–1993) and **Kang Liu, Ph.D.**, (2001–2005), helped Steinman demonstrate that the CD40 protein on the surface of dendritic cells and other antigen-presenting cells can help flag down killer T cells and alert them to the presence of invading pathogens.

Our PRINCE pancreatic cancer trial, which draws upon the work of Steinman and his collaborators, is being led by **Robert H. Vonderheide, M.D., D.Phil.**, a CRI Clinical Accelerator investigator at the University of Pennsylvania. In preclinical studies, Vonderheide demonstrated that targeting CD40 in the presence of dying cancer cells vastly increases dendritic cells' activation of T cells. Now he and other investigators in the PRINCE study are harnessing this insight to benefit human patients.

First, patients are treated with chemotherapy to rapidly kill some of the tumor, causing those dying cancer cells to release "telltale" antigens that betray the tumor's presence. Next, patients receive the CD40-targeting drug to help their dendritic cells mobilize T cells. Then, finally, a checkpoint inhibitor is given to help the patients' T cells sustain their attack on the remaining cancer cells.

Early results from the study are very promising. The treatment shrank tumors in 20 out of 24 evaluable patients. Excitingly, more than half the patients receiving

the combination of chemotherapy and immunotherapy had their tumors shrink significantly—more than 30 percent—indicating that this combination therapy may be twice as effective as giving chemotherapy alone.

It's great news for patients facing an otherwise grim fate. The most useful long-term data, however, may actually arise from the four patients that have not yet responded. To learn why they haven't responded, CRI is funding a parallel effort that analyzes biomarkers, immune activity, tumor DNA, and more to unveil insights that can be applied well beyond this specific trial or this type of cancer.

The PRINCE trial is just one of many promising CRI-funded efforts currently under way that have grown out of the seminal contributions of Steinman, Austyn, Bhardwaj, and other CRI-supported scientists in this area.

Earlier this year, CRI CLIP investigator **Joshua D. Brody, M.D.**, (2015–2017) published a groundbreaking paper in *Nature Medicine* sharing results from a small clinical trial in which Brody and his collaborators took aim at indolent non-Hodgkin lymphoma (iNHL), an incurable form of cancer that has so far proved poorly responsive to checkpoint blockade immunotherapy.

Brody showed that patients' T cells aren't to blame. Rather, the challenge lies in triggering the immune attack to begin in the first place—a challenge that dendritic cells might overcome with some assistance. Brody and his team developed a vaccine containing a cocktail of proteins capable of activating dendritic cells.

Patients were first treated with radiation to kill some of their tumor, and then were given the vaccine. Initial results are exciting—previously nonresponding patients became newly responsive to PD-1 blockade, prompting a follow-up trial of the combined therapy. A number of these patients are now in remission.

CRI is also building on this research in cervical, ovarian, and prostate cancers, funding trials testing new combinations of PD-1/PD-L1 immunotherapies given with drugs called TLR agonists that help activate dendritic cells.

Last October, in a seminal *Nature* paper, former CRI fellow (2012–2014) and current CLIP investigator (2017–2019) **Juan R. Cubillos-Ruiz, Ph.D.**, along with his CRI fellow **Chang-Suk Chae, Ph.D.**, (2017–2019) at Weill Cornell Medicine described how ovarian tumors can sabotage T cells by starving them of fuel. They also showed in mice that blocking the pathway involved restored T cell activity and strengthened their attacks on cancer. This exciting work suggests that drugs targeting this pathway could be a promising new approach to treating ovarian cancer patients.

While working to extend the effectiveness of today's immunotherapies, CRI remains committed to its long-term mission of supporting the basic science that enables future innovation leading to new treatment options for more cancer patients.

Juan R. Cubillos-Ruiz, Ph.D., with Chang-Suk Chae, Ph.D. Weill Cornell Medicine

CLINIC AND LABORATORY INTEGRATION PROGRAM (CLIP)

2019 Fast Facts

- 12 new CLIP grants
- $2.4 million awarded

Did You Know?

- 86 CLIP investigators funded since 2011
- $17.2 million awarded to date
- 19 CLIP grantees have mentored more than 70 CRI postdoctoral fellows

Provides catalytic support for the translation of laboratory discoveries into novel therapies that can be tested in patients.

Click here for a list of all 41 active CLIP grants.

Cynthia L. Sears, M.D., and lab members
Johns Hopkins University School of Medicine

Laying the Foundation for the Future

One of the most promising new areas of exploration in cancer immunotherapy is the human microbiome—the vast, largely uncharted territory of microorganisms that colonize our bodies, primarily in our digestive tract. CRI scientists are studying how these bacteria influence cancer development as well as responses or resistance to treatment in order to improve outcomes for more patients.

IMPACT GRANTS

Support research projects and initiatives aimed at advancing defined scientific and technological goals and addressing major challenges that would otherwise limit progress in cancer immunotherapy research and drug development.

2019 Fast Facts

- 5 new Impact grants
- $929,000 awarded
- Funded first-of-its-kind biomarker study in metastatic triple-negative breast cancer

Did You Know?

CRI partners with other nonprofits to make the greatest impact:

- Breast Cancer Research Foundation
- Fibrolamellar Cancer Foundation
- Fight Colorectal Cancer
- Focused Ultrasound Foundation
- Israel Cancer Research Fund
- PICI

Click here for a list of all 13 active Impact Grants.

In 2009, **Cynthia L. Sears, M.D.**, an infectious disease specialist at Johns Hopkins, offered up an eyebrow-raising suggestion in the pages of *Nature Medicine*: certain strains of a bacterium commonly found in the human colon can trigger an autoimmune response that results in inflammation leading to colon cancer, the second leading cause of cancer deaths in the U.S.

The revelation suggested new research vistas that hold promise for treating a disease that kills 50,000 Americans each year. She and collaborators including longtime CRI grantee and Scientific Advisory Council member **Drew M. Pardoll, Ph.D.**, later characterized the specific chain of immune-related events leading to colon cancer.

Funded in part with a CRI Impact Grant, Sears has since emerged as a leader in what has become one of the hottest new areas of cancer immunology. Understanding the interaction between the gut microbiome and the human immune system holds vast potential not just to help prevent colon cancer, but also, it turns out, to improve the effectiveness of treatments for other cancers and entirely different diseases.

Sears isn't the only CRI scientist currently exploring this relationship in search of potential cures. At the University of Texas at Austin, CRI Technology Impact Award recipient **Hyun Jung Kim, Ph.D.**, is building a colorectal cancer on-a-chip device capable of mimicking the three-dimensional tumor microenvironment—where colorectal cancer cells, gut bacteria, and immune cells interact, opening up new vistas in technology-assisted research.

In another exciting area of innovation, **Ashish Kulkarni, Ph.D.**, of the University of Massachusetts Amherst, is using a first-of-its-kind nanomaterial to develop a new technology that can efficiently treat tumors—and enables tracking the immune responses against them in real-time.

Today at CRI we are working to identify and fund exceptional scientists—the next Jim Allisons and Ralph Steinmans—whose unorthodox yet sound research ideas may take cancer immunotherapy to the next level.

In pursuit of this goal, in 2019 we launched the CRI Lloyd J. Old STAR Program (**S**cientists **Ta**king **R**isks), which empowers dynamic and exceptionally talented mid-career scientists to advance disruptive, high-risk, high-reward research ideas with potential to transform cancer treatment.

The first five STARs, which we announced in June, are **Yvonne Y. Chen, Ph.D.**, at the University of California, Los Angeles; **Amanda W. Lund, Ph.D.**, at Oregon Health & Science University; **Alexander Marson, M.D., Ph.D.**, at the University of California, San Francisco; **Andrea Schietinger, Ph.D.**, at Memorial Sloan Kettering Cancer Center; and **Gregory F. Sonnenberg, Ph.D.**, at Weill Cornell Medicine.

These STARs are finding innovative ways to improve T cell function, exploit the microbiome's impact on the immune response, and develop the yet-untapped therapeutic potential of the human lymphatic system. The goal of their work is to improve outcomes for more cancer patients treated with immunotherapy.

TECHNOLOGY IMPACT AWARD

Provides seed funding to encourage collaboration between technology developers and clinical cancer immunologists to create novel platform technologies that can enable physician-scientists to generate deeper insights into the mechanisms of action of cancer immunotherapies.

Click here for a list of all 9 active Technology Impact Awards.

2019 Fast Facts

- 5 new Tech Impact Awards
- $1 million in new grants

Did You Know?

Key areas of technology innovation to advance cancer immunotherapy research include:

- Bioinformatics tools and methodology
- Computer models of biological systems
- Immunotherapy target discovery
- Real-time imaging of patient response to immunotherapy
- Tumor profiling to guide treatment

LLOYD J. OLD STAR PROGRAM
(Scientists Taking Risks)

STAR grants provide $1.25 million over five years to exceptional mid-career scientists, giving a degree of flexibility and freedom for them to explore out-of-the-box, disruptive avenues of research. Candidates selected for this award are expected to be future “stars” in the field of cancer immunology.

2019 Fast Facts

- 5 inaugural Lloyd J. Old STARs named
- $6.25 million awarded
- Honors the memory of Dr. Lloyd J. Old, CRI’s founding scientific and medical director, who is recognized as the “Father of Modern Tumor Immunology”

Did You Know?

- 3 STARs have published papers in *Nature*
- 2 have received the New Innovator Award from the National Institutes of Health
- 1 nominated as a *Wired* magazine "Icon of the Future"

Click here to see a list of all 5 active STARs.

Drs. James Allison and Jill O'Donnell-Tormey with STARs Drs. Amanda Lund, Yvonne Chen, and Gregory Sonnenberg. Not pictured: STARs Drs. Alexander Marson and Andrea Schietinger.

Cancer survivor Adrienne Skinner and daughter, Erica

Bringing the Science of Immunotherapy to the Public

Not all the important work in the fight against cancer occurs in the lab or clinic. At CRI, we are also committed to finding ways to raise public awareness while also bringing scientists, patients, caregivers, advocates, and health care professionals together to make new connections, share new ideas, and inspire one another.

Last October, CRI cohosted with our U.S. and European nonprofit partners the Fifth CRI-CIMT-EATI-AACR International Cancer Immunotherapy Conference in New York City. More than 1,400 scientists attended to discuss the current research and clinical trial landscape and what lies beyond, with an emphasis on basic biology, immunological mechanisms, and new scientific discovery. These fundamental studies are "the essential grist that will enable the field to move forward in its quest to develop personalized immunotherapy that benefits more cancer patients," as Jill O'Donnell-Tormey, Ph.D., CRI's CEO and director of scientific affairs, put succinctly during her opening remarks.

Toward the goal of extending immunotherapy's benefits to more patients, CRI convened the first meeting of the "Genomics in Immunotherapy Think Tank." At the two-day gathering, which took place in August in New York City, thought leaders from academia and industry along with other stakeholders met to discuss the current and emerging genomic biomarkers landscape in immunotherapy. The think tank aims to define strategies to speed scientific discovery and clinical adoption of biomarker-based treatment personalization, improving care and leading to better patient outcomes. The group plans to reconvene in 2020 to discuss how to harness ongoing developments in genomics and biomarkers to advance cancer immunotherapy.

In June, CRI summoned scientists, health care investment analysts, and the media to New York City for the inaugural "Immuno-Oncology: A Future Look," a broad discussion of what lies ahead in cancer immunotherapy research and drug development. The event offered an opportunity to meet and hear from leading scientists in both academia and industry communicating the near-term opportunities and challenges facing the field.

To educate and forge links among patients, caregivers, advocates, and the physician-scientists and health care experts working to help them, CRI hosted a series of free Immunotherapy Patient Summits at leading academic research and treatment centers throughout the U.S. These half-day events are designed to explain in easy-to-understand terms the science underlying cancer immunotherapy and to discuss the latest advances in patient treatment as well as the importance of clinical trials.

All the while, our website continues to serve as a central repository for expert-vetted educational and informational resources aimed at empowering patients, caregivers, and others to stay current on the latest developments in this fast-moving field. This year, our Answer to Cancer Patient Education Program received more than 1.5 million views. These include our Cancer Immunotherapy and You Webinar Series, Ask a Scientist Videos, Immunotherapy Patient Stories, and Immunotherapy Clinical Trial Finder. We are grateful for the generous support of our sponsors, who enable us to create and deliver this programming without diverting resources from our donor-funded research programs.

As we reflect on this exciting past year and the long path of scientific discovery that led to the Nobel ceremony in Stockholm, it's clear we need the support of our donors now as much as ever. Cancer is a ruthless and relentless foe. There is plenty more work to do, too. If we all work together, with time and determination, we can prevail over this deadly disease.

The army that will ultimately defeat cancer already exists in the body. We just need to find the right ways to unleash it.

Expert Panel at CRI's Immunotherapy Patient Summit in New York City

Cancer Immunotherapy Month

Our seventh annual Cancer Immunotherapy Month in June featured educational videos, social media awareness campaigns, and fundraising and employee engagement events designed to draw attention to and support for cancer immunotherapy research.

Hundreds of people from around the globe joined in Wear White Day on June 14, donning white T-shirts or lab coats in celebration of the power of science to create a Future Immune to Cancer™. Additionally, over 20 corporate partners hosted Wear White Day events.

Special thanks to our partners for participating in Wear White Day and sponsoring Cancer Immunotherapy Month: AbbVie, ACEA Biosciences, Adaptimmune, AER, Agenus, Alexandria, AstraZeneca, Ascend Integrated, Biosero, Bristol-Myers Squibb, Celgene, Cellectis, Coeur de Rosé, Genentech, Immunotherapy Foundation, Janssen, Killer Concepts, Lilly Oncology, Merck, MUFG, PICI, Regeneron, and Sanofi Genzyme.

Awards & Honors

Each year, the Cancer Research Institute honors individuals and organizations that have made important contributions to the field of cancer immunotherapy.

1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4

1 Lauren Veronis and Perri Peltz

2 Dr. George Yancopoulos and Andrew Tsai

3 Drs. Miriam Merad, Boris Reizis, and Padmanee Sharma

4 Drs. Jill O'Donnell-Tormey, Cornelis Melief, and Ellen Puré

THE WILLIAM B. COLEY AWARD FOR DISTINGUISHED RESEARCH IN BASIC IMMUNOLOGY

Miriam Merad, M.D., Ph.D., Icahn School of Medicine at Mount Sinai, in recognition of her important contributions relating to the biology of important immune cells known as macrophages and dendritic cells.

THE WILLIAM B. COLEY AWARD FOR DISTINGUISHED RESEARCH IN TUMOR IMMUNOLOGY

Padmanee Sharma, M.D., Ph.D., The University of Texas MD Anderson Cancer Center, in recognition of her discovery of the importance of the co-stimulatory ICOS pathway and the pioneering role she played in the use of immune checkpoint therapy prior to surgery.

THE FREDERICK W. ALT AWARD FOR NEW DISCOVERIES IN IMMUNOLOGY

Boris Reizis, Ph.D., NYU Langone Health, for his contributions that advanced our understanding of dendritic cells, the key sentinel cells of the immune system.

THE OLIVER R. GRACE AWARD FOR DISTINGUISHED SERVICE IN ADVANCING CANCER RESEARCH

George D. Yancopoulos, M.D., Ph.D., president and chief scientific officer, Regeneron, in recognition of his company's success in developing life-transforming medicines a variety of hard-to-treat cancer types.

Perri Peltz, journalist and filmmaker, in recognition of her passion for using broadcast media to spark public conversation about the latest advances in medicine, including cancer immunotherapy, answering a vital need to educate patients and their caregivers about today's treatment options.

THE AACR-CRI LLOYD J. OLD AWARD IN CANCER IMMUNOTHERAPY

Cornelis J. M. Melief, M.D., Ph.D., Leiden University Medical Center and ISA Pharmaceuticals, for his discovery of the mechanisms of immune recognition of cancer antigens and activation of antitumor responses, and for his role in the development of innovative vaccine-based immunotherapies against human papillomavirus (HPV)-associated cancers.

Funding Excellent Science That Gets Results

In fiscal year 2019 (July 1, 2018, to June 30, 2019), the Cancer Research Institute awarded $36.4 million for cancer immunology research and immunotherapy clinical development.

An asterisk denotes grants newly awarded in fiscal year 2019. All others are active grants awarded in prior years.

CRI IRVINGTON POSTDOCTORAL FELLOWSHIP PROGRAM

Mohamed Abdel Hakeem, Ph.D.
University of Pennsylvania, Philadelphia, PA
Reprogramming of exhausted T lymphocytes following cure of chronic viral infection: Implications for immunotherapy

Oscar A. Aguilar, Ph.D.
University of California, San Francisco, San Francisco, CA
The role of Fcg receptors in NK-mediated immunity against cancer and virus infection

Sadeem Ahmad, Ph.D.
Boston Children's Hospital, Boston, MA
Non-canonical activation of the innate immune receptor MDA5 in immune disorder and cancer therapy

Zhaoqing Ba, Ph.D.
Boston Children's Hospital, Boston, MA
Mechanisms that mediate intra-locus and inter-locus regulation of V(D)J recombination at immunoglobulin light chain loci
Samuel and Ruth Engelberg Fellow

Jennifer Kaoru Bando, Ph.D.
Washington University School of Medicine, St. Louis, MO
Immune modulation of dormant skin tumor development and persistence

Kevin C. Barry, Ph.D.
University of California, San Francisco, San Francisco, CA
Interrogation of immune responses to fibrolamellar hepatocellular carcinoma
CRI Fibrolamellar Cancer Foundation Fellow

Christian Bassi, Ph.D.
University Health Network, Toronto, Canada
Role of HMGB1 in breast cancer resistance to chemotherapy

Simone Becattini, Ph.D.
Memorial Sloan Kettering Cancer Center, New York, NY
Exploring colonization resistance against *Listeria monocytogenes* in cancer patients

Henrique Borges da Silva, Ph.D.
University of Minnesota, Minneapolis, MN
Harnessing CD8+ T cell antitumor responses by manipulating extracellular ATP signaling
Paul C. Shiverick Fellow

En Cai, Ph.D.
University of California, San Francisco, San Francisco, CA
Understanding the fundamental processes of T cell immunity through high precision 3D dynamic imaging of antigen recognition
Robertson Foundation Fellow

Adam N. R. Cartwright, Ph.D.
Dana-Farber Cancer Institute, Boston, MA
Systematic discovery of combination immunotherapy targets

Chang-Suk Chae, Ph.D.
Weill Cornell Medicine, New York, NY
Incessant ER stress responses promote dendritic cell dysfunction in ovarian cancer
Dr. Keith Landesman Memorial Fellow

Arun R. Chavan, Ph.D.*
Yale University, New Haven, CT
Dissecting the evolutionary origin of lymphocytes

Ross W. Cheloha, Ph.D.
Boston Children's Hospital, Boston, MA
Study of B cell antigen receptor trafficking

Liang Chen, M.D., Ph.D.
Stanford University, Stanford, CA
Systemic identification of melanoma-specific antigens that can elicit cytotoxic T cell responses following anti-PD1 immunotherapy
Robertson Foundation Fellow

Peiwen Chen, Ph.D.
The University of Texas MD Anderson Cancer Center, Houston, TX
Mechanism and therapeutic potential of PTEN-regulated macrophages in glioblastoma

Joseph K. Cheng, Ph.D.
Seattle Children's Research Institute, Seattle, WA
Development and characterization of a humanized synthetic notch receptor platform to regulate chimeric antigen receptor T cell immunotherapies in a solid tumor model

Chun Chou, Ph.D.
Memorial Sloan Kettering Cancer Center, New York, NY
Origin and regulation of innate-like T cell responses in cancer

Michael G. Constantinides, Ph.D.
National Institute of Allergy and Infectious Diseases, NIH, Bethesda, MD
Role of the microbiome in lung cancer

Victor Samuel Cortez, Ph.D.*
University of California, San Francisco, San Francisco, CA
Immune modulation of intestinal adenoma formation and growth

Haiqiang Dai, Ph.D.
Boston Children's Hospital, Boston, MA
Elucidation of feedback and other mechanisms of IgH allelic exclusion for production of therapeutic bispecific antibodies *in vivo*

Sofia L. Novais de Oliveira, Ph.D.
Albert Einstein College of Medicine, Madison, WI
The role of the innate immune system in fibrolamellar hepatocellular carcinoma: FHL2 as a putative molecular target

Carina C. de Oliveira Mann, Ph.D.
Ludwig-Maximilians-Universität Munchën, Munich, Germany
cGAS activation mechanism by endogenous DNA species

Zihou Deng, Ph.D.
Memorial Sloan Kettering Cancer Center, New York, NY
Roles of macrophage subsets in tumorigenesis

Pranay Dogra, Ph.D.
Columbia University Medical Center, New York, NY
Impact of tissue location on antitumor activity of human NK cells

Sascha H. Duttke, Ph.D.
University of California San Diego, La Jolla, CA
Reprogramming macrophage phenotypes during immunosurveillance and neoplastic progression

Shlomo Elias, M.D., Ph.D.*
Memorial Sloan Kettering Cancer Center, New York, NY
Cooperativity between the transcription factor Foxp3 and its ancestor Foxp1 in Treg cells

Neris Michel Enamorado Escalona, Ph.D.*
National Institute of Allergy and Infectious Diseases, NIH, Bethesda, MD
Dissecting how commensal-specific immune response regulates metastasis development

Jonatan Ersching, Ph.D.
The Rockefeller University, New York, NY
Molecular control of B cell proliferation in germinal centers
The Hearst Foundations Fellow

Yinnian Feng, Ph.D.*
Stanford University, Stanford, CA
High-throughput mapping of the sequence- and force-dependent landscape of T cell activation

Timothy Fessenden, Ph.D.*
Massachusetts Institute of Technology, Cambridge, MA
Imaging and controlling tumor-infiltrating dendritic cell behaviors

Andrew I. Flyak, Ph.D.
California Institute of Technology, Pasadena, CA
The structural basis of HCV neutralization by broadly neutralizing human antibodies

Raquel Fueyo Arevalo, Ph.D.*
Stanford University, Stanford, CA
Regulatory role of human endogenous retroviral elements in tumor immunogenicity and cancer progression
Bristol-Myers Squibb Fellow

Josephine R. Giles, Ph.D.
University of Pennsylvania, Philadelphia, PA
Defining the transcriptomic and epigenetic reprogramming of human tumor-infiltrating CD8 T cells after PD-1 blockade
The Mark Foundation for Cancer Research Fellow

Ariella Glasner, Ph.D.
Memorial Sloan Kettering Cancer Center, New York, NY
A study of mechanisms governing Foxp3-dependent and -independent gene expression in regulatory T cells using evolutionary distant mice

Kevin Andrew U. Gonzales, Ph.D.*
The Rockefeller University, New York, NY
Dissecting the stem cell and immune roots of the tumorigenicity of wounds
Carson Family Fellow

Siyi Gu, Ph.D.*
University of California San Diego, La Jolla, CA
Molecular mechanisms of C-C chemokine receptor 5 ligand-biased signaling

Claudia Han, Ph.D.
University of California San Diego, La Jolla, CA
Epigenomic modulation of microglia function in homeostasis and gliomas

Pavel Hanc, Ph.D.
Harvard Medical School, Boston, MA
Investigating the neuroimmune interaction between nociceptive neurons and dendritic cells

Harald Hartweger, Ph.D.
The Rockefeller University, New York, NY
The effect of replicative stresses on the genesis of chromosome translocations

Rogelio Antonio Hernandez-Lopez, Ph.D.
University of California, San Francisco, San Francisco, CA
Engineering antigen density sensors for T cell immunotherapy
Merck Fellow

Michael J. Hogan, Ph.D.*
Children's Hospital of Philadelphia, Philadelphia, PA
Endogenous MHCII presentation: Cell biology and functional consequences

Jun Young Hong, Ph.D.
Yale University, New Haven, CT
Developmental programming of T cell immunity and cancer susceptibility
Bristol-Myers Squibb Fellow

Chun-Chieh Hsu, Ph.D.
Yale University, New Haven, CT
Regulation of translation by the interferon-induced antiviral protein viperin

Jun Hu, Ph.D.
Boston Children's Hospital, Boston, MA
Targeting gasdermin D for potential therapeutic interventions
Margaret Dammann Eisner Fellow

Bo Hu, Ph.D.
Dana-Farber Cancer Institute, Boston, MA
Investigating the role of Prdm16 in the immunoregulation of tumorigenesis
Leonard Kahn Foundation Fellow

William H. Hudson, Ph.D.
Emory University, Atlanta, GA
Deciphering the role of lncRNAs in CD8+ T cell differentiation

Justin M. Jenson, Ph.D.*
The University of Texas Southwestern Medical Center, Dallas, TX
Mechanisms whereby liquid phase separation of cGAS activates innate immune signaling

Livnat Jerby, Ph.D.
Broad Institute of MIT and Harvard, Cambridge, MA
Integrating CRISPR with single-cell RNA-sequencing to map the underlying circuits of immune evasion mechanisms in melanoma
The Hearst Foundations Fellow

Kazuki Kato, Ph.D.*
Boston Children's Hospital, Boston, MA
Molecular mechanism of auto-immune regulator

Ranit Kedmi, Ph.D.
New York University Medical Center, New York, NY
Antigen presenting cells as coordinators of T cell responses to gut microbiota
Robertson Foundation Fellow

Jonggul John Kim, Ph.D.
The University of Texas Southwestern Medical Center, Dallas, TX
Manipulation of T-cell receptor signaling by phase separation of signaling molecules

Susan E. Klaeger, Ph.D.
Broad Institute of MIT and Harvard, Cambridge, MA
Immunopeptidomics for antigen discovery and prediction
The Hearst Foundations Fellow

Marc Joseph Lajoie, Ph.D.
University of Washington, Seattle, WA
Protein nanoparticles to elicit defined T cell response against cancer cells

Colleen M. Lau, Ph.D.*
Memorial Sloan Kettering Cancer Center, New York, NY
Investigating the role of DNA methylation on NK cell-mediated tumor immunity
Carson Family Fellow

Julie Leca, Ph.D.
University Health Network, Toronto, Canada
Therapeutic implications of altered epigenetics and DNA damage responses in IDH2-mutated hematologic diseases

Cheng-Sheng Lee, Ph.D.
Boston Children's Hospital, Boston, MA
Elucidating the mechanism and the impacts of RAG tracking

Chaoran Li, Ph.D.
Harvard Medical School, Boston, MA
Differentiation and accumulation of adipose-tissue Tregs: Important players in the immunological control of metabolism and obesity-associated cancer

Shun Li, Ph.D.
Memorial Sloan Kettering Cancer Center, New York, NY
Anti-tumor immunity unleashed by innate immune sensing of self-DNA
Lloyd J. Old Fellow

Qiang Li, Ph.D.
The Rockefeller University, New York, NY
Chemical biology of anti-inflammatory lipids

Aileen Li, Ph.D.
University of California, San Francisco, San Francisco, CA
Synthetic modulation of the tumor microenvironment
Merck Fellow

Adam J. Litterman, Ph.D.
University of California, San Francisco, San Francisco, CA
A global map of mRNA regulatory elements in CD8+ T cells

Dan Liu, Ph.D.
University of California, San Francisco, San Francisco, CA
LSC and its G protein coupling signaling as regulators of dendritic cell maintenance and function in immune responses
AstraZeneca Fellow

Lior Lobel, Ph.D.
Harvard T.H. Chan School of Public Health, Boston, MA
Identifying novel effectors of the gut microbiota that modulate cancer cells killing by CD8+ T cells using functional metagenomics

Geoffrey Lovely, Ph.D.
National Institute on Aging, Baltimore, MD
Watching RAG recombinase assembly on the IgH locus and off-target assembly in live pro-B cells

Rutger David Luteijn, Ph.D.
University of California, Berkeley, Berkeley, CA
Inflammatory pathways in senescence-induced tumor formation

Shixin Ma, Ph.D.*
Salk Institute, La Jolla, CA
Metabolic control of epigenetic states that drive CD8 T cell exhaustion and anti-tumor immunity

Murad R. Mamedov, Ph.D.*
University of California, San Francisco, San Francisco, CA
Mapping T cell genetic networks and cancer ligands

Duncan Robert McKenzie, Ph.D.
The Francis Crick Institute, London, United Kingdom
The molecular basis of epidermal cancer immunosurveillance

Alejandra Mendoza, Ph.D.
Memorial Sloan Kettering Cancer Center, New York, NY
Role of "non-immune" functions of regulatory T cells in tissue homeostasis and cancer development
Bristol-Myers Squibb Fellow

Ka Ho Stephen Mok, Ph.D.
The University of Texas MD Anderson Cancer Center, Houston, TX
Effects of anti-CTLA-4 and anti-PD-1 on memory T-cell differentiation

Martina Molgora, Ph.D.*
Washington University School of Medicine, St. Louis, MO
Impact of Natural Killer cell recognition of growth factors on tumor immune surveillance
Lloyd J. Old Fellow

Adriana M. Mujal, Ph.D.*
Memorial Sloan Kettering Cancer Center, New York, NY
Investigating post-transcriptional regulation of antitumor NK cells
Amgen Fellow

Hidetoshi Nakagawa, M.D., Ph.D.
Dana-Farber Cancer Institute, Boston, MA
Helios, Treg stability and cancer immunotherapy

Kristof Nolan, Ph.D.
University of Chicago, Chicago, IL
Structure and function of human leukocyte antigen-F (HLA-F) in gynecologic cancers

Valerie Phoebe O'Brien, Ph.D.
Fred Hutchinson Cancer Research Center, Seattle, WA
Assessing *helicobacter pylori*-mediated chronic inflammation and its contributions to stomach cancer progression

Monica M. Olcina, Ph.D.
Stanford University, Stanford, CA
Innate immunity and cancer: Targeting the complement system to improve treatment response

Ivan Osokine, M.D., Ph.D.*
University of California, San Francisco, San Francisco, CA
Impact of epigenetic silencing on stromal control of fibrosis and immunity

Deng Pan, M.D., Ph.D.
Dana-Farber Cancer Institute, Boston, MA
Systematic discovery of immune modulators in tumor cells
Robertson Foundation Fellow

Christophe Pedros, Ph.D.
La Jolla Institute for Immunology, La Jolla, CA
Control of regulatory T cell function by protein kinase C-eta (PKC): A novel target for cancer immunotherapy

Justin S. A. Perry, Ph.D.
University of Virginia Health System, Charlottesville, VA
Regulation of phagocyte physiology during tumor cell clearance
The Mark Foundation for Cancer Research Fellow

Kathleen Pestal, Ph.D.
University of California, Berkeley, Berkeley, CA
The regulation of apoptotic cell-clearance identity in tissue-resident macrophages

Anthony Tsai-Chieh Phan, Ph.D.
University of Pennsylvania, Philadelphia, PA
Redefining the T cell-intrinsic role of IL-27 signaling in the tumor microenvironment
Robertson Foundation Fellow

Padmini Sushila Pillai, Ph.D.
Massachusetts Institute of Technology, Cambridge, MA
Oral delivery of inflammation-targeting resolvin nanoparticles to treat IBD

Amanda Poissonnier, Ph.D.*
Oregon Health & Science University, Portland, OR
Relieving immune suppressive pathways in breast cancer to improve outcomes
Dr. Keith Landesman Memorial Fellow

Jun Ren, Ph.D.*
Massachusetts General Hospital, Boston, MA
Reprogramming the tumor microenvironment to improve immunotherapy of glioblastoma
Dr. Keith Landesman Memorial Fellow

Pamela C. Rosato, Ph.D.
University of Minnesota, Minneapolis, MN
Harnessing tissue resident memory T cells to combat solid tumors

Nathan Roy, Ph.D.
Children's Hospital of Philadelphia, Philadelphia, PA
Modulation of T cell trafficking by Crk adapter proteins

Megan K. Ruhland, Ph.D.
University of California, San Francisco, San Francisco, CA
Mechanisms of peripheral self-tolerance contribute to immune tolerance to cancer

Martina Sassone-Corsi, Ph.D.
Harvard Medical School, Boston, MA
Identifying bacterial molecules that induce gut immune responses and characterizing their protective potential against colitis-associated cancer.

Emily K. Schutsky, Ph.D.*
University of Washington, Seattle, WA
Elucidating the role of the damage response protein DNA-dependent protein kinase in innate immunity

Hyungseok Seo, Ph.D.
La Jolla Institute for Immunology, La Jolla, CA
Analysis of NFAT and Nr4a-mediated epigenetic reprogramming of tumor-infiltrating immune cell exhaustion
Donald J. Gogel Fellow

Nisarg J. Shah, Ph.D.
Harvard Medical School, Boston, MA
Designing a synthetic bone marrow niche to overcome immunodeficiency
Gould Family Foundation Fellow

Avishai Shemesh, Ph.D.
University of California, San Francisco, San Francisco, CA
Engineering CAR NK cells for antigen-dependent autocrine expansion

Chen Shen, Ph.D.*
Boston Children's Hospital, Boston, MA
dsRNAs induce NLRP6-mediated innate immune signaling through liquid-liquid phase separation

Boyoung Shin, Ph.D.*
California Institute of Technology, Pasadena, CA
The molecular mechanisms of Runx transcription factors in early thymic T cell development

Shivani Srivastava, Ph.D.
Fred Hutchinson Cancer Research Center, Seattle, WA
An autochthonous solid tumor model to evaluate strategies for enhancing CAR-T cell therapy

Elizabeth M. Steinert, Ph.D.
Northwestern University, Chicago, IL
Mitochondrial respiration in CD8 T cell-mediated immune responses to solid tumors

Meredith L. Stone, Ph.D.*
University of Pennsylvania, Philadelphia, PA
A role for the liver microenvironment in cancer immunosurveillance
Samuel and Ruth Engelberg Fellow

Kevin Michael Sullivan, M.D.
University of Washington, Seattle, WA
T cell immunotherapy in fibrolamellar cancer
CRI Fibrolamellar Cancer Foundation Fellow

Chong Sun, Ph.D.
The Netherlands Cancer Institute, Amsterdam, The Netherlands
Unraveling the biology of CMTM6, a novel regulator of PD-L1 identified through genome-wide genetic screening

Nilesh P. Talele, Ph.D.
Massachusetts General Hospital, Boston, MA
Re-engineering the obese tumor immune microenvironment to improve immunotherapy efficacy in pancreatic ductal adenocarcinoma

Xiaojun Tan, Ph.D.
The University of Texas Southwestern Medical Center, Dallas, TX
Phosphoinositide regulation of STING trafficking and cancer immunity

Lin Tian, Ph.D.*
Memorial Sloan Kettering Cancer Center, New York, NY
Dissecting extracellular matrix-mediated immune evasion of HER2+ breast cancer brain metastasis

Yuan-Li Tsai, Ph.D.*
University of California, San Francisco, San Francisco, CA
Overcoming immunosuppression by selectively targeting suppressor of T cell receptor signaling in T cells

Marie Anne Vetizou, Ph.D.
National Cancer Institute, Bethesda, MD
Targeting microbiota for improving cancer immunotherapy

Daan Vorselen, Ph.D.
University of Washington, Seattle, WA
Role of mechanics in phagocytic clearance of cancer cell mimics

Ivan Vujkovic-Cvijin, Ph.D.
National Institute of Allergy and Infectious Diseases, NIH, Bethesda, MD
Identifying novel microbiome-based immunotherapeutics for melanoma

Qiwei Wang, Ph.D.*
Dana-Farber Cancer Institute, Boston, MA
Harnessing the immune system to overcome resistance to PARP inhibition in BRCA1-deficient breast cancer
Bristol-Myers Squibb Fellow

Yen-Chih Wang, Ph.D.
The Rockefeller University, New York, NY
Chemical biology of microbiota protection against gastrointestinal cancer

Guangchuan Wang, Ph.D.
Yale University, New Haven, CT
Genetic dissection of PD-1 pathway immune checkpoint blockade in liver cancer

Alexandra M. Whiteley, Ph.D.
Harvard Medical School, San Francisco, CA
The role of Ubiquilin-1 in BCR-driven lymphoma proliferation

Finn D. Wolfreys, Ph.D.*
University of California, San Francisco, San Francisco, CA
P2RY8 and geranylgeraniol-glutathione as novel regulators of human immune cell function

Kehui Xiang, Ph.D.
Whitehead Institute for Biomedical Research, Cambridge, MA
Investigate the importance and mechanism of poly(A) tail length-mediated translational control in different immune cells

Hao Xu, Ph.D.
New York University Medical Center, New York, NY
Identification of the RORt ligands, protein complexes and targeting signals involved in Th17 cell-mediated homeostasis and pathogenesis

Qian Yin, Ph.D.
Stanford University, Stanford, CA
Activation of endogenous anergic self-specific CD8+ T cells by polymeric nanoparticles for enhanced cancer immunotherapy
Lloyd J. Old Fellow

Ido Yofe, Ph.D.
Weizmann Institute of Science, Rehovot, Israel
Single-cell analysis of the tumor-immune ecosystem in human cancers

Ryan A. Zander, Ph.D.
Versiti Wisconsin, Inc., Milwaukee, WI
Identification of potent IL-21-producing T helper cell population that sustains cytotoxic T cell response during chronic viral infection and tumorigenesis

Ying Zhang, Ph.D.
Boston Children's Hospital, Boston, MA
Enhancing immunotherapy for triple-negative and HER2+ breast cancer with EpCAM aptamer-siRNA mediated gene knockdown

Xian Zhang, Ph.D.*
Memorial Sloan Kettering Cancer Center, New York, NY
Nutrient sensing and mTORC1 signaling in control of tumor immune evasion

Li Zhang, Ph.D.
Weill Cornell Medicine, New York, NY
Type I interferon control of macrophage cell death
Robertson Foundation Fellow

Yunlong Zhao, Ph.D.
University of California San Diego, La Jolla, CA
Investigating the roles of cis-interactions in regulating the PD-1 pathway

Chunxing Zheng, Ph.D.*
University Health Network, Toronto, Canada
The role of ChAT-expressing T cells in intestinal homeostasis and cancer development

Yu Zhu, Ph.D.
Stanford University, Stanford, CA
Targeting notch signaling in tumor endothelial stem cells to normalize tumor vasculature and improve anti-tumor immunity and immunotherapies

CLINIC AND LABORATORY INTEGRATION PROGRAM

Nina Bhardwaj, M.D., Ph.D.
Icahn School of Medicine at Mount Sinai, New York, NY
Analysis of immune responses induced by *in situ*, autologous therapeutic vaccination against solid cancers with intratumoral hiltonol (Poly-ICLC)

Vincenzo Bronte, Ph.D.
Universita di Verona, Verona, Italy
Neutralizing human arginase to enhance cancer immunotherapy

Antoni Celià-Terrassa, Ph.D.
Institut Hospital del Mar d'Investigacions Mèdiques (IMIM), Barcelona, Spain
LCOR orchestrates the differential IFN-alpha response and immunological properties of triple-negative breast cancer stem cells.

Sidi Chen, Ph.D.
Yale University, New Haven, CT
Systematic identification of druggable targets for enhancement of PD-1 checkpoint blockade therapy in melanoma

Hilary Ann Coller, Ph.D.
University of California, Los Angeles, Los Angeles, CA
Testing stromal autophagy as a predictor of melanoma immunity

Juan R. Cubillos-Ruiz, Ph.D.
Weill Cornell Medicine, New York, NY
Targeting LPA sensors in the tumor microenvironment to enhance ovarian cancer immunotherapies
Wade F. B. Thompson CLIP Investigator

Shadmehr Demehri, M.D., Ph.D.
Massachusetts General Hospital, Charlestown, MA
$CD4^+$ T cell immunity against early skin carcinogenesis

Gavin Peter Dunn, M.D., Ph.D.
Washington University School of Medicine, St Louis, MO
Monitoring the anti-tumor immune response in glioblastoma patients treated with a personalized neoepitope vaccine

Ruth Ganss, Ph.D.*
Harry Perkins Institute of Medical Research, Nedlands, Western Australia
Improving immunotherapy for desmoplastic and metastatic cancers

Ping-Chih Ho, Ph.D.*
Universite de Lausanne, Epalinges, Switzerland
Targeting metabolic weaknesses of intratumoral Tregs for reprogramming the tumor microenvironment

Ping-Chih Ho, Ph.D.
Universite de Lausanne, Epalinges, Switzerland
UCP2-regulated immunostimulatory shift of the tumor microenvironment in melanomas

Stanley Huang, Ph.D.*
Case Western Reserve University, Cleveland, OH
Targeting macrophage nonessential amino acid metabolism for improvement of cancer immunotherapy

Susan M. Kaech, Ph.D.
Salk Institute, La Jolla, CA
Elucidating cellular and genetic factors associated with tumor resistance to immunotherapies

Philip J. Kranzusch, Ph.D.
Dana-Farber Cancer Institute, Boston, MA
Controlling activation of STING responses in cancer immunotherapy

Stephen J. Kron, M.D., Ph.D.
University of Chicago, Chicago, IL
Radiation-enhanced delivery of checkpoint blockade antibodies

Rajan Kulkarni, M.D., Ph.D.
Oregon Health & Science University, Portland, OR
Elucidating the molecular basis of skin-directed irAEs

Suzanne Lentzsch, M.D., Ph.D.*
Columbia University Medical Center, New York, NY
Checkpoint inhibitor PD-1H links multiple myeloma bone disease and myeloma-induced immunosuppression
Wade F. B. Thompson CLIP Investigator

Ming O. Li, Ph.D.*
Memorial Sloan Kettering Cancer Center, New York, NY
Innate and innate-like cytotoxic lymphocytes as templates for anti-tumor adoptive transfer cellular therapy

Carrie L. Lucas, Ph.D.*
Yale University, New Haven, CT
Intersection of DNA damage pathways with T cell signaling responses

Lydia Lynch, Ph.D.
Brigham & Women's Hospital/Harvard Medical School, Boston, MA
The relationship between metformin, obesity and cancer immunotherapy success

Thomas Urban Marron, M.D., Ph.D.*
Icahn School of Medicine at Mount Sinai, New York, NY
The effect of neoadjuvant chemotherapy and chemo-immunotherapy on the NSCLC tumor microenvironment

Ludovic Martinet, Ph.D.*
University of Toulouse, Toulouse, France
Importance of CD226 in immune exhaustion and response to immunotherapy
Bristol-Myers Squibb CLIP Investigator

Ignacio Melero, M.D., Ph.D.
Foundation for Applied Medical Research, FIMA, Pamplona, Spain
Functional expression of PD-L1 on professional cross-priming dendritic cells

Andrew Oberst, Ph.D.
University of Washington, Seattle, WA
Inducing immunogenic cell death to improve cancer immunotherapy
Wade F. B. Thompson CLIP Investigator

Allison Frances O'Neill, M.D.
Dana-Farber Cancer Institute, Boston, MA
The role of checkpoint inhibition in pediatric hepatocellular carcinoma: Clinical efficacy and biologic correlates

Vinodh Pillai, M.D., Ph.D.*
Children's Hospital of Philadelphia, University of Pennsylvania, PA
Predicting response to CAR T cell therapy

Robert M. Prins, Ph.D.
University of California, Los Angeles, Los Angeles, CA
Elevated TIL accumulation, with clonal TCR expansion and inflammatory tumor gene expression, predicts clinical benefit of PD-1 blockade in patients with recurrent glioblastoma
Wade F. B. Thompson CLIP Investigator

Mark P. Rubinstein, Ph.D.
Medical University of South Carolina, Charleston, SC
Generating human tumor-reactive T cells with high levels of IL-2Ra for adoptive T cell therapy

Vanja Sisirak, Ph.D
University of Bordeaux, Bordeaux, France
In vivo study of mechanisms that regulate tumor-derived DNA immunogenicity during the process of cancer immunosurveillance

Craig L. Slingluff Jr., M.D.
University of Virginia Health System, Charlottesville, VA
Barrier molecules and their impact on T cell infiltration in melanoma

Craig L. Slingluff Jr., M.D.*
University of Virginia Health System, Charlottesville, VA
Effects of cancer vaccine adjuvants in the vaccine-site microenvironment
Oliver R. Grace CLIP Investigator

Mark John Smyth, Ph.D., FAHMS
QIMR Berghofer Medical Research Institute, Herston, Australia
Targeting NK cell differentiation in cancer

Gregory F. Sonnenberg, Ph.D.
Weill Cornell Medicine, New York, NY
Modulating host-microbiota interactions to improve cancer immunotherapies
Wade F. B. Thompson CLIP Investigator

Manuel Valiente, Ph.D.
Fundacion Centro Nacional De Investigaciones Oncologicas Carlos III, Madrid, Spain
Brain-specific strategies to improve responses to immunotherapy

Jose A. Villadangos, Ph.D.
The University of Melbourne, Parkville, Australia
Characterization and prevention of "Stunning," a cytotoxic T lymphocyte inactivating program that impairs adoptive cell therapy against cancer

David Wald, M.D., Ph.D.
Case Western Reserve University, Cleveland, OH
Targeting TGF/GSK3 to enhance NK cell therapy for colon cancer

Li Wang, Ph.D.
Cleveland Clinic Foundation, Cleveland, OH
Defining the role of a novel T cell-regulatory receptor in the development of anti-tumor immunity

Edus H. Warren, M.D., Ph.D.
Fred Hutchinson Cancer Research Center, Seattle, WA
A platform for single-cell functional characterization of tumor infiltrating lymphocytes from renal cell carcinoma

Xingxing Zang, Ph.D.*
Albert Einstein College of Medicine, Bronx, NY
A novel immune checkpoint pathway in human cancers

Baochun Zhang, M.D., Ph.D.*
Dana-Farber Cancer Institute, Boston, MA
Developing a multiantigen-targeting cytotoxic CD4+ T cell approach for treating B cell malignancies
Wade F. B. Thompson CLIP Investigator

Nu Zhang, Ph.D.
University of Texas Health Science Center at San Antonio, San Antonio, TX
The cellular mechanisms controlling PD-1 blockade-responding CD8 T cells

LLOYD J. OLD STAR PROGRAM

Yvonne Y. Chen, Ph.D.*
University of California, Los Angeles, Los Angeles, CA
Engineering smarter and stronger T cells for cancer immunotherapy

Amanda W. Lund, Ph.D.*
Oregon Health & Science University, Portland, OR
Investigating and exploiting the lymphatic vasculature through cancer immunity lifecycle

Alexander Marson, M.D., Ph.D.*
University of California, San Francisco, San Francisco, CA
Reprogramming human immune cells with CRISPR for cancer immunotherapy

Andrea Schietinger, Ph.D.*
Memorial Sloan Kettering Cancer Center, New York, NY
Decoding and reprogramming T cells for cancer immunotherapy

Gregory F. Sonnenberg, Ph.D.*
Weill Cornell Medicine, New York, NY
Defining host-microbe interactions in cancer and immunotherapy

TECHNOLOGY IMPACT AWARDS

Brian D. Brown, Ph.D.
Icahn School of Medicine at Mount Sinai, New York, NY
Development of a novel technology for cancer immunology target discovery

Marcin Piotr Cieslik, Ph.D.*
Regents of the University of Michigan, Ann Arbor, MI
TCR-FISH: A novel method for spatially and clonally resolved profiling of tumor-infiltrating lymphocytes

Dongeun Huh, Ph.D.
University of Pennsylvania, Philadelphia, PA
A microengineered biomimetic model of tumor-immune cell interactions

Hyun Jung Kim, Ph.D.
University of Texas at Austin, Austin, TX
A pathomimetic colorectal cancer-on-a-chip for unveiling the role of gut microbiome on cancer immunotherapy

Ashish Kulkarni, Ph.D.
University of Massachusetts, Amherst, Amherst, MA
Nanoscale platform technology for monitoring immunotherapeutic responses

Adam Mor, M.D., Ph.D.*
New York University Medical Center, New York, NY
Novel technology to discover targetable kinases to enhance checkpoints inhibition

Ansuman T. Satpathy, M.D., Ph.D.*
Stanford University, Stanford, CA
Single-cell epigenome technologies for cancer immunotherapy

Muneesh Tewari, M.D., Ph.D.*
University of Michigan, Ann Arbor, MI
Single molecule counting digital immunoassay platform for ultrafast multiplex screening of cytokine release syndrome in CAR T patients

Yun Wu, Ph.D.*
State University of New York, Buffalo, Buffalo, NY
Exosome protein microRNA one stop biosensor: A new liquid biopsy for precision cancer Immunotherapy

IMPACT GRANTS

Robert Michael Angelo, M.D., Ph.D., and Sean C. Bendall, Ph.D.
Stanford University, Stanford, CA
High dimension protein characterization of glial tumor tissues and relevance to outcomes in immunotherapy clinical trials

Justin Guinney, Ph.D.
Sage Bionetworks, Seattle, WA
The Pan-Cancer Immune Atlas: A platform for immuno-oncology research and data sharing

Sergei A. Nedospasov, Ph.D., D.Sc.
Lomonosov Moscow State University, Moscow, Russia
Lloyd J. Old Advanced Training Program in Immunology and Oncoimmunology at Lomonosov Moscow State University

American Association for Cancer Research*
Philadelphia, PA
Collaboration on *Cancer Immunology Research*

Partnership Grants

Timothy N.J. Bullock, Ph.D.
University of Virginia Health System, Charlottesville, VA
Enhancing immune therapy for brain metastases with focused ultrasound
In partnership with the Focused Ultrasound Foundation

Cyrille Cohen, Ph.D.*
Bar-Ilan University, Tel-Aviv, Israel
CRISPR-based editing and manipulation of TIGIT/CD96 to enhance T cell anti-tumor function
Immunotherapy Promise Grant in partnership with the Israel Cancer Research Fund

Gavin Peter Dunn, M.D., Ph.D.
Washington University School of Medicine, St Louis, MO
Leveraging focused ultrasound to enhance immunogenicity and liquid biopsy in glioblastoma
In partnership with the Focused Ultrasound Foundation

Amy K. Kim, M.D.
Johns Hopkins University School of Medicine, Baltimore, MD
Investigating immune checkpoint biomarkers in tissue and peripheral blood of patients with fibrolamellar hepatocellular carcinoma
In partnership with the Fibrolamellar Cancer Foundation

Elizabeth A. Mittendorf, M.D., Ph.D.*
Dana-Farber Cancer Institute, Boston, MA
An exploratory biomarker study of metastatic triple-negative breast cancer patients treated with atezolizumuab, an anti-PD-L1 antibody, and nab-Paclitaxel
In partnership with Breast Cancer Research Foundation and Parker Institute for Cancer Immunotherapy

Malcolm A.S. Moore, D.Phil.
Memorial Sloan Kettering Cancer Center, New York, NY
Engineering chimeric antigen receptor T cells to overcome immune escape in multiple myeloma
Gar Reichman Laboratory

Lior Nissim, Ph.D.*
The Hebrew University-Hadassah Medical School, Jerusalem, Israel
A synthetic-biology based modality for lung cancer immunotherapy
Immunotherapy Promise Grant in partnership with the Israel Cancer Research Fund

Asya Rolls, Ph.D.*
Israel Institute of Technology, Haifa, Israel
Neuronal regulation of anti-tumor immunity
Immunotherapy Promise Grant in partnership with the Israel Cancer Research Fund

Cynthia L. Sears, M.D.
Johns Hopkins University School of Medicine, Baltimore, MD
Gut microbiome and the immune microenvironment of human primary and metastatic colorectal cancer
In partnership with Fight Colorectal Cancer

CLINICAL ACCELERATOR

Clinical Strategy Team Grants

Targeting the tumor immune microenvironment to enhance immune-stimulating effects of chemoradiotherapy
Team Lead: Andrew G. Sikora, M.D., Ph.D., Baylor College of Medicine, Houston, TX
Investigators: Sacha Gnjatic, Ph.D., Icahn School of Medicine at Mount Sinai, New York, NY; Christine Chung, M.D., Moffitt Cancer Center, Tampa, FL; Nham Tran, Ph.D., University of Technology, Sydney, Australia; Cornelis J.M. Melief, M.D., Ph.D., Leiden University, Leiden, The Netherlands

Clinical Trials Funded

Platform study for prostate cancer researching translational endpoints correlated to response to inform use of novel combinations*
Study Chairs: Lawrence Fong, M.D., University of California, San Francisco, San Francisco, CA, and Sumit K. Subudhi, M.D., Ph.D., The University of Texas MD Anderson Cancer Center, Houston, TX
Lead Investigators: Karen A. Autio, M.D., M.Sc., Memorial Sloan Kettering Cancer Center, New York, NY; Charles G. Drake, M.D., Ph.D., Columbia University Medical Center, New York, NY; Matthew Galsky, M.D., and Kristopher Weintzel, M.D., Icahn School of Medicine at Mount Sinai, New York, NY

An immunotherapy platform study in platinum resistant high grade serous ovarian cancer*
Study Chairs: Helen J. Mackay, M.D., Princess Margaret Cancer Centre, Toronto, Canada, and Dmitriy Zamarin, M.D., Ph.D., Memorial Sloan Kettering Cancer Center, New York, NY

A biomarker directed phase II study of molecular response of immuno-chemotherapy in NSCLC*
Study Chair: Valsamo Anagnostou, M.D., Ph.D., and Julie R. Brahmer, M.D., Johns Hopkins University School of Medicine, Baltimore, MD, Cheryl Ho, M.D., FRCPC, British Columbia Cancer Foundation, Vancouver, British Columbia

A phase 1b/2 multicenter, open-label, exploratory platform study to evaluate immunotherapy combinations for the treatment of patients with previously untreated metastatic pancreatic adenocarcinoma*
Study Chair: Robert H. Vonderheide, M.D., D.Phil., Abramson Cancer Center of the University of Pennsylvania, Philadelphia, PA
Lead Investigators: George Fischer, M.D., Stanford University School of Medicine, Stanford, CA; Andrew Ko, M.D., University of California, San Francisco, San Francisco, CA; Mark O'Hara, M.D., Abramson Cancer Center of the University of Pennsylvania, Philadelphia, PA; Eileen O'Reilly, M.D., Memorial Sloan Kettering Cancer Center, New York, NY; Osama Rahma, M.D., Dana-Farber Cancer Institute, Boston, MA; Robert A. Wolfe M.D., The University of Texas MD Anderson Cancer Center, Houston, TX; Zev Wainberg, M.D., University of California, Los Angeles School of Medicine, Los Angeles, CA

An exploratory study of nivolumab with or without ipilimumab according to the percentage of tumoral CD8 cells in participants with advanced metastatic cancer*
Study Chair: Padmanee Sharma, M.D., Ph.D., The University of Texas MD Anderson Cancer Center, Houston, TX
Lead Investigators: Alexandra Drakaki, M.D., University of California, Los Angeles, Los Angeles, CA; Lawrence Fong, M.D., University of California, San Francisco, San Francisco, CA; F. Stephen Hodi, M.D., Dana-Farber Cancer Institute, Boston, MA; Danny N. Khalil, M.D., Ph.D., Memorial Sloan Kettering Cancer Center, New York, NY; Shivaani Kummar, M.D., FACP, Stanford University Medical Center, Stanford, CA

Nivolumab ipilimumab in patients with hypermutated cancers detected in blood
Study Chair: Naiyer Rizvi, M.D., Ph.D., Columbia University, New York, NY
Lead Investigators: Nina Bhardwaj, M.D., Ph.D., Icahn School of Medicine at Mount Sinai, New York, NY; Timothy A. Chan, M.D., Ph.D., Memorial Sloan Kettering Cancer Center, New York, NY; Stephen Chia, M.D., British Columbia Cancer Foundation, Vancouver, British Columbia; Neesha Dhani, M.D., Princess Margaret Cancer Centre, Toronto, Canada; Holger W. Hirte, M.D., Juravinski Regional Cancer Centre, Hamilton, Canada; Patricia Tang, M.D., Tom Baker Cancer Centre, Calgary,

Canada; Michael Vickers, M.D., MPH, The Ottawa Hospital Cancer Centre, Ottowa, Canada; Jeffrey S. Weber, M.D., Ph.D, NYU Langone Health, New York, NY

Open-label, multicenter, phase 1b/2 clinical study to evaluation safety and efficacy of APX005M with gemcitabine and nab-paclitaxel with or without nivolumab in patients with previously untreated metastatic pancreatic adenocarcinoma
Study Chair: Robert H. Vonderheide, M.D., D.Phil., Abramson Cancer Center of the University of Pennsylvania, Philadelphia, PA
Lead Investigators: George Fischer, M.D., Stanford University School of Medicine, Stanford, CA; Andrew Ko, M.D., University of California, San Francisco, San Francisco, CA; Mark O'Hara, M.D., Abramson Cancer Center of the University of Pennsylvania, Philadelphia, PA; Eileen O'Reilly, M.D., Memorial Sloan Kettering Cancer Center, New York, NY; Osama Rahma, M.D., Dana-Farber Cancer Institute, Boston, MA; Robert A. Wolfe, M.D., The University of Texas MD Anderson Cancer Center, Houston, TX; Zev Wainberg, M.D., University of California, Los Angeles School of Medicine, Los Angeles, CA

A phase 1/2 study of combination immunotherapy and mRNA vaccine in subjects with non-small cell lung cancer
Study Chair: Jhanelle E. Gray, M.D., Moffitt Cancer Center, Tampa, FL
Lead Investigators: Jiaxin Niu, M.D., Banner Gateway Medical Center, Gilbert, AZ; Joshua Sabari, M.D. NYU Langone Health, New York, NY; Jonathan Thompson, M.D., Medical College of Wisconsin, Milwaukee, WI

A phase 1/2 dose escalation study with expansion cohorts to investigate the safety, biologic and anti-tumor activity of ONCOS-102 in combination with durvalumab in subjects with advanced peritoneal malignancies
Study Chair: Dmitriy Zamarin, M.D., Ph.D., Memorial Sloan Kettering Cancer Center, New York, NY
Lead Investigators: Linda Duska, M.D., University of Virginia, Charlottesville, VA; John Neumanitis, M.D., University of Toledo, Toledo, OH; Kunle Odunsi, M.D., Ph.D., Roswell Park Comprehensive Cancer Center, Buffalo, NY; Brian Slomovitz, M.D., University of Miami, Miami, FL

A phase 1/2 study of in situ vaccination with checkpoint antibodies tremelimumab and IV durvalumab plus the toll-like receptor agonist PolyICLC in subjects with advanced, measurable, biopsy-accessible cancers
Study Chairs: Nina Bhardwaj, M.D., Ph.D., Icahn School of Medicine at Mount Sinai, New York, NY; Craig L. Slingluff Jr., M.D., University of Virginia Health System, Charlottesville, VA
Lead Investigators: Michael Lowe, M.D., Emory University School of Medicine, Atlanta, GA; Mateusz Opyrchal, M.D., Roswell Park Comprehensive Cancer Center, Buffalo, NY; Keisuke Shirai M.D., Dartmouth Hitchcock Medical Center, Lebanon, NH; Ahmad Tarhini, M.D., Cleveland Clinic, Cleveland, OH

Phase 1/2 study of chemoimmunotherapy pegylated liposomal doxorubicin, and anti-PD-L1 antibody MEDI4736 in recurrent, platinum-resistant epithelial ovarian or primary peritoneal cancer
Study Chair: George Coukos, M.D., Ph.D., University Hospital of Lausanne, Lausanne, Switzerland
Lead Investigators: Paul DiSilvestro, M.D., Woman and Infants Hospital, Providence, RI; Bradley Monk, M.D., Arizona Oncology, Phoenix, AZ; Roisin O'Cearbhail, M.D., Memorial Sloan Kettering Cancer Center, New York, NY; David O'Malley, M.D., Ohio State University, Columbus, OH; Anita Wolfer M.D., Ph.D., CHUV, Lausanne, Switzerland

Phase 2 study to evaluate the clinical efficacy and safety of MEDI4736 in patients with glioblastoma
Study Chair: David Reardon, M.D., Dana-Farber Cancer Institute, Boston, MA
Lead Investigators: Jennifer Clarke, M.D., UCLA Medical Center, Los Angeles, CA; Timothy S. Cloughesy, M.D., UCLA Medical Center, Los Angeles, CA; Jorg Dietrich, M.D., Massachusetts General Hospital, Boston, MA; Gavin Dunn, M.D., Ph.D., Washington University School of Medicine, St. Louis, MO; Hui Gan, M.D., Austin Hospital, Melbourne, Australia; Thomas Kaley, M.D., Memorial Sloan Kettering Cancer Center, New York, NY; Michael Lim, M.D., Johns Hopkins University School of Medicine

A phase 1 study to evaluate the safety and tolerability of anti-PD-L1 (MEDI4736) in combination with tremelimumab in subjects with advanced solid tumors
Study Chairs: Margaret Callahan, M.D., Ph.D., and Jedd Wolchok, M.D., Ph.D., Memorial Sloan Kettering Cancer Center, New York, NY
Lead Investigators: Patrick Dillon, M.D., University of Virginia, Charlottesville, VA; Kunle Odunsi, M.D., Roswell Park Comprehensive Cancer Center, Buffalo, NY; Patrick Ott, M.D., Dana-Farber Cancer Institute, Boston, MA; Reva Schneider, M.D., Mary Crowley Cancer Center, Dallas, TX; Mario Sznol, M.D., Yale School of Medicine, New Haven, CT

Correlative and Laboratory Studies

Contribution of tumor antigen-specific adaptive immunity to responsiveness to immune checkpoint blockade
Maha Ayyoub, Pharm.D., Ph.D.
University of Toulouse, Toulouse, France

REVIVE: Resistance to PD-1—ReVerse translational to identify NoVEl combinations*
Danny Wells, Ph.D.
Parker Institute for Cancer Immunotherapy, San Francisco, CA

The single cell atlas of response to immunotherapy*
Ansuman T. Satpathy, M.D., Ph.D.
Stanford University, Stanford, CA

Platform study for prostate researching translational endpoints correlated to response to inform use of novel combinations: Correlative studies*
Parker Institute for Cancer Immunotherapy, San Francisco, CA

Reagent Production

Polypeptide Laboratories
San Diego, CA
Production of NY-ESO-1 overlapping peptides for use in a variety of trials

ANNUAL AWARDS

Cornelis J.M. Melief, M.D., Ph.D.*
Leiden University Medical Center, Leiden, The Netherlands
CRI-AACR Lloyd J. Old Award in Immunotherapy

Miriam Merad, M.D., Ph.D.*
Icahn School of Medicine at Mount Sinai, New York, NY
William B. Coley Award in Basic Immunology

Boris V. Reizis, Ph.D.*
New York University School of Medicine, New York, NY
Frederick W. Alt Award for New Discoveries in Immunology

Padmanee Sharma, M.D., Ph.D.*
The University of Texas MD Anderson Cancer Center, Houston, TX
William B. Coley Award in Tumor Immunology

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The Helen Coley Nauts Society recognizes donors who have included CRI in their estate plans. Through deferred gifts, bequests, trusts, and other planned giving instruments, these thoughtful individuals safeguard CRI's financial future.

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The Helen Coley Nauts Society is named in memory of CRI's founder, whose passionate belief that the immune system could one day be harnessed to fight cancer helped make this powerful vision a reality for millions of cancer patients today.

Contact Us

To learn about preserving your legacy by making a planned gift to CRI, contact Rupinder Kaur at legacy@cancerresearch.org or call us at (212) 688-7515.

Community Fundraisers

We are deeply grateful for the growing community of fundraisers who inspire their family, friends, colleagues, and broader networks to support our cause.

Robin Halperin raised funds for Team CRI by running the 2018 TCS New York City Marathon.

Brian Landau raised over $5,000 and delivered his check in-person at CRI offices after cycling over 4,000 miles across America.

After losing his father to cancer, Gunner's only wish for his fourth birthday was to have donations made to CRI.

Conversing with Oceans performs at the Music for a Cause fundraiser in Bronx, NY. Photo by Lou Guarneri.

Carter and Mark Comer turned their wedding into a fundraiser and raised over $14,000.

Joshua Boudreaux hosts a drag-themed party and fundraiser (over $2,300) to celebrate being cancer-free.

Trevor Smith and friends gather after the Fourth Annual Jim and Jerry Smith Memorial Golf Tournament Fundraiser, which raised over $6,500.

Financial Highlights

Donor trust is our most valued asset. We earn and keep this trust through our commitment to accountability and transparency, holding ourselves to the highest standards of fiscal integrity and responsible use of donor dollars.

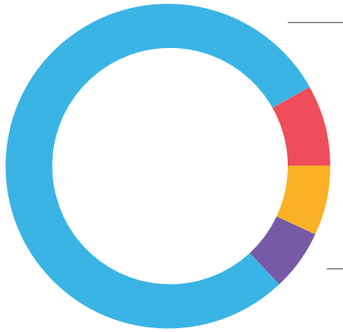
Applying best nonprofit accounting practices has consistently earned CRI top ratings from charity watchdogs including the Better Business Bureau, Charity Navigator, GuideStar, and others—giving further assurance to discerning donors seeking to make the greatest impact with their philanthropic investments.

We open our books annually for inspection and verification by independent auditors. EisnerAmper conducted an audit of our financial records for Fiscal Year 2019 (July 1, 2018, to June 30, 2019), a complete copy of which is available on our website. We provide highlights from that report here, which reflect revenues of $39.4 million, expenses of $37.1 million, and end of year net assets of $58.8 million.

ALFRED R. MASSIDAS
Chief Financial Officer

To view our complete audited financials, go to **cancerresearch.org/financials**.

Total Support & Revenues: $39.4 million



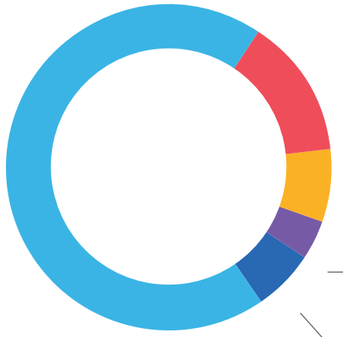
Contributions
$31.3 million, 79%

Bequests and Memorials
$3.1 million, 8%

Investments and Other
$2.8 million, 7%

Special Events
$2.3 million, 6%

Total Expenses: $37.1 million



Research
$25.5 million, 69%
$36.4 million awarded minus $10.9 million in early terminations of grants and clinical trials from prior years

Science, Medical, and Research Information and Communications
$5.2 million, 14%

Marketing and Development
$2.7 million, 7%

Administration
$1.5 million, 4%

Allowance for Uncollectible Accounts
$2.2 million, 6%

End of Year Net Assets: $58.8 million

Governance and Guidance

Leaders in business, philanthropy, and science volunteer their time and expertise to guide the Cancer Research Institute's strategic course, oversee its operations, shape its mission-driven programs, and increase awareness of CRI's impact.

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CRI honored scientific and philanthropic contributions to cancer immunotherapy at its annual awards gala in October 2018.

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CRI actively seeks out and welcomes opportunities to work with others to develop educational and awareness-building programs designed to advance the pace of progress in cancer immunotherapy research. Contact Sharon Slade at **sslade@cancerresearch.org** or (212) 688-7515 x230 to learn more.

Michelle Falkner
immunotherapy patient and esophageal cancer veteran

Although conventional treatments for esophageal cancer put Michelle into remission, odds were high that her late-stage cancer would come back. Determined to do all she could to stay cancer-free, she enrolled in a clinical trial of an immunotherapy designed to keep her immune system fighting. Three years later, Michelle’s cancer hasn’t returned. Immunotherapy, she says, was a safety net that led to peace of mind. Today she is able to continue doing what she loves most: planning adventures with her husband, Juan, and daughter, Cara Mia.

Watch Michelle’s immunotherapy story at **cancerresearch.org/michelle**

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