

2018 FUNDING ALLOCATIONS

Cycle for Survival fights back against rare cancers with 100% of every dollar. This extraordinary community funds groundbreaking clinical trials, research studies, and technology development led by Memorial Sloan Kettering.



Thanks to the determination of riders, supporters, patients, researchers, and physicians, \$39 million was raised in 2018—bringing the total to more than \$180 million in twelve years.

Within six months of the close of fundraising, donations are allocated to support a wide-reaching research enterprise that empowers scientists and doctors to make lifesaving discoveries. Their common theme: to advance trailblazing innovations that will help patients everywhere.

The funding includes research on these specific cancer types:

Adenoid Cystic Carcinoma	Esophageal Cancer	Leukemia	Ovarian Cancer
Adrenocortical Carcinoma	Ewing Sarcoma	Liposarcoma	Pancreatic Cancer
Angiosarcoma	Gastric Cancer	Liver Cancer	Pancreatic Neuroendocrine Tumors
Bladder Cancer	Germ Cell Tumors	Lymphoma	Retinoblastoma
Blood Cancer	GIST	Malignant Rhabdoid Tumors	Rhabdomyosarcoma
Brain Cancer	Glioblastoma	Merkel Cell Carcinoma	Sarcoma
Cholangiocarcinoma	Glioma	Melanoma	Stomach Cancer
Chordoma	Histiocytosis	Multiple Myeloma	Thyroid Cancer
Clear Cell Ovarian Cancer	Kidney Cancer	Neuroblastoma	Uterine Cancer
Endometrial Cancer	Leiomyosarcoma	Osteosarcoma	
Ependymoma	Leptomeningeal Disease		

FUNDED RESEARCH

MSK is on the frontline of the battle against rare cancers. Cycle for Survival is proud to support the advancement of comprehensive initiatives at MSK, which span across many critical areas of research.

»» Sloan Kettering Institute

Sloan Kettering Institute (SKI) was founded in 1945 to develop new techniques to conquer cancer. Today, SKI's laboratories operate as the crucial experimental research arm of MSK: advancing science to help cancer patients everywhere.

Directed by **Dr. Joan Massagué**, SKI represents the very best of scientific inquiry. Spanning nine research programs, its staff of more than 100 investigators, 400 fellows, and 200 graduate students works together toward SKI's collective mission: devising better ways to combat cancer. Cycle for Survival's longtime support for SKI has propelled innovation, advanced sophisticated technologies, and bolstered infrastructure in profound ways. This year's funding will be directed to key strategic initiatives: furthering scientists' ability to turn ideas once considered impossible into meaningful breakthroughs for patients battling rare cancer.

»» Human Oncology and Pathogenesis Program

The Human Oncology and Pathogenesis Program (HOPP) is MSK's hallmark translational research program: a collaborative hub that bridges discoveries made in the lab with research leading to new and improved treatments for cancer. Cycle for Survival support has been vital to the success of this multi-disciplinary initiative—much to the benefit of patients with rare cancers.

By bringing together a brilliant collective of MSK physicians and scientists who have one foot in the laboratory and the other in clinic, HOPP serves as a unique and rapid incubator for innovative cancer-fighting strategies. Led by **Dr. Charles Sawyers**, the program focuses on developing novel cancer therapies, often for people with malignancies that lack effective treatments or standards of care. Cycle for Survival has been a proud, longstanding partner of this renowned program, fueling paradigm-changing research that has reshaped how rare cancers are understood and treated. HOPP researchers are among the world's foremost experts in oncology and their findings impact the lives of patients worldwide.

»» The Marie-Josée and Henry R. Kravis Center for Molecular Oncology

Cycle for Survival is a major supporter of the groundbreaking work of the Marie-Josée and Henry R. Kravis Center for Molecular Oncology. The genomic discoveries uncovered through this revolutionary program provided answers—and fresh hope—to countless people with rare cancers.

Today, doctors target cancer cells more precisely than ever before, and work is underway to continuously improve this approach. The results of MSK-IMPACT sequencing, a technology invented at MSK—and the first such test to receive FDA authorization—can guide treatment decisions by identifying which genetic mutations are causing a person's cancer. For patients battling rare diseases, this information can point to never-before-considered treatment options that target mutations resulting in dramatic tumor regressions or even wipe out disease. Among the leaders of this endeavor are **Drs. David Solit, Marc Ladanyi, and Michael Berger**. Cycle for Survival's investment in this dynamic effort has been vital to its success and momentum: MSK just surpassed 31,000 tumors sequenced since 2014.

»» Sarcoma

The Jennifer Goodman Linn Laboratory of New Drug Development in Sarcoma and Rare Cancers—named in honor of Cycle for Survival's founder—is a powerful symbol of the movement's commitment to attack every form of sarcoma. This support has empowered MSK's team to move the needle with unprecedented speed.

MSK's Sarcoma Medical Oncology Service, directed by **Dr. William Tap**, explores every possible option to help patients with sarcoma. Cycle for Survival has given MSK's physician-scientists the resources to rapidly grow the arsenal of options to combat these 70+ complex diseases known to resist treatment. This includes building the world's largest immunotherapy program focused on sarcoma: MSK is running nearly 20 clinical trials to test novel strategies against these malignancies. Scientists are also studying ways to manipulate how drugs work, and are finding ways to predict if a therapy will be effective for a patient before it's even prescribed. Cycle for Survival backing has cemented MSK's international reputation in sarcoma research—changing the game for people facing this challenging disease.

»» Computational Oncology

When diagnosed with cancer, patients often ask, “What caused my disease?” and “How can we beat it?” Cycle for Survival is fueling MSK's computational oncology program: maximizing an abundance of “big data” to uncover the answers, guide treatment, and change the lives of patients battling rare cancers.

Scientists use clinical and molecular data, gathered over time, to predict how cancer responds to different treatments. This valuable information points future patients toward the most effective option to attack their disease so no time is wasted. Home to one of the largest data sets anywhere, MSK is taking these findings to the next level, with **Dr. Sohrab Shah** as the program's inaugural Chief. Cycle for Survival is advancing MSK's research into the microenvironment where cancer thrives and mutates. Recognizing that cancer is diverse and constantly changing, computational oncology will enable physician-scientists to see through this complexity to find new treatment options—and save lives.

»» Precision Prevention

If cancer is caught early, before it takes root, the likelihood of a patient's survival can go from 5% to 90%. This is the essence of precision prevention: finding traces of disease—and stopping it in its tracks. Cycle for Survival support is propelling this ambitious MSK program, set to change the future of oncology as we know it.

Most current cancer screening tests are insufficient; many miss the first signs of disease entirely. MSK is working to change this. Led by **Dr. Luis Diaz** and backed by Cycle for Survival, MSK's Precision Interception and Prevention Program is a pioneering effort to find cancer early and improve outcomes. Recent progress was made toward that goal when a clinic, run by **Dr. Ross Levine**, was opened for people with a blood condition that has strong links to cancer, specifically leukemia. By carefully monitoring these individuals and initiating treatment at the first sign of progression, MSK is demonstrating precision prevention in action—just the start of a pivotal new approach in cancer care.

EQUINOX INNOVATION INITIATIVE

The Equinox Innovation Initiative—named in honor of Cycle for Survival’s longtime founding partner—fuels game-changing research that embodies the innovative spirit of Equinox.

These coveted grants and projects are awarded to MSK physicians and scientists annually through a highly competitive process that enables them to pursue cutting-edge research with speed and agility.

In addition to the projects listed below, the 2018 funding also supports the new **Pilot Transformative Clinical Trials** program, which will elevate clinical trials developed by researchers at MSK—a.k.a. “investigator-initiated” studies—and provide the financial resources necessary to launch a trial without the need for external funding from an industry or government sponsor.

Blood Cancer

Dr. Andrew Intlekofer is studying a newly discovered mechanism of therapeutic resistance in patients with acute myeloid leukemia and other rare cancers. Specifically, he seeks to understand how a secondary genetic mutation makes the once-effective targeted therapy stop working—and find ways to overcome this hurdle.

Dr. Raajit Rampal is studying how different genetic mutations found within blood cancers known as myeloproliferative neoplasms impact disease progression and outcome. In parallel, he is launching a multicenter phase II trial to test the efficacy of a targeted therapy combination against these malignancies.

Having proved that modified donor tumor-targeted T cells help patients avoid life-threatening complications following bone marrow transplant, **Dr. Melody Smith** is developing an early-phase trial to help patients with blood cancer avoid relapse after transplant.

Brain Cancer

To figure out how immunotherapy can be effective for patients with glioblastoma, **Dr. Ingo Mellingerhoff** and his team are piloting an approach using therapies targeting the immune system before and after brain cancer surgery. By integrating the latest technology to collect key measurements of response, this collaborative study has the potential to understand mechanisms of drug resistance and how to overcome them.

Dr. Viviane Tabar and her team are testing the repurposing of FDA-approved drugs, used alone or in combination, on glioma models to explore the relationship between cell metabolism and cancer. Any promising results will be fast-tracked to the clinic to help people battling these difficult-to-treat brain tumors.

In a second project, as part of the Functional Genomics Initiative, she and her team are studying a recently identified mutation found in high-grade pediatric gliomas. To understand the molecular mechanism that fuels the disease, her team will use stem cells to investigate the mutation’s functional role in how glioma cells grow and mature.

Chemical Biology

Dr. Yael David is studying the role of a gene in turning off the DNA repair function of a group of proteins found within a cell's nucleus, and characterizing how this same gene promotes the formation of cancer cells.

Germ Cell Tumors

Dr. Darren Feldman is researching patients with germ cell tumors who develop secondary cancers that transform out of their original germ cell tumor, a condition that makes treatment far less likely to succeed. To investigate the relationship between the cancers, he is using biology and genomics to discover what causes this to occur, which will hopefully lead to new treatments and improve outcomes.

Histiocytosis

To correct—and someday prevent—a rare and devastating neurodegenerative syndrome in patients with histiocytosis (a group of disorders identified by mutations in a type of immune cell called macrophages that cleans tissues), **Dr. Frederic Geissmann** is working alongside clinicians, neurosurgeons, and biologists to characterize the genetic mutations in affected brain areas, and to test the therapeutic potential of targeted drugs in lab models.

Leptomeningeal Metastases

In an early-stage trial, **Dr. Jonathan Yang** is evaluating a new radiation therapy targeting leptomeningeal metastases—cancer that has spread to the area containing the brain and the spinal cord, as well as cerebrospinal fluid. He is using cerebrospinal fluid to measure biomarkers of treatment response in an effort to understand the genetics driving this rare condition.

Malignant Rhabdoid Tumors (Pediatrics)

Using laboratory models, **Dr. Filemon Dela Cruz** is evaluating how a genetic mutation within malignant rhabdoid tumors contributes to the disease's aggressive nature. Understanding this will improve how the cancer is diagnosed so children whose tumor carries the gene can enroll in clinical trials much faster.

Ovarian Cancer

Leveraging a recent MSK discovery about small cell carcinoma of the ovary (hypercalcemic type) and immunotherapy, **Dr. Britta Weigelt** is studying how the immune system recognizes this aggressive tumor—and identifying predictors of response to checkpoint blockade drugs.

Pancreatic Cancer

To ensure that pancreatic cancer patients receive the best therapy for their particular disease, **Dr. Christine Iacobuzio-Donahue** is studying a newly identified subtype of the BRCA2 mutation that appears to fuel the growth of some tumors faster than others.

Pediatric Cancer

Using models replicating actual patients' diseases, **Dr. Alex Kentsis** is exploring the interconnections between DNA repair and damage response—and how a combined therapy that halts one and revs up the other could wipe out certain pediatric solid tumors.

Sarcoma

Using laboratory models, **Dr. Cristina Antonescu** is investigating how different sets of cooperating genetic mutations and their underlying fusions drive a diverse group of tumors that include clear cell sarcoma of the soft tissue and gastrointestinal tract, and other rare cancers.

Stomach Cancer

Using laboratory models that replicate human stomach cancer both biologically and molecularly, **Dr. Scott Lowe** is investigating how different immune cells control the spread of this deadly disease—to learn why some tumors respond to immunotherapy and others become resistant.

BASIC AND TRANSLATIONAL LAB RESEARCH PROGRAMS, DIRECTED SUPPORT, AND PEDIATRICS

Every single project that Cycle for Survival funds represents a bold step toward new and better ways to fight rare cancers. MSK's Translational Research Programs, Directed Support, and pediatric cancer research projects aim to improve the lives of patients of all ages.

Behind every breakthrough are teams of determined, focused scientists who started with an idea to help people beat cancer. Every year, Cycle for Survival recognizes the potential of a wide range of research projects and topics—any one of which could profoundly change the lives of patients and their loved ones. Cycle for Survival is also proud to fuel studies led by MSK's Department of Pediatrics—the nation's largest, and home to a specialized precision oncology program singularly focused on childhood cancers. All of these research endeavors exemplify the progress and momentum underway at MSK for targeting rare diseases.

Dr. Ghassan Abou-Alfa

Gastrointestinal Oncology Service
Cholangiocarcinoma

Dr. David Abramson

Chief, Ophthalmic Oncology Service
Retinoblastoma

Dr. Nadeem Abu-Rustum

Chief, Gynecology Service
Ovarian and Uterine Cancer

Dr. Srikanth Ambati

Department of Pediatrics
Sarcoma

Dr. Cristina Antonescu

Director, Bone and Soft Tissue Pathology
Angiosarcoma, GIST, Rhabdomyosarcoma

Dr. Chris Barker

Radiation Oncology
Merkel Cell Carcinoma

Dr. Mary Baylies

Developmental Biology Program
Rhabdomyosarcoma

Dr. Robert Benezra

Cancer Biology and Genetics Program
Brain Cancer

Dr. Bernard Bochner

Urology Service
Bladder Cancer

Dr. Adrienne Boire

Brain Tumor Service
Brain Cancer

Dr. Farid Boulad

Medical Director, Pediatric Day Hospital
Acute myeloid leukemia

Dr. Jayanta Chaudhuri

Immunology Program
Lymphoma

Dr. Emily Cheng

HOPP
Kidney Cancer

Dr. Nai-Kong Cheung

Department of Pediatrics
Neuroblastoma

Dr. Dennis Chi

Deputy Chief, Gynecology Service
Ovarian Cancer

Dr. Daniel Coit

Gastric and Mixed Tumor Service
Merkel Cell Carcinoma

Dr. Lisa DeAngelis

Chair, Department of Neurology
Brain Cancer

Dr. Mark Dickson

Sarcoma Service
Sarcoma

Dr. Ira Dunkel

Department of Pediatrics
Pediatric Brain Cancer

Dr. Joseph Erinjeri

Interventional Radiology Service
Interventional Radiology

Dr. Darren Feldman

Genitourinary Oncology Service
Testicular Cancer, Germ Cell Tumors

Dr. Emily Foley

Cell Biology Program
Ovarian and Uterine Cancer

Dr. Sergio Giralt

Chief, Adult Bone Marrow Transplant Service
Multiple Myeloma

Dr. Michael Glickman

Immunology Program
Bladder Cancer

Dr. Mrinal Gounder

Sarcoma Medical Oncology Service
Chordoma

Dr. Rachel Grisham

Gynecologic Medical Oncology Service
Ovarian Cancer

Dr. Alan Hanash

Bone Marrow Transplant Service
Stem Cell Transplantation

Dr. John Healey

Chief, Orthopaedic Service
Bone Cancer

Dr. Daniel Heller

Molecular Pharmacology Program
Nanomedicine

Dr. Martee Hensley

Gynecologic Medical Oncology Service
Gynecologic Sarcomas

Dr. Alan Ho

Head and Neck Oncology Service
Head and Neck Cancers; Thyroid Cancer

Dr. Christine Iacobuzio-Donahue

Associate Director for Translational Research
Rubenstein Center for Pancreatic Cancer Research
Pancreatic Cancer

Dr. Andrew Intlekofer

Lymphoma Service
Lymphoma

Dr. Yelena Janjigian

Chief, Gastrointestinal Oncology Service
Esophageal Cancer

Dr. William Jarnagin

Chief, Hepatopancreatobiliary Service
Gallbladder cancer

Dr. Alexandra Joyner

Developmental Biology Program
Pediatric Brain Cancer

Dr. Yasmin Khakoo

Director, Child Neurology Program
Pediatric Brain Tumors

Dr. Virginia Klimek

Leukemia Service
Myelodysplastic Syndrome

Dr. Andrew Koff

Molecular Biology Program
Brain Tumors and Liposarcoma

Dr. Jason Konner

Chief, Medical Oncology, MSK Monmouth
Clear Cell Ovarian Cancer

Dr. Andrew Kung

Chair, Department of Pediatrics
Pediatric Cancer

Dr. Brian Kushner

Department of Pediatrics
Neuroblastoma

Dr. Michael La Quaglia

Chief, Pediatric Surgical Service
Sarcoma

Dr. Marc Ladanyi

Chief Attending, Department of Pathology; HOPP
Sarcoma

Dr. Heather Landau

Myeloma Service; Bone Marrow Transplant Service
Multiple Myeloma

Dr. Nikoletta Lendvai

Myeloma Service, Department of Medicine
Multiple Myeloma

Dr. Scott Lowe

Chair, Cancer Biology & Genetics Program
Cholangiocarcinoma

Dr. Vicky Makker

Gynecologic Medical Oncology Service
Gynecologic Cancers

Dr. Paul Meyers

Department of Pediatrics
Sarcoma; Rhabdomyosarcoma

Dr. Robert Motzer

Genitourinary Oncology Service
Kidney Cancer

Dr. Eileen O'Reilly

Associate Director for Clinical Research
Center for Pancreatic Cancer Research
Pancreatic Cancer

Dr. Kenneth Offit

Chief, Clinical Genetics Service
Ovarian Cancer

Dr. Luis Parada

Director, Brain Tumor Center
Brain Cancer

Dr. John Petrini

Director, Functional Genomics Initiative; Chair,
Molecular Biology
Myodysplasia

Dr. Michael Postow

Melanoma and Immunotherapeutics Service
Melanoma

Dr. Diane Reidy Lagunes

Gastrointestinal Oncology Service
*Pancreatic Neuroendocrine Tumors and Adrenocortical
Carcinoma*

Dr. Neal Rosen

Molecular Pharmacology Program
Cholangiocarcinoma

Jonathan Rosenberg

Chief, Genitourinary Medical Oncology Service
Bladder and Kidney Cancer

Dr. Alexander Rudensky

Ludwig Center for Cancer Immunotherapy
Immunotherapy Research

Dr. David Scheinberg

Chair, Molecular Pharmacology Program
Mesothelioma

Dr. Neal Shukla

Department of Pediatrics
Pediatric Lymphoma

Dr. Mariel (Molly) Smith

Department of Pediatrics
Rhabdomyosarcoma

Dr. David Solit

Director, CMO; Make An Impact
DNA Sequencing

Dr. Amber Simpson

Memorial Hospital Research Laboratories
Cholangiocarcinoma

Dr. Samuel Singer

Chief, Gastric and Mixed Tumor Service
Sarcoma

Dr. Viviane Tabar

Chair, Department of Neurosurgery
Brain Cancer

Dr. Martin Tallman

Chief Attending, Leukemia Service
Myeloid Leukemia and Acute Lymphoblastic Leukemia

Dr. Tanya Trippett

Department of Pediatrics
Pediatric Blood Cancers

Dr. Andrea Ventura

Cancer Biology and Genetics Program
Brain Tumors

Dr. Aaron Viny

Leukemia Service
Acute myeloid leukemia

Dr. Leonard Wexler

Department of Pediatrics
Rhabdomyosarcoma

Dr. Jedd Wolchok

Chief, Melanoma & Immunotherapeutics Service
Immunotherapy

Dr. Anas Younes

Chief Attending, Lymphoma Service
Hodgkin and Non-Hodgkin Lymphoma

THE DECEMBER CHALLENGE: MOLECULAR ONCOLOGY

This past December, the Cycle for Survival community raised **\$2 million** to purchase a DNA sequencer and fund genomic profiling. This technology and approach is how MSK doctors and researchers investigate the drivers behind each person's cancer. DNA sequencing provides key insights that can be used to determine the best treatment options.

The machine is now at home in an MSK lab. It is faster, more efficient, cost effective, and more precise than ever before.

Every participant who received a donation from five donors during the month of December had their name displayed in the lab with the new sequencer.

