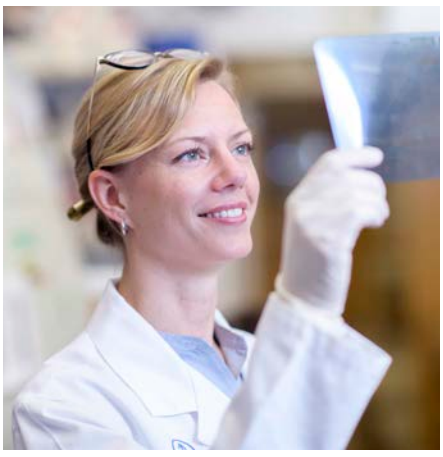
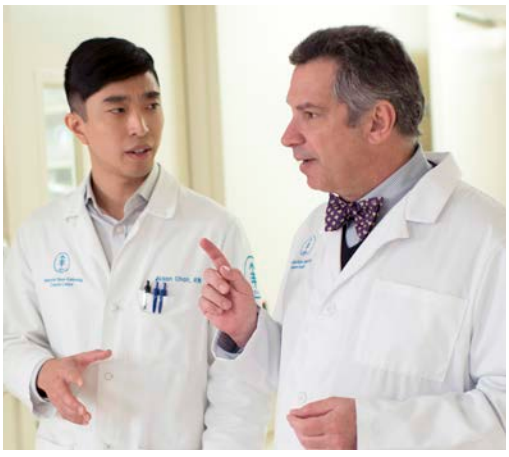
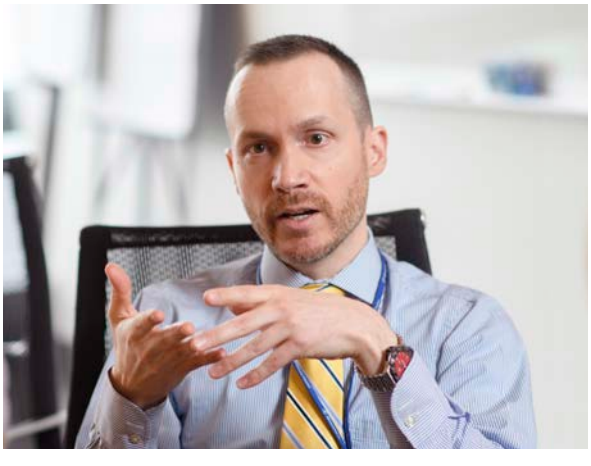




HEMATOLOGIC ONCOLOGY

2017

ANNUAL REPORT

Memorial Sloan Kettering Cancer Center

CONTENTS

ON THE COVER: , LEFT TO RIGHT:, TOP: Eytan Stein, Bernadette Cuello; Malin Hultcrantz; Jason Chan, Sergio Giralt, **BOTTOM**: Anita Kumar, Lia Palomba, Jarrell Robinson; Simon Mantha

CREDIT: MSK DEPARTMENT OF COMMUNICATIONS

DIVISION OF HEMATOLOGIC ONCOLOGY FACULTY

ADULT BONE MARROW TRANSPLANTATION


Juliet Barker


Hugo Castro-Malaspina


Christina Cho*


David Chung

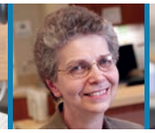

Parastoo Dahi


Sergio Giralt
CHIEF ATTENDING


Boglarka Gyurkocza


Alan Hanash


Katharine Hsu


Ann Jakubowski


Scott James*


Heather Landau


Esperanza Papadopoulos

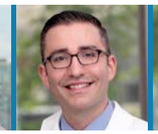

Jonathan Peled


Miguel Perales


Doris Ponce


Ioannis Politikos*


Craig Sauter


Michael Scordo*


Gunjan Shah


Melody Smith


Roni Tamari


Marcel van den Brink
DIVISION HEAD


James Young

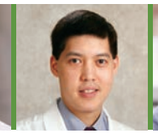
LEUKEMIA


Omar Abdel-Wahab


Ellin Berman


Renier Brentjens

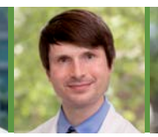

Sheng Cai

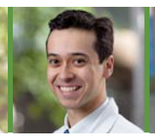

Stephen Chung


Bayard Clarkson


Anthony Daniyan*


Jacob Glass


Mark B. Geyer*


Aaron Goldberg*


Virginia Klimek †


Ross Levine


Peter Maslak


Michael Mauro


Jae Park


Raajit Rampal

David Scheinberg

Alan Shih

Eytan Stein

Martin Tallman
CHIEF ATTENDING

Justin Taylor*

Aaron Viny

HEMATOLOGY

Simon Mantha

Jodi Mones

Rekha Parameswaran

Gerald Soff
CHIEF ATTENDING

LYMPHOMA

Connie Batlevi

John Gerecitano

Paul Hamlin

Steven Horwitz

Andrew Intlekofer

Anita Kumar

Matthew Matasar †

Alison Moskowitz

Craig Moskowitz
CLINICAL DIRECTOR

Ariela Noy

Lia Palomba

Carol Portlock

David Straus

Elina Tsyvkin

Santosha Vardhana*

Anas Younes
CHIEF ATTENDING

Andrew Zelenetz †

MYELOMA

Hani Hassoun †

Malin Hultcrantz*

Neha Korde †

Ola Landgren
CHIEF ATTENDING

Nikoletta Lendvai

Alexander Lesokhin

Sham Mailankody †

Eric Smith

REGIONAL NETWORK

Philip C. Caron †

Pamela R. Drullinsky †

Audrey M. Hamilton †

Oscar Lahoud*†

Colette Owens †

COLLABORATING TEAMS

- Cardiology Service
- Case Management
- Colorectal Service
- Critical Care Medicine Service
- Dental Service
- Dermatology Service
- Endocrinology Service
- Gastroenterology & Nutrition Service
- Gastric & Mixed Tumor Service
- General Internal Medicine Service
- Geriatrics Service
- Gynecology Service
- Head & Neck Service
- Hepatopancreatobiliary Service
- Infectious Diseases Service
- Integrative Medicine Service
- Interventional Radiology Service
- Laboratory Medicine and Cell Therapy Lab
- Music/Art Therapy
- Neurology Service
- Neurosurgery
- Nursing
- Nutrition
- Occupational Therapy
- Ophthalmic Oncology Service
- Orthopaedic Service
- Pain & Palliative Care Service
- Pathology
  - Diagnostic Molecular Pathology
  - Hematopathology
  - Pathology Diagnostic Services, Cytology
  - Surgical Pathology Diagnostic Services:
    - Bone & Soft Tissue Pathology
    - Dermatopathology
    - Gastrointestinal Pathology
- Physical Therapy
- Plastic & Reconstructive Surgical Service
- Psychiatry Service
- Pulmonary Service
- Radiation Oncology
- Radiology
- Rehabilitation Medicine Service
- Renal Service
- Social Work
- Surgery
- Thoracic Service
- Urgent Care Center
- Urology Service

* Joined faculty in 2017 † Physicians who also practice in the Regional Network

LETTER FROM THE DIVISION HEAD

IIT IS A GREAT HONOR to present to you the 7th Annual Report of the Division of Hematological Oncology at Memorial Sloan Kettering Cancer Center. Here are a few of the highlights of this year's report.

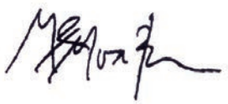
Members of our Division did the original groundbreaking work in the laboratory to develop a novel cell therapy using Chimeric Antigen Receptor (CAR) T cells. CAR T cells are patient's own T lymphocytes, which have been genetically engineered to kill cancer cells. In 2017, CAR T cells were approved by the FDA for the treatment of Non-Hodgkin Lymphoma. Currently, novel CAR T cell strategies are being developed by members of the Division for myeloma and bone marrow transplant patients.

In 2017, the FDA also approved a novel drug (Enasidenib) for Acute Myeloid Leukemia and members of the Division played an important role both in the lab and clinic for the development of this therapy.

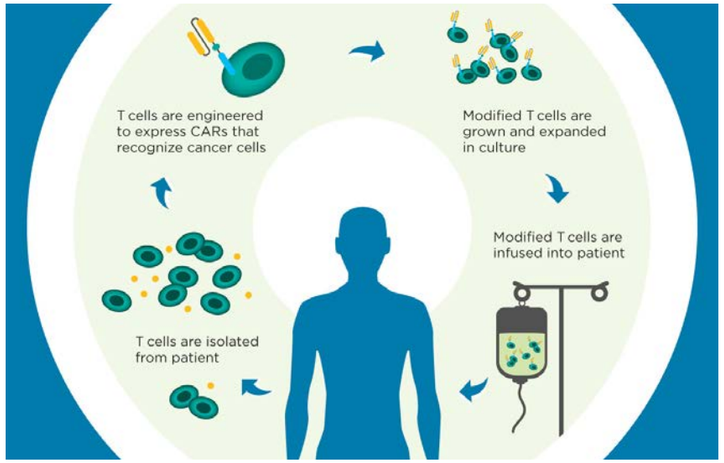
We are grateful to our donors who play a crucial role in funding our clinical and laboratory-based research. This year, we highlight Board Member Peter Solomon, who with his wife Susan has been a major supporter of genomic research of blood cancers in the Division.

Finally, at the celebration for the survivors of Blood and Marrow Transplant, Robin Roberts, who herself underwent a bone marrow transplant, taught us that we should change the name of this annual event from *survivors* to *thrivers*. That is indeed the goal of our Division: through excellence in research, training and clinical care, to improve the outcomes for patients with hematological malignancies and help them thrive again!

Regards,



Marcel van den Brink, MD, PhD
Alan Houghton Chair in Immunology
Head, Division of Hematologic Oncology
Memorial Sloan Kettering Cancer Center



FDA APPROVES CAR T CELL THERAPY FOR NON-HODGKIN LYMPHOMA

BY MATTHEW TONTONOZ

People with an aggressive form of lymphoma that is no longer responding to chemotherapy may now be eligible to receive a novel cell-based immunotherapy called CAR T. Previously, this treatment was available only to people participating in clinical trials.

FOR THE SECOND TIME IN recent months, the US Food and Drug Administration has green-lighted a novel form of immunotherapy, called CAR T cell therapy, for the treatment of cancer. The approval is for axicabtagene ciloleucel (trade name Yescarta) for the treatment of people with aggressive diffuse large B cell lymphoma (DLBCL), a type of non-Hodgkin lymphoma. The cell-based product is made by Kite Pharma, which was recently acquired by Gilead Sciences.

A similar product from the drug company Novartis was approved in August for pediatric leukemia. Both cell-based treatments use genetically engineered versions of a person's own immune cells to fight cancer. MSK researchers played a leading role in developing the technique.

DLBCL is the most common type of non-Hodgkin lymphoma, a blood cancer that primarily affects older adults. The typical treatment is chemotherapy using a combination of different drugs. This treatment may provide a cure but not always.

Previously, when a person relapsed after having therapy or stopped responding to treatment, a stem cell transplant was the only option. Now, CAR T cell therapy is a second potentially life-saving choice for people who may not be eligible for a stem cell transplant, or even for those whose disease has relapsed after having had one.

"For more than three decades, there has not been a single drug approved by the FDA for people with relapsed DLBCL," says Anas Younes, Chief of the Lymphoma Service at MSK. "The approval of axicabtagene is a major step forward, providing a new effective treatment option for these patients. Our group is at the forefront of developing second-generation CAR T cells to further improve their efficacy."

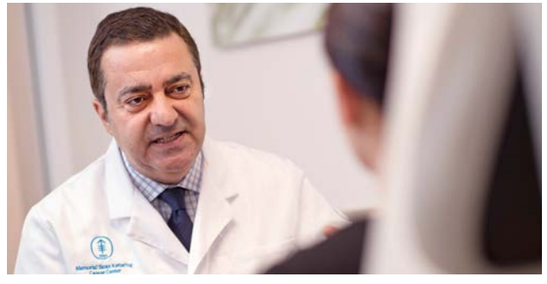
The FDA based its approval of axicabtagene ciloleucel on a clinical trial, led by Kite. The trial found that nearly half of people with this aggressive type of chemotherapy-resistant DLBCL had a complete response after receiving one infusion of CAR T cells, meaning all signs of their disease disappeared (at least for a time).

To make the cell product, doctors collect T cells from a person's blood. The cells are frozen and then shipped to a lab where they are genetically engineered to contain a new gene. The modified cells are grown in the lab until there are billions of copies and then shipped back to the hospital for reinfusion into the person's blood through an IV days later.

As in the previously approved Novartis product, Kite's CAR T cells target a protein on B cells called CD19. Both normal B cells and cancer cells contain CD19. Due to the action of the drug, the body temporarily loses its B cells, which are responsible for making protective immune molecules called antibodies. So people receiving CD19 CAR T therapy need to receive replacement antibodies. Some people may also experience a dangerous side effect called cytokine release syndrome, caused when the modified immune cells go into overdrive and produce chemicals that lower blood pressure and promote fever.

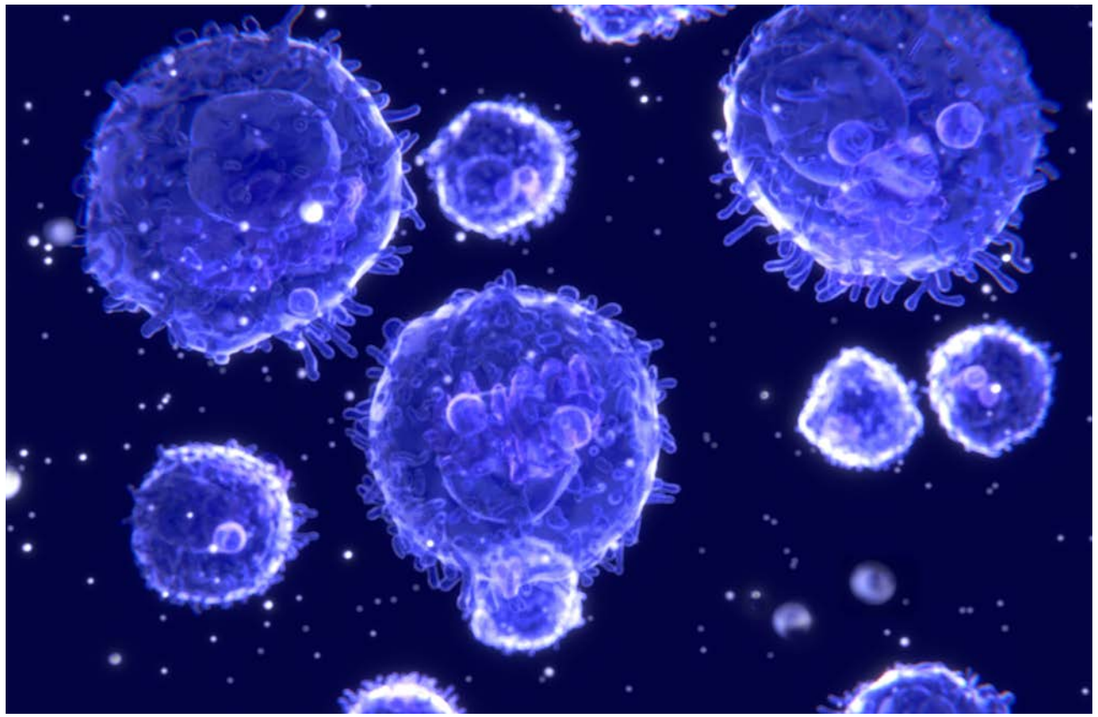
MSK is one of only a handful of cancer centers that have the experience and expertise necessary to administer CAR T cell therapies safely to patients.

"We have a multidisciplinary team of experts with vast experience who consult on every case," says Sergio Giralt, Chief of the Adult Bone Marrow Transplant Service at MSK. "Our primary job is making sure that each patient gets the very best care — whether that's CAR T cell therapy or another approach." ■



"For more than three decades, there has not been a single drug approved by the FDA for people with relapsed DLBCL."

— ANAS YOUNES, Medical oncologist



MSK scientists are engineering immune cells to be more powerful cancer fighters.

#AACR17: STUDY EXPLORES BEST TIME TO GIVE CAR T CELL THERAPY

MATTHEW TONTONOZ

For patients with leukemia who relapse after chemotherapy, treatment options have traditionally been limited. At MSK, an experimental immunotherapy called CAR T therapy has expanded options for these patients. New research data presented at this year's annual meeting of the American Association for Cancer Research (AACR) suggest that patients do better on the therapy when they are treated at the time of minimal residual disease.

LIKE MANY PATIENTS who come to Memorial Sloan Kettering, Glen Blum, 31, had already received treatment at another hospital for a cancer that was proving stubbornly hard to beat.

His saga began several years ago, when lingering back pain led to a blood test, a biopsy, and eventually a diagnosis of acute lymphoblastic leukemia, or ALL. This aggressive cancer, which grows in the bone marrow, had already damaged several of his vertebrae. He received conventional treatment with both chemotherapy and radiation, which helped for a while. But as is often the case with ALL, the cancer came roaring back. And when it did, it was resistant to further treatment with conventional drugs.

That's when Mr. Blum's doctor recommended that he enroll in a clinical trial of an experimental immunotherapy treatment at MSK. The goal of that treatment, called chimeric antigen receptor (CAR) T cell therapy, would be to shrink his cancer down to a point where he would be eligible for a potentially life-saving bone marrow transplant.

"Our ultimate goal is to cure the disease with as little therapy as possible and with the minimum of toxicity."

— JAE PARK, Hematologic Oncologist

"The way they explained it to me is that the treatment would get my own immune cells to see the cancer cells as foreign and eliminate them," says Mr. Blum, who lives in East Harlem in New York City. "Then the bone marrow transplant was a secondary step so that I wouldn't grow more cancer cells."

Historically, a bone marrow transplant is often a leukemia patient's last, best hope for a cure once initial therapy has failed. But the procedure is not without significant risks. To receive new bone marrow, patients must first have their existing bone marrow destroyed with high-dose chemotherapy or radiation. Because the bone marrow is what produces blood cells — including the white blood cells that make up the immune system — patients are vulnerable to infections while the new bone marrow grows. There is also the risk that immune cells from the donor marrow will start to attack the body's healthy cells, a dangerous complication called graft-versus-host disease.

But what if it were possible for patients to receive CAR T cell therapy earlier, before a relapse? Would outcomes for these patients be better? And might they be able to forgo a bone marrow transplant altogether?

CARS AT THE STARTING LINE

On April 3, at the AACR annual meeting, MSK physician-scientist Jae Park presented research that speaks directly to these questions. Dr. Park and his colleagues took a retrospective look at all adult patients with relapsed or refractory ALL treated with CAR T cells at MSK — 51 patients in all. They wanted to understand who benefits the most from this experimental treatment. For example, does the amount of leukemia a person has at the time of CAR T therapy influence how long that person remains free of disease or how severe the side effects are?

To get at these questions, the team divided those 51 patients into two groups: those with minimal residual disease (MRD, defined as less than 5% of cancer cells in the bone marrow at the time of CAR therapy) and those with obvious morphologic disease (MD, defined as 5% or greater cancer cells in the bone marrow). They then performed statistical analyses on the two groups to determine whether they differed in terms of length of survival and severity of side effects.

"The treatment would get my own immune cells to see the cancer cells as foreign and eliminate them."

— GLEN BLUM, a MSK patient

What they found was that, indeed, there was a significant difference in outcomes between the two groups. Although both groups initially experienced deep regressions leading to a high rate of complete responses, patients in the MRD group lived longer and had less toxicity compared with those in the MD group. (After an average of 18 months of follow-up, most of the MRD patients were still alive and free of disease, while the MRD patients had a median survival of 17 months; the rate of a life-threatening side effect called cytokine release syndrome was 5% for MRD patients versus 42% for MRD patients.)

According to Dr. Park, the results of this study provide strong support for administering CAR T cell therapy soon after initial chemotherapy, when a patient has minimal residual disease, rather than waiting until a patient relapses. The data from this study, he says, indicate that the CAR T cell therapy is likely to be both more effective and less toxic in the earlier setting. A prospective study to test this hypothesis is currently being planned.

Another suggestive finding — though one that needs to be interpreted with caution, given the small sample size — was that receiving a BMT after the CAR T therapy did not seem to improve outcomes in either group of patients. This raises the possibility that CAR T therapy might serve as a final or destination therapy, rather than as a "bridge" to transplant as it is typically used.

"Our ultimate goal is to cure the disease with as little therapy as possible and with the minimum of toxicity," Dr. Park says. "A bone marrow transplant is currently the only proven curative treatment for patients with relapsed or refractory ALL. But at the same time, it's a pretty toxic therapy, and carries a mortality rate anywhere from 15% to 25%. So if we could use CAR T cell therapy to treat the disease while sparing at least some patients the risks of transplant, that would be a big improvement."

GOING THE LAST MILE

For Mr. Blum, there was never really a question that he would go for the transplant, though he admits there was a point after the CAR T cell therapy when he considered his options.

"Hearing that your cancer is at zero feels like a victory," he said. "It feels like, Oh great, I'm done. But then when I thought about all I went through to get to that point — all the rounds of chemo and radiation, the hospital stays, the experimental treatment — to not go the last mile just didn't feel right."

Yet Mr. Blum's experience with bone marrow transplantation indicates why doctors are eager get to a point at which they can safely avoid it. About a month after the transplant, he got an infection that led to a severe case of pneumonia.

"I was in the ICU, and honestly, it was a really scary time," Mr. Blum says. "The doctors told my mother not to leave the hospital. They were worried I might not make it."

continued on page 8

continued from page 9

HIGHLIGHTS

- In a retrospective study, MSK researchers looked at the impact of pre-treatment disease burden on outcomes to CAR T cell therapy in leukemia.
- Patients with minimal residual disease had significantly longer survival and experienced less-severe toxicities compared with patients with more disease.
- A subsequent bone marrow transplant did not seem to improve outcomes in either group, though this finding was preliminary.

According to Dr. Park, the decision to recommend a BMT or not becomes a question of weighing different factors, including the number of previous treatments, the characteristics of the disease, the risks of the transplant, the risk of relapse, and the age of the patient.

"These are the practical conversations we're having with patients every day," he says. "And while I'm not suggesting by any means that we've answered the question definitively, this study raises the possibility that — at least for some patients — CAR therapy could be an end point."

NEW HORIZONS

In May, it will be one year since Mr. Blum had his bone marrow transplant. Though he still has some back pain, he says he is feeling much better. He's since gotten engaged, and he and his fiancée, Ashley, are planning a trip to Jamaica in June — assuming doctors give him the all-clear before then.

He says he has no regrets about the treatment he received, despite the difficulties. He always felt very well cared for at MSK.

"That hospital is a piece of heaven," Mr. Blum says. "Everyone there, including Dr. Park, has a heart three times the size of normal."

This study was funded by the National Cancer Institute, the Terry Fox Foundation, Juno Therapeutics, and the Experimental Therapeutics Center at MSK.

Editor's note: Recently, the biotechnology company Juno Therapeutics, which licenses CAR T technology from MSK, closed a phase II clinical trial of CD19-directed CAR T cells due to several deaths. The deaths were caused by cerebral edema, or swelling in the brain. No patients being treated at MSK with CAR T cells have had this severe side effect, and none of the 51 ALL patients included in this study were part of the Juno phase II (ROCKET) trial.

LINK: https://www.mskcc.org/blog/aacr17-study-explores-best-time-give-car-cell-therapy

OVER A 50-YEAR CAREER, CAROL PORTLOCK BEARS WITNESS TO EVOLUTION OF LYMPHOMA TREATMENTS

The two years that Carol Portlock, MD, spent as a laboratory technician/part-time student after graduating from college — when she was too broke to afford medical school — ended up being a gift that kept on giving.

DR. PORTLOCK, WHO ARRIVED AT Memorial Sloan Kettering in 1988, is closing out her distinguished 50-year career in medicine this coming July. With her entire practice devoted to patients with Hodgkin and non-Hodgkin lymphomas, Dr. Portlock has inevitably witnessed a wide array of advances in lymphoma treatments — including some that re-embraced the sturdy fundamentals in place when she started.

But it was her short stint in basic science as a young twenty-something that solidified her path toward clinical care.

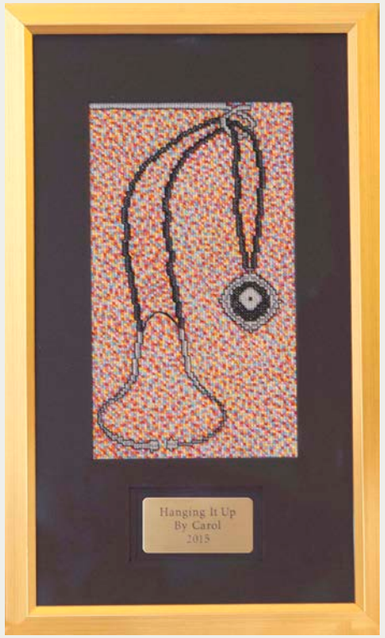
"Those two years of experience in science were negative for me. They were isolating," Dr. Portlock says. "I liked the scientific knowledge, but preferred patient interaction and practical application of the things I learned, rather than seeing it on a graph. But that time was valuable, because you do figure out what the real world is like, as opposed to what the books say and the way things are described."

Dr. Portlock entered medical school at Stanford in 1968, where she did her residency, fellowship and first faculty years before moving on to Yale in 1978. She eventually became internationally known in lymphoma, serving on the Board of Scientific Counselors of the National Cancer Institute and the Oncologic Drug Advisory Committee of the U.S. Food and Drug Administration.

MENTORS STAND TALL IN MEMORIES

Earlier in her career, Dr. Portlock felt fortunate to benefit from an inspirational group of mentors pivotal in lymphoma and other malignancies, including Drs. Saul Rosenberg and Henry Kaplan at Stanford; Dr. Joseph Bertino at Stanford, Yale and MSK; and Drs. Vincent DeVita and Samuel Hellman at MSK. Each of them, she says, was instrumental in developing or furthering some of the first effective agents in lymphoma, including radiotherapy, the drug methotrexate, and lymphoma combination chemotherapy.

"The treatments that were used at that time, although in retrospect very limited, really did accomplish the development of curative regimens — with high toxicity, but curative outcomes," Dr. Portlock recalls. "And combination chemotherapy and drugs like methotrexate, as well as radiotherapy, are still used but in a more effective, less toxic manner. I was lucky enough to participate in these early clinical trials, and enjoyed working with a group of people who were very knowledgeable and collaborative."



Thanks also to her mentors, Dr. Portlock gravitated toward the lymphoma specialty from medical school onward. But she has witnessed remarkable interdisciplinary collaboration throughout her career to apply new concepts from all areas of cancer into lymphoma, especially immunotherapy and other pharmacological approaches.

"There was alot of cross-fertilization between what was happening in pharmacology and solid malignancies and what was happening in lymphoma," she explains. "Probably the best thing for us was the development of the chemotherapy regimen ICE (ifosfamide, carboplatin and etoposide), whose agents were developed at MSK for use in solid tumors and are still one of our most active salvage regimens in Hodgkin and non-Hodgkin lymphoma."

SHIFT OBSERVED IN TREATMENT TRENDS

In contrast to 40 years ago, new drug development typically starts out as a solid tumor treatment. That's just one of the many trends Dr. Portlock has seen shift over her long career, but a happy result is that "alot of lymphomas are now highly curable and many targeted agents are designed specifically for lymphoma subtypes," she says.

Many of the newer targeted agents include immunotherapies such as nivolumab (Opdivo) and pembrolizumab (Keytruda), which have become established drugs for advanced solid cancers in the last several years and are also showing promise in lymphoma. "Immunotherapy will hopefully be one of the waves of the future, and everyone is hoping that will be the case," Dr. Portlock says.

But in certain respects, immunotherapy has been part of lymphoma care for decades, she points out. For example, interferon and rituximab (Rituxan) were staples of lymphoma care many years ago, with rituximab — a broad monoclonal antibody used for B-cell lymphoma — for more than 20 years.

"One of the questions for the future is how precise should targeted agents be," Dr. Portlock notes. "Many of these new drugs are developed for a single target or metabolic pathway, but cells are awfully smart, so ... precision may have a disadvantage as cells become resistant."

Dr. Portlock contends that modifications made in the use of many standard lymphoma treatments have also been impactful to patient outcomes . For instance, radiotherapy has been lessened in dose and scope to minimize late effects from treatment, and drugs like vincristine are now dose-reduced or stopped to avoid resulting weakness or paralysis. Decades of clinical trials have also reversed a prior Hodgkin lymphoma treatment paradigm favoring a radiotherapy-chemotherapy regimen, with chemo-alone patient groups, observed to live longer overall.

"We're being mindful that treatment can be part of curative regimens, but can also have later impacts such as secondary malignancies or infertility," she says. "We want patients to be cured, but with the least side effects, and to have normal ongoing lives as much as possible."

COMING FULL CIRCLE

A simple principle has guided Dr. Portlock's practice all these years: Treat every patient as if they were a family member or friend. At the same time, she remains pragmatic: "They all deserve the very best medical care we can deliver," she says. "But it's not yet possible to cure everybody."

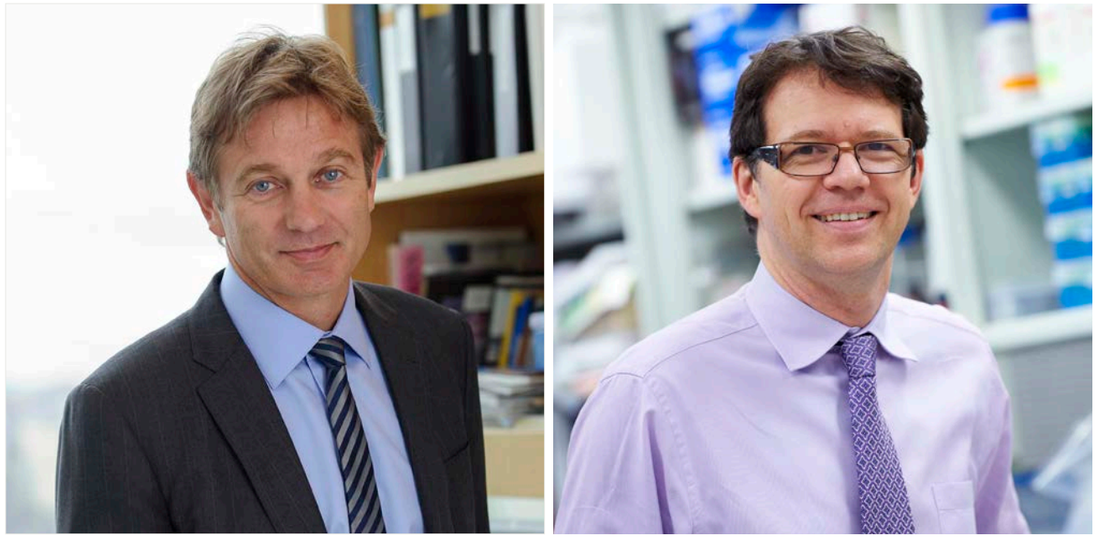
She has attempted to stay "reasonable" in her assessment of each patient's case and prognosis, whether that means using watchful waiting for someone with an indolent lymphoma or pursuing the most aggressive treatment possible, which often involves stem cell transplantation.

"I would say it's probably the guiding principle for all oncologists — that we believe the glass is half-full no matter the size of the glass," Dr. Portlock says. "I say that because we want to maintain optimism even in difficult times, and to maintain that optimism means also having the strength to be honest with yourself and patients and families about what the future holds."

"When things aren't working well, where comfort is very important, there's optimism in providing that comfort ... and switching from the optimism of continuing aggressive, active care to supportive, comfort care," she adds. "And that's a whole lot easier said than done."

The family of one of Dr. Portlock's late patients from long ago reached out and visited her years later simply because of their gratitude for her efforts. Now, at the end of her career, she feels these gestures mean more than any accolades.

"It's really a wonderful full circle," she says. "You realize that you impact people, but you see that it's actually generational and not at a single time point, that families are impacted in a positive way even when the outcome isn't what you'd hoped for. I think that says it all." ■



Physician-scientists Marcel van den Brink (left) and Michel Sadelain study ways to improve the treatment of blood cancers.

STUDY SUGGESTS WAYS TO MAKE BONE MARROW TRANSPLANTS SAFER FOR PEOPLE WITH BLOOD CANCERS

MATTHEW TONTONOZ

Recent clinical evidence suggests that genetically engineered immune cells from a donor cause less of a serious side effect called graft-versus-host disease as compared with unmodified donor immune cells. A new laboratory study shows why.

FOR PEOPLE WITH advanced blood cancers, a bone marrow transplant is often the last, best chance at a cure. But the procedure — which involves replacing diseased bone marrow with healthy blood cells from a donor — is not without risks. The most significant is graft-versus-host disease (GVHD), when donor white blood cells attack healthy tissues in the recipient. In severe cases, it can be fatal.

"Graft-versus-host disease is a complication that we've been battling for decades," says Marcel van den Brink, Head of the Division of Hematologic Oncology and Co-Director of the Parker Institute for Cancer Immunotherapy at MSK. "Everybody within this field would agree that figuring out ways to limit graft-versus-host would be real progress."

In a paper published January 9 in the journal *Nature Medicine*, a team of researchers led by Dr. van den Brink and Michel Sadelain, Director of the Center for Cell Engineering at MSK, present preliminary research that suggests ways to make transplants both safer and more effective.

The team is studying a type of immune cell taken from a donor and genetically modified. In a series of experiments done in mice, they showed that these altered donor cells cause less GVHD than unmodified donor cells, and deciphered the biological basis of this phenomenon. The research could lead to changes in how blood cancers are treated.

TIPPING THE BALANCE

A bone marrow transplant from a donor wipes the slate clean and gives a patient the potential for a cancer-free life with a new set of blood cells. But there's another way the procedure heals: Because the donor immune cells are genetically different from the recipient, they can recognize any remaining cancer cells in the body as foreign and destroy them. This phenomenon — a kind of lucky side effect — is called graft-versus-tumor.

The flipside of graft-versus-tumor is when the donor immune cells attack normal tissues, causing the unwanted side effect of graft-versus-host.

"The billion-dollar question in our field is how to tip the balance between graft-versus-host and graft-versus-tumor," says Dr. van den Brink.

One way researchers are attempting to tip this balance is by equipping immune cells with genetically modified proteins that specifically recognize targets on cancer cells and therefore enable a directed attack. These chimeric antigen receptors, or CARs, have proven remarkably successful at beating back several types of advanced leukemia in both children and adults, including acute lymphoblastic leukemia and chronic lymphocytic leukemia.

Leukemia-fighting CARs are built to recognize a marker called CD19, which is found on blood cells called B cells from which these leukemias arise. Dr. Sadelain's group designed some of the first clinically effective CARs, and CAR T cell therapy is now being tested in clinical trials around the world.

CARs can be made from a person's own T cells or from a donor's. Donor T cells are used when a person relapses after a bone marrow transplant (and no longer has his or her original T cells).

A CURIOUS FINDING

According to Dr. van den Brink, about 5% of T cells from a donor contain a receptor that can recognize normal tissues and lead to GVHD. Therefore, when CAR T cells are made from donor cells, some small proportion of the modified cells will contain both types of receptor.

One might think that these dual-targeting cells would make GVHD worse by being overstimulated to go on the attack. But interestingly, recent clinical studies looking at donor-derived CAR T cells in patients who have relapsed after a BMT have found that the CAR T cells seem to cause much less GVHD than unmodified T cells.

HIGHLIGHTS

- Graft-versus-host disease is a dangerous potential side effect of bone marrow transplants and other treatments that use donor immune cells to treat cancer
- Genetically engineered donor immune cells cause less of this side effect.
- Laboratory results from mouse models show why these cells are less toxic yet still effective.

Drs. van den Brink, Sadelain, and colleagues wanted to understand this curious finding, so they turned to a mouse model of cancer in which they could carefully tease out the mechanisms. They first made different versions of donor T cells. Into some T cells they put working CARs, specific for CD19. Into others they put sham CARs that didn't signal. Then they tested the cells in the mice.

What they found was that donor CAR T cells that recognized both normal tissues and CD19-positive cells eventually lost their ability to function.

"Seeing both targets together leads to a cell getting too much signal over too long a period of time," says MSK physician-scientist Scott James, who is co-first author on the paper along with fellow physician-scientists Melody Smith and Arnab Ghosh. "As a result, the cells become exhausted and eventually die."

Since these dual-targeted cells are the ones that might have caused GVHD, the selective die-off of these cells is an unexpected boon.

Donor CAR T cells that recognized only CD19-positive cells continued to thrive and carry out their cancer-killing mission.

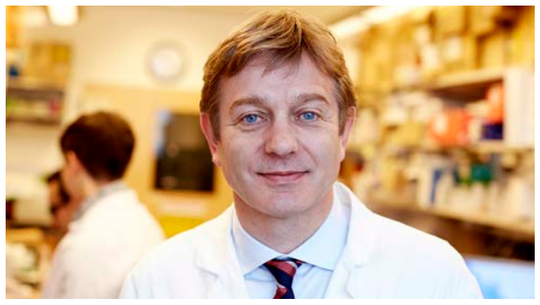
A NEW CLINICAL TRIAL

These results have immediate clinical implications. They suggest, first of all, that when a person relapses after a BMT, infusions with donor T cells modified with CARs might be safer and more effective than unmodified T cells — the current standard treatment in these patients.

Second, when using donor CAR T cells to prevent recurrence after a transplant, they suggest how these CAR T cell infusions should be timed to avoid graft-versus-host disease: They should be given once the bone marrow has recovered sufficiently such that there are plentiful CD19-positive cells in the body to help cause signal overload and exhaustion of the GVHD-causing cells.

A phase I study of using donor-derived CAR T cells to prevent relapse after BMT is being planned and is scheduled to open at MSK later this year. ■

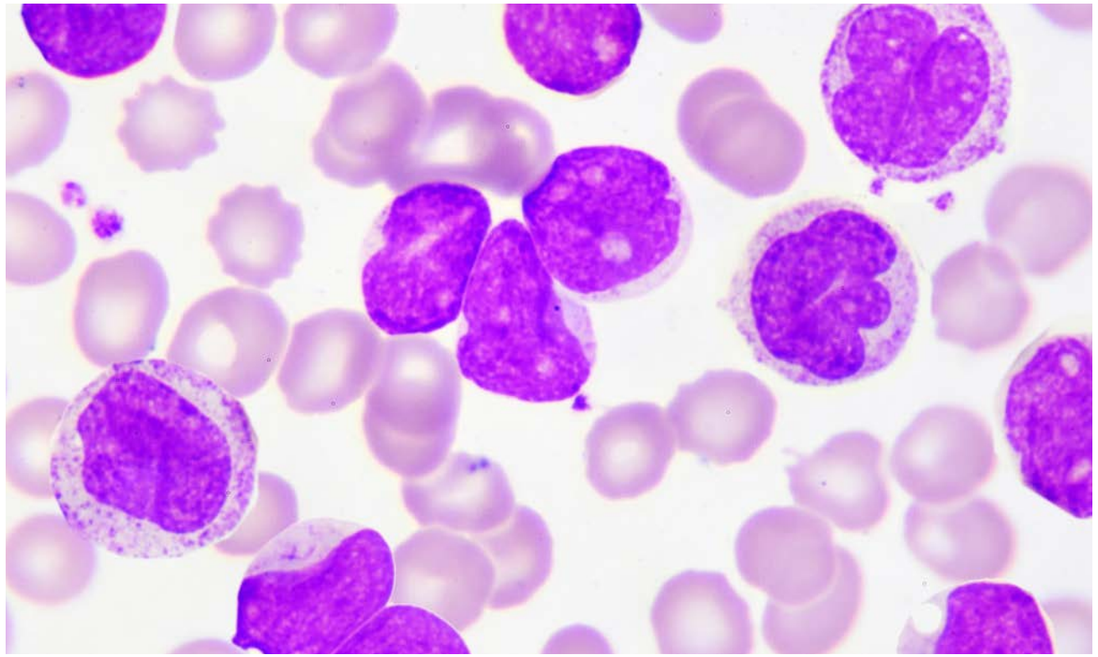
The study was supported by grants from the National Institutes of Health, the Lymphoma Foundation, the Susan and Peter Solomon Divisional Genomics Program, Cycle for Survival, the Lymphoma Research Foundation, the Lymphoma Foundation, and the American Society for Blood and Marrow Transplantation.



"Graft-versus-host disease is a complication that we've been battling for decades."

MARCEL R.M. VAN DEN BRINK, Physician-scientist

LINK: https://www.mskcc.org/blog/study-suggests-ways-make-bone-marrow-transplants-safer-people-blood



FDA APPROVES ENASIDENIB (IDHIFA), A FIRST-OF-ITS-KIND DRUG, FOR ADVANCED BLOOD CANCER

BY MATTHEW TONTONOZ

Acute myeloid leukemia is characterized by the presence of immature, rapidly growing white blood cells in the bone marrow. They crowd out and interfere with the production of normal blood cells.

ACUTE MYELOID LEUKEMIA is a rare but hard-to-treat blood cancer that primarily affects older adults. The FDA has approved a new medicine for the disease that works in a manner different from standard chemotherapies.

The US Food and Drug Administration has approved the drug enasidenib (Idhifa®) for the treatment of acute myeloid leukemia (AML) that has stopped responding to other therapies.

The FDA based its decision on the results of a phase I/II trial led by Memorial Sloan Kettering hematologist-oncologist Eytan Stein. People receiving the drug had higher response rates and lived significantly longer than is typical with existing treatments for the disease. Dr. Stein presented the study's data in June at the annual meeting of the American Society of Clinical Oncology. A paper detailing the findings was simultaneously published in the journal *Blood*.

Enasidenib is the first drug of its kind to be approved for any cancer. Rather than kill cancer cells, enasidenib rehabilitates them. It allows them to develop as normally functioning blood cells, reversing a stalled developmental state that causes the cells to behave as wayward miscreants. This makes the treatment much less toxic.

"Most of our drugs for AML are toxic to cells. Patients have this prolonged period of bone marrow suppression, which can lead to dangerous infections," Dr. Stein notes. "This is a drug where you don't see that. Instead, you see the differentiation of cells into normal, healthy adult cells."

Enasidenib is an oral medication that people can take at home, with a low risk of side effects.

BIRTH OF A NEW DRUG

Enasidenib (previously known as AG-221) belongs to an emerging class of epigenetic drugs. These medications work to correct patterns of misdirected gene activity stemming from the way DNA is packaged in cells. Epigenetics has captured the attention of cancer biologists because, in principle, this altered DNA packaging is more easily fixed than changes in the DNA sequence itself. MSK's Center for Epigenetics Research is a leader in this field.

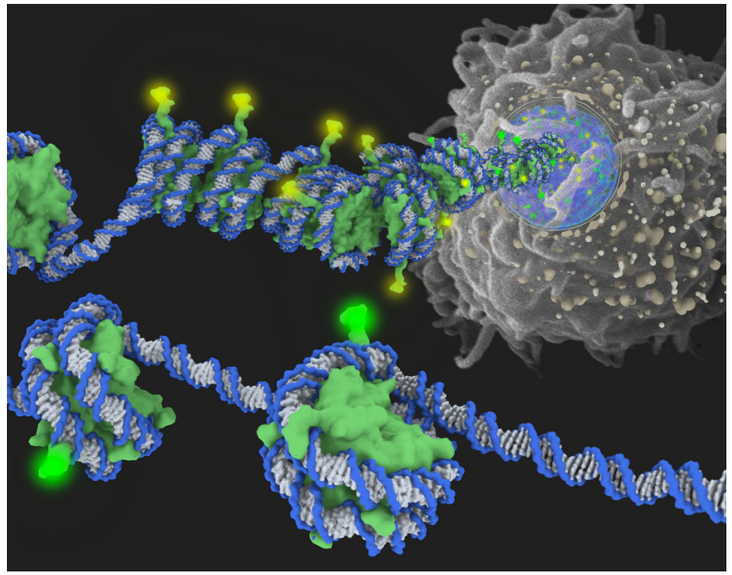
The scientific rationale for enasidenib in particular goes back to genetic evidence unearthed about seven years ago. By sequencing the genome of cancer cells in people with AML, scientists discovered that about 12% have a mutation in a gene called *IDH2*. The mutation causes the protein made by this gene to go haywire. Instead of doing its normal job, the protein produces a molecular byproduct called 2-HG. The troublesome offshoot interferes with a cell's ability to remove methyl groups from its DNA. With too much methyl around, a cell's transcriptional machinery can't get to the DNA. The inability to access DNA prevents cellular differentiation, because the cells can't turn on the genes they need to grow up.

"That's sort of the definition of leukemia," Dr. Stein points out. "It's the accumulation of immature white blood cells."

These discoveries led to the idea that if you could block the mutant protein, you could lower levels of 2-HG. That would restore a cell's ability to remove superfluous methyl groups, and its ability to differentiate.

By sequencing the genome of cancer cells in people with AML, scientists discovered that about 12% have a mutation in a gene called *IDH2*.

MSK's President and CEO Craig Thompson did much of the preclinical work deciphering the relationship between the *IDH2* mutation and the block to differentiation, including work done while he was a professor at the University of Pennsylvania. MSK physician-scientists Ross Levine and Omar Abdel-Wahab were key collaborators in this research.



"Patients will go from being riddled with infections to having a normally functioning body. It's pretty amazing."

— EYTAN STEIN, Physician-scientist

Scientists at Agios Pharmaceuticals, the maker of enasidenib, undertook the development of a molecule that could specifically block the action of the mutated enzyme. "They did all the structural modeling and chemical research that developed the drug that fits into the binding site of the mutant enzyme," Dr. Stein says.

On the clinical side, MSK played a lead role in testing the drug's safety and efficacy. "We've accrued the most patients onto the trial," Dr. Stein says. "We've been driving a lot of the clinical development and also the correlative science to understand what's happening in patients." Overseeing this clinical effort is Martin Tallman, Chief of the Leukemia Service.

SAFE AND EFFECTIVE

The clinical trial of enasidenib, conducted between 2013 and 2016, enrolled a total of 239 people with myeloid malignancies that had an *IDH2* mutation. Included were 176 people who had relapsed or refractory AML. Most of these individuals had received two or more prior therapies. The trial showed that the drug was safe and generally well tolerated. The most common side effects were jaundice (38%) and nausea (23%).

The overall response rate for those with AML was 40%, with a median overall survival time of 9.3 months and an estimated one-year survival rate of 39%. For the 34 people (19.3%) who attained a complete response, the median survival time was 19.7 months. This study did not directly compare enasidenib with standard-of-care chemotherapy, but historically people with relapsed or refractory AML have an average survival time of about three months. These extensions in survival time are therefore significant.

Moreover, people taking the drug start to feel better almost immediately because the level of their infection-fighting white blood cells rapidly returns to normal.

"It's really a transformation," Dr. Stein says. "Patients will go from being riddled with infections to having a normally functioning body. It's pretty amazing." (The dramatic experience of people taking enasidenib was the subject of a *New Yorker* article by Jerome Groopman in 2014 aptly called "The Transformation.")

Unfortunately, most of the people who received enasidenib did eventually relapse. This points to the need to develop more-effective combinations of drugs. Clinical trials of several such combinations are ongoing. A few people in the study had very deep and long-lasting responses and are still alive and cancer free today.

Enasidenib is approved for people with relapsed or refractory AML that tests positive for an *IDH2* mutation, as determined by an FDA-approved test. ■

Craig Thompson is a co-founder of Agios Pharmaceuticals, which has a financial relationship with Celgene Corporation. Eytan Stein has received grants and personal fees from Celgene Corporation and from Agios Pharmaceuticals. Ross Levine has received research support from Celgene Corporation.

LINK: https://www.mskcc.org/blog/fda-approves-enasidenib-idhifa-first-its-kind-drug-advanced-blood

ERIC SMITH'S MISSION: TO ADD MULTIPLE MYELOMA TO APPROVED USES FOR REVOLUTIONARY CAR T CELL THERAPY

The 63-year-old patient's multiple myeloma had roared back despite eight lines of therapy, and hospice care was being discussed. But the woman — who had received experimental CAR T cell therapy as part of a new clinical trial based on lab work by Memorial Sloan Kettering's Eric Smith, MD, PhD — then developed a worrisome cough. Subsequent imaging scans revealed an incredible development: Tumors in her lungs, liver and bones that were present before her CAR T cell therapy had all vanished.

THE PATIENT'S AMAZING RESPONSE to chimeric antigen receptor (CAR) T cell therapy in 2017 represents the promise of this revolutionary treatment for multiple myeloma and all that Dr. Smith has been working toward since he first came to MSK in 2012 for fellowship training. Now balancing duties as an assistant attending physician in the Myeloma Service and as Director of Clinical Translation in MSK's Cellular Therapeutics Center, Dr. Smith relishes the juggle of research and clinical care inherent to his physician-scientist role.

In addition to caring for multiple myeloma patients, he also specializes in other plasma cell cancers such as asymptomatic (or smoldering) multiple myeloma and MGUS (monoclonal gammopathy of undetermined significance). His major goal since arriving here has been to move the field of CAR T therapy forward to provide safest, most effective cellular therapy options to patients.

"I feel very fortunate to work in oncology for two reasons: One, it's clearly a critical point in patients' lives, and you really get to form very strong relationships with the patients and hopefully have a very significant effect in their lives and their families' lives," Dr. Smith says. "But on the research side, there's so many exciting advances happening in cancer and blood cancers specifically, so once I got further along on my career path it was obvious to me that oncology and blood cancers is where I should be."

UNIQUE CAR T THERAPY THAT EVADES IMMUNITY

Interested in a medical career since childhood, Dr. Smith "got quite the research bug" as a college student, where he first realized it was possible to combine research and clinical care. He later completed a joint MD-PhD program at Mount Sinai School of Medicine, but MSK's stellar reputation called to him when it came time to take the next step.

He immediately set his sights on developing CAR T therapy for multiple myeloma patients, which would require discovering a new antigen target in the lab than those already established for other blood cancers. CAR T therapy — which genetically re-engineers a patient's extracted T cells to kill cancerous cells with the targeted antigen on their surface — has since become FDA-approved for relapsed B-cell precursor acute lymphoblastic leukemia (ALL) and relapsed large B-cell lymphoma.

But both of those CAR T therapies target the CD19 antigen on malignant cells, which isn't an effective target in myeloma. In the lab, under the mentorship of MSK's Director of Cellular Therapeutics, Renier Brentjens, MD, PhD, Dr. Smith and colleagues homed in on a "very attractive target" aiming at a B-cell maturation antigen, a surface protein with a known role in myeloma development. But unlike other scientists around the country working on a CAR T therapy for this target, Dr. Smith's is a fully human version that avoids the immunity response some patients have developed specifically against other versions incorporating mouse protein.

The clinical trial, led by Sham Mailankody, MBBS, is based on Dr. Smith's CAR T research for patients with relapsed myeloma and opened at MSK in March 2017, with 11 patients already being treated.

"All patients in the clinical trial had multiple relapsed cases, with treatment courses

averaging seven prior lines of therapy," he explains. "That's not unusual. In these first-in-human studies, typically we're investigating populations that have no other options. Our study and a couple of others around the country are looking at CAR T cells going first-in-patients in this setting."

PRELIMINARY RESULTS HIGHLY PROMISING

Dr. Smith presented preliminary results from this clinical trial to thousands of peers at the American Society of Hematology (ASH) annual meeting in Atlanta in December 2017. Safety data was mainly reported, with efficacy data to follow after more patients are enrolled in the study. But he's certainly confident about the future of his CAR T approach for multiple myeloma.

"Based on what has been publicly presented, we can conclude it is well-tolerated and has the potential for inducing dramatic remission even in patients with very advanced, refractory disease," he says.

Meanwhile, Dr. Smith and MSK colleagues are trying to understand and address relapses in patients who become resistant to CAR T therapy. These relapses generally

"We can conclude (CAR T therapy) is well-tolerated and has the potential for inducing dramatic remission even in patients with very advanced, refractory disease."

fall into two categories, he says: Either an antigen "escapes" being targeted, or the re-engineered CAR T cells develop a "lack of functional persistence" and stop working. These relapses might be avoided by combining multiple antigen targets to prevent an antigen escape or engineering "armored" CARs to convey additional molecular advantages to T cell attackers.

"We're trying to understand how CAR T cells from myeloma patients interact with the microenvironment of the myeloma and learn from that to specifically generate armored T cells that rationally work best with myeloma," he says.

OUTCOMES IMPROVING, WITH HOPE STRONG

Even as CAR T clinical trials continue, Dr. Smith is enthusiastic about established therapies for advanced multiple myeloma patients that are improving patient outcomes. One such FDA-approved drug is daratumumab (Darzalex), "our first really effective monoclonal antibody therapy for myeloma," he says. "In combination with other myeloma medications, it has shown great efficacy for relapsed patients."

"I tell all my patients they can go on Google and look for overall survival in myeloma and see a number like seven years, but by definition, that number is out of date. For patients diagnosed in 2000, that's probably accurate," Dr. Smith adds. "But for patients diagnosed in 2017, in part because of newly approved drugs, those patients will do much better. But even more so because of CAR T therapy that will be approved in the next several years, hopefully we can turn this into a potentially curable disease."

To Dr. Smith, one of the biggest advantages of his physician-scientist role is having "input in both doors" — the research and clinical sides of medicine.

"Taking care of patients every day who I know will benefit from CAR T cell therapy and other therapies for the relapsed population clearly motivates me to try to get to these patients faster and improve the therapies," he says. "It also gives me a foundation to understand what therapies are needed."

"Every patient is certainly different, and we really do try and work with the patient to prioritize our treatment options with what works with them and their family and their life," Dr. Smith adds. "I feel very strongly that clinical trial options are usually very attractive options for patients compared to standard of care, but appreciate that sometimes, that needs to be blended with other aspects of the patient's life." ■

NURSING CAREER ALL IN THE FAMILY FOR NURSE PRACTITIONER COORDINATOR NICOLE LESTRANGE

SOMETIMES MOTHER does know best. Just ask Nicole LeStrange, ANP, AOCNP, who initially resisted going into nursing when her mom suggested the profession as LeStrange applied to college.

But nearly two decades later, a nursing career seems written in the stars for LeStrange, a nurse practitioner coordinator in Outpatient Hematology Oncology at Memorial Sloan Kettering. Arriving at MSK in 2005 after graduating from Georgetown University with a bachelor's of nursing degree, she worked her way up to her current position after starting as an inpatient floor nurse in leukemia and lymphoma.

LeStrange's mother happens to be a retired nurse herself, and her two sisters are also NPs. But "I don't think much" about the family connection to the profession, says LeStrange, who earned her NP credentials in 2009 while continuing to work at MSK.

"It's hard to know when you're 18 years old what you want to do for the rest of your life," LeStrange says. "It's interesting how things work out — now I can't imagine doing anything else. I think it's fate."

FULL PLATE OF ADMINISTRATIVE DUTIES AND PATIENT CARE

As one of about 500 NPs at MSK – which has accelerated efforts in recent years to employ more NPs and other advanced practice providers — LeStrange oversees the 30 or so nurse practitioners working in Outpatient Hematology Oncology. Additionally, she still works with patients in Adult Blood and Marrow Transplantation (BMT), finding the juggle of clinical care and administrative duties tough but rewarding.

A day on the job might find LeStrange doing performance appraisals of various staff members while also delving into nitty-gritty details, such as making sure enough nurses are on duty to handle that day's outpatient visits. She's also looped in to various administrative meetings integral to institution-wide efforts to enhance the roles of NPs and physician assistants in MSK's outpatient settings.

"When you're in this role you kind of naturally get involved in different meetings and steering committees and task forces," she explains. "NPs need someone to represent them in the projects that are rolling out. I'm their voice."

HOMEBOUND BMT PATIENT STUDY: A NEW THRUST

One of LeStrange's current responsibilities is overseeing outpatient NPs involved in an MSK feasibility study to provide all post-transplant BMT care at home. These "red team" NPs manage patient care from the autologous stem cell transplant itself — which is done in an outpatient area — to daily home visits as patients recover, consulting with MSK physicians via video technology such as Skype. Approximately 12 patients have been enrolled in the study thus far.

Her one-on-one work with BMT patients helps LeStrange keep perspective on the sometimes-stressful push-pull between her clinical and administrative responsibilities.

"I love seeing patients, and I would never not want to do that," she says. "Some weeks are busier than others. When I feel stressed, I think of Dr. (Sergio) Giralt — he has the biggest practice in BMT as the Service Chief, and he's always involved in a hundred things at once."

"At Memorial, I feel we set the bar very high, and everyone is extremely hard-working," LeStrange continues. "Whatever their job is, people are multi-tasking and all have different responsibilities." ■

ELAINA PRESTON, MPH, MSHS, PA-C

CLINICAL RESEARCH PHYSICIAN ASSISTANT
ADULT BLOOD AND MARROW TRANSPLANT (ABMT) SERVICE

Elaina Preston's burgeoning intellectual interest in HIV and other infectious diseases as a teenager eventually led to a career in medicine, with Memorial Sloan Kettering the lucky recipient of this physician assistant's dual focus on research and patient care.

HOPSCOTCHING THROUGH several other jobs in research-related roles after earning a master's in public health, Preston received her Master of Science in Health Sciences PA degree in 2011 and worked at the Cleveland Clinic's adult leukemia unit. But the East Coast was calling to her — with family in Rhode Island — Preston came to MSK in 2013, working in the inpatient BMT Service until October 2016.

Her desire to blend the research and clinical realms matched well with Adult BMT Chief Sergio Giralt's plan to create a new role for a clinical research advanced practice provider. This led to Preston's current position as clinical research physician assistant in the Adult BMT Service.

"I really liked learning about infectious diseases, especially those that affected the whole body, and that's actually what led me to choose hematology-oncology as my area of medicine in which I specialize, because there's a lot of overlap," Preston says.

"My first goals here were to learn transplant, because my exposure had been mostly acute leukemia treatments and I wanted to widen my area of expertise within hematology-oncology," she adds. "And as I got up and running, I then wanted to expand my research experience. I wanted to use my background from my pre-PA days and work as a clinical professional in the research realm."

In this interview, Preston details her role at MSK compared to most other physician assistants, as well as what current BMT research enthuses her most.

How is your role unique from other physician assistants?

Unlike research PAs in other areas of the hospital, I do a lot of clinical management from a protocol perspective, not a hands-on patient perspective. That's because transplant is so intense from a patient-visit perspective compared to other groups. Patients usually start out in the hospital, and then they are seen very frequently, especially if they're sick, and a lot of our protocols focus on if they have something go wrong after transplant, such as graft-versus-host disease (GVHD). So it's impossible for me to evaluate patients at every single visit. Our inpatient and outpatient teams can do these evaluations and I can then specify the information we need to communicate to study sponsors, like toxicities.

What are your day-to-day duties?

A big part of my work over this past year has been moving responsibilities off the direct plate of the principal investigators (PIs) of each study, where I use my knowledge to get screening off the ground and work on treatment toxicities. I also assist the research study assistants and act as a liaison between them and the PIs.

On any given day, I'm involved in screening patients for new BMT-related research protocols and performing protocol toxicity evaluations for patients; communicating toxicity information to each study's sponsors; assisting in setting up new clinical trials at our institution; and meeting with all involved parties, including nurses, outpatient staff and other areas within the department.

Which current research in the Adult BMT Service do you feel is most compelling?

My "baby," one of the first projects I wanted to work on when I found out about it a few years ago, is PI Dr. Boglarka Gyurkocza's acute leukemia registration protocol for inpatients newly diagnosed with acute leukemia or receiving new therapies for persistent or relapsed disease. The study is looking at barriers to allogeneic (or donor) transplant.

Much of the reason we couldn't transplant patients over the last few decades — even when we felt it was their best shot at care — is because they didn't have a donor, which happens more often in certain ethnic groups.

In 2017, almost all patients do have a donor because we now use a lot more cord blood transplants and haplo-identical (or half-matched) donors. So we're studying what the other barriers are.

I visit patients early in their diagnosis, often the first few weeks, and I'm teaching them and their family members about BMT and identifying potential donors for them should they need transplant. It's really exciting to me that we're working so proactively as a group to do this.

Tell us how MSK's research into new agents for GVHD — a potentially life-threatening complication of BMT that occurs when immune cells from the donor's marrow or stem cells attack the patient's normal cells — is bearing fruit.

As a clinician, treating advanced GVHD is really frustrating, and now we have newer agents that are showing promise in preventing and treating it. Steroids are a first-line therapy for GVHD, but there are no approved agents for first- or second-line treatment of acute GVHD. There have been many studies over the years testing different agents, but it seems that now we're starting to zero in on some that could be approved for these purposes.

If a patient has a steroid-refractory, high-grade GVHD, their chances of survival at a year are less than 15%. You've basically helped cure one condition, but they have something else that's really hard to live with. I can't say we have a magic drug in our pocket, but it seems the field is evolving where we're getting closer to that target.

What do you hope to accomplish next?

Recently I had my first two research abstracts accepted for posters at the 2018 American Society for Blood and Marrow Transplantation (ASBMT) conference. My goal in the coming year is to have an oral presentation at a major conference. Physician assistants are not frequently in the research realm in general, and I want to show that PAs can be part of these clinical scientific meetings — that they have a role there, or that they're contributing to work that's presented. ■

ADULT BMT RESEARCH DIETITIAN MARISSA BUCHAN HELPS USHER NUTRITION INTO FOREFRONT OF CANCER CARE

IT WASN'T TOO MANY YEARS AGO that nutrition was an afterthought to cancer care, with clinicians brushing off how diet affects not only cancer risk, but also treatment and survivorship. Marissa Buchan's eight-year tenure at Memorial Sloan Kettering Cancer Center is a compelling testament to the end of that mindset both at MSK and elsewhere, with the Adult Bone Marrow Transplant (BMT) research dietitian helping drive home the tenet that food is medicine.

Buchan, MS, RD, CDN, came to MSK in 2009 as a research study assistant for Juliet Barker, MBBS, Director of MSK's Cord Blood Transplantation Program, just after graduating from Duke University with a psychology degree. But while she loved participating in research, Buchan's nascent interest in nutrition seemed it would remain a hobby — until she saw dietitians at work in the BMT Service and other MSK divisions.

"It made me realize this was an option and also something I could really see myself doing," says Buchan, who managed to earn her registered dietitian credentials at NYU while continuing to work at MSK. "It made sense to blend my role in BMT research with nutrition. There aren't that many research dietitians in the field and only two at MSK. It's kind of exciting because it shows that clinicians recognize what an important piece nutrition is in patient care."

"Now everyone is realizing that nutrition is instrumental in all stages of cancer, from before diagnosis to the treatment process to survivorship," she adds. "It's being integrated into the whole process in a way it wasn't before."

DISCOVERING IMPACT OF 'GUT FLORA' ON BMT OUTCOMES

Patient care is a prominent part of Buchan's duties, as it is for the more than 30 dietitians employed across MSK and its satellite centers. Nutritionists work with patients and their families throughout their MSK experience, offering personalized counseling on strategies for managing treatment side effects — such as mouth sores and nausea — as well as how to best manage their weight during and after treatment.

Many patients also require specialized diets due to their specific diagnosis, and BMT patients often follow a low-microbial diet to promote food safety and minimize risks of infection due to undercooked or tainted foods. "We try to optimize their nutrition and health to hopefully keep patients from coming back," Buchan notes.

But Buchan's research position also sets her apart from most of her dietitian colleagues. One main reason her job was created was to work in the Microbiota Lab, which analyzes changes in "gut flora" — the complex blend of bacteria and other microorganisms living in the digestive tract — after bone marrow transplant.

"The goal is to identify dietary elements that lead to healthier microbiota and to fewer complications after transplant, like graft-versus-host disease," she explains. Graft-versus-host disease, or GVHD, is a potentially life-threatening complication of BMT that occurs when immune cells from the donor's marrow or stem cells attack the patient's normal cells. With MSK performing more than 450 bone marrow or stem cell transplants every year, the specter of GVHD — which can prove tough to prevent and treat — looms large for both patients and clinicians.

In addition to established efforts at MSK to analyze thousands of stool samples from BMT patients for clues about their gut flora, Buchan tracks the diets of patients admitted for transplant to document highly detailed information on what and how well they're eating. She also counsels them on any nutrition-related issues they're experiencing as inpatients.

"The microbiota is definitely a hot topic right now and a lot of institutions are doing research in this area," Buchan says. "We're at an advantage here because we have so many samples from so many patients — including samples from centers nationally and internationally that don't have the lab support we have — and we're hoping the project leads us to some answers as to what patients can do in terms of diet to set them up for as much success as possible. Diet is one of the few modifiable factors."

EXCITING STRIDES IN RESEARCH IMPACT PATIENTS' QUALITY OF LIFE

Another major research effort dominating Buchan's time focuses on dysgeusia, the distortion in taste many BMT patients — and cancer patients in general — experience after undergoing chemotherapy and/or radiation treatments. Like diet itself, dysgeusia was once an afterthought, perceived as unimportant to cancer care.

Buchan and her colleagues are evaluating patients' sense of taste by using droppers containing specific flavors into their mouths. Because this research process, known as gustometry, is so labor-intensive, it's also being analyzed for its clinical feasibility and value, she says.

"We want to see if there's a way to customize diets to help patients eat better depending on the kinds of taste changes they're experiencing," Buchan says. "I think we don't even realize how much those taste changes impact how much patients are eating, and we know that BMT patients with poorer nutrition lose more weight and have worse outcomes."

She's excited by the strides made in updating the standard low-microbial diet most BMT patients must follow in the months after transplant. "The diet we had in place was a little outdated, too restrictive and not based on all the current research out there," Buchan explains. "So we've modified the diet, and now patients are able to eat a lot more raw fruits and vegetables than before, and that improves their quality of life significantly."

While hurdles remain — including leveraging technology such as nutrition apps and other tools to collect more data — Buchan is probably most enthused by the fact that work like hers is finally being done at all.

"Nutrition and nutrition-related research are finally being valued enough that roles like mine exist and hopefully will continue to grow in the future," she says. "I'm also excited to work with food as my medicine."

"People finally realize that food is more than just nourishment or energy, but also a source of comfort and connection to others," Buchan continues. "To help patients going through cancer treatment to feel good and potentially help improve their outcomes is the best of both worlds." ■

MYELOMA PRECURSOR DISEASE CAN START MUCH EARLIER THAN EXPECTED, ESPECIALLY IN AFRICAN AMERICANS

JULIE GRISHAM

A new study suggests that healthcare providers should consider looking for monoclonal gammopathy of undetermined significance (MGUS) in younger African Americans.

NEW RESEARCH has found that a precancerous blood condition can linger undetected for more than 20 years. The findings suggest that screening tests may be appropriate for some people.

The medical community is always learning more about the hereditary nature of cancer. It's becoming more apparent that some cancers and cancer-related genetic alterations are more frequent in certain racial and ethnic groups. For example, mutations in the genes *BRCA1* and *BRCA2* are more common in people of Ashkenazi Jewish descent. And research has indicated that multiple myeloma, a type of blood cancer, occurs more often in African Americans.
In addition, this group tends to be younger at the time of the disease's onset.

Multiple myeloma occurs when plasma cells, a kind of white blood cell, form tumors in the bone marrow. Every year it affects about 30,000 people in the United States. More than 100,000 Americans are currently living with multiple myeloma. The average age of onset is about 70 years old. Fewer than 5% of people with multiple myeloma are diagnosed before age 50.

Previously, a large screening study of more than 77,000 people showed that multiple myeloma is consistently preceded by monoclonal gammopathy of undetermined significance (MGUS), a condition in which the blood produces an abnormal protein that can be detected with blood tests. A team of researchers from Memorial Sloan Kettering has collaborated with the Mayo Clinic and the National Cancer Institute on a new wide-ranging study that looked for the first signs of MGUS across racial groups. It found that MGUS, like multiple myeloma, appears with higher frequency in African Americans. MGUS also comes on at a much younger average age in African Americans compared with other ethnic groups.

"It's very possible that in the future, the standard of care will be to initiate treatment earlier in the course of the disease."

— C. OLA LANDGREN, Hematologic Oncologist

"By screening blood from 12,372 individuals between ten and 50 years of age, we have re-drawn the map of the myeloma precursor disease MGUS," says Ola Landgren, Chief of MSK's Multiple Myeloma Service and lead author of the new study, which is being published in the *Nature* publication *Blood Cancer Journal*. "Our results show that MGUS starts with people in their 30s, which is 20 years younger than we used to think.

"It makes sense that MGUS appears more frequently in younger African Americans," he adds, "since we know that multiple myeloma also occurs at a younger average age in this group. These findings set the agenda for trying to identify these patients, to learn who is going to develop cancer, and to determine whether we can do early intervention to prevent it."

TAKING ADVANTAGE OF A WIDE-RANGING BIOBANK AND DATABASE

To do this analysis, the investigators used data from the National Health and Nutrition Examination Survey (NHANES). This government-funded study has been ongoing since the 1960s. NHANES regularly collects blood samples and health data from adults and children in the United States for a range of research. Dr. Landgren's team analyzed 12,372 blood samples from that study: about 4,000 from African Americans, 4,000 from Hispanics, 3,600 from whites, and the rest from other ethnic groups. The samples included those from people between the ages of ten and 50. "No prior population-based study has screened for the presence of MGUS in people this young before, so these results are entirely unique," he says.

The study found that prevalence rates differed substantially across ethnic groups. Starting at age 30, African Americans already had a rate of MGUS that was close to 1%, and by ages 40 to 49, it was 3.3%. By contrast, previous studies have found the rate in whites over age 50 was only about 2%.

"A higher rate of MGUS translates to higher rates of multiple myeloma," Dr. Landgren explains. "And now we know the early forms of this disease may be lingering for 20 years or more in some people. It's kind of mind-blowing."

Dr. Landgren says this study should send an important message to healthcare providers about when to look for these conditions. "Although the majority of people diagnosed with MGUS and multiple myeloma do not have signs until the disease is very advanced, there are some early clues," he says. "If a younger African American goes to the clinic with symptoms like bone pain, fatigue, or excessive bruising or bleeding, doctors should think about testing him or her for this disease."

POTENTIAL BENEFITS OF SCREENING

Current guidelines say that people with MGUS should not be treated but should be followed with yearly blood tests. The risk that someone with MGUS will develop multiple myeloma is 0.5 to 1% per year on average. But for people with certain high-risk features, that likelihood can be higher.

Therapies can begin when people first develop smoldering myeloma, another precursor condition to multiple myeloma, which comes after MGUS, rather than waiting for the progression to cancer. Research is under way to determine whether early treatment may provide a benefit. "It's very possible that in the future, the standard of care will be to initiate treatment earlier in the course of the disease," Dr. Landgren says. "This change would largely be driven by the development of drugs that have fewer side effects but are still effective, in parallel with better biomarkers to define individuals at a high risk of progression."

Other ongoing research is investigating the benefits of screening for myeloma precursor diseases in the general population. Dr. Landgren says, "Among people at an increased risk of developing multiple myeloma, such as individuals exposed to Agent Orange or other pesticides and toxins, in my opinion, it seems reasonable to screen for MGUS."

IMPROVING DIVERSITY IN CLINICAL RESEARCH

Dr. Landgren points out that the study's findings help highlight the importance of including racial minorities in clinical research. "Racial and ethnic disparities in blood cancers are a very understudied area," he notes. "As the American population becomes more diverse, it's of major importance that everyone be included in clinical trials. Studies in a number of different cancers have suggested that cancer drugs may not work the same way across all groups."

MSK's Cancer Health Equity Research Program, led by gynecologic surgeon Carol Brown, was recently established to address these gaps. "Great advances can have the greatest impact only if diverse groups are included in trials," she says.

Dr. Landgren adds that although African Americans are at a higher risk of developing multiple myeloma, data show that those who are diagnosed tend to have a less-aggressive disease and better survival rates. "There appear to be differences in the biology of the disease across ethnic groups," he says. "It clearly warrants further study." ■

This research was funded by the National Cancer Institute (under grants CA107476, CA168762, and CA186781).

LINK: https://www.mskcc.org/blog/myeloma-precursor-disease-can-start-much-earlier-expected-especially-african-americans

PETER J. SOLOMON

MEMBER, BOARDS OF MANAGERS
MEMORIAL SLOAN KETTERING CANCER CENTER
MEMORIAL HOSPITAL FOR CANCER AND ALLIED DISEASES
SLOAN KETTERING INSTITUTE FOR CANCER RESEARCH

Peter J. Solomon likes to joke that he never leaves a meeting at Memorial Sloan Kettering without having a slight headache.

THE LONGTIME MSK BOARD member attributes this "perk" of his role to the unavoidable and wonderful fact of MSK's global leadership in cancer research, treatment and outcomes. For Solomon — who also runs the Peter J. Solomon Co., a Manhattan-based investment banking advisory firm — absorbing the glut of information needed to help guide MSK in these endeavors can simply boggle the mind.

"I've been on a lot of boards, and some are more challenging than others," he says. "But when you're leaving a meeting at MSK, you've been challenged intellectually, you've probably been challenged emotionally, and you've certainly learned something."

Recruited to the board in 2008, Solomon's interests in science and medicine, combined with his well-honed business acumen, made him an appealing candidate for such a position. He had also served previously on the Mt. Sinai Hospital board and as Chairman of the New York City Health and Hospitals Corporation, which operated 17 municipal hospitals under Mayor Edward Koch. His nephew's tragic death of acute myeloid leukemia (AML) six years ago at age 47 led Solomon to focus on how he, in his role as a trustee, could help the Division of Hematologic Oncology.

With the help of MSK President and CEO Craig Thompson, MD, and other hospital leaders, Solomon has helped sponsor efforts by Division Head Marcel R.M. van den Brink, MD, PhD and his team in the field of blood cancers, particularly leukemia.

"Craig, an expert on blood cancers himself, and the Development Office told us that hematologic oncology is a priority and guided us to work together with MSK to create more resources," Solomon explains. "I think the results have been terrific."

"My wife Susan and I have been supporting people who are experts in the field, but we also believe in following the money, following the progress, and seeing what the results are and if they're measurable," he adds.

In this interview, Solomon highlights his board duties, accomplishments and challenges.

What types of people do you interact with on the MSK board?

We have a very hard-working, involved board comprised of people from diverse backgrounds, including those in science and philanthropy, but all of us share a commitment to research and clinical care. We meet both collectively and individually in finance meetings and quality of patient care meetings, and four times a year we attend lectures from two leading doctors about the trends and discoveries and challenges in cancer of all types. I understand about half of these lectures. They're very technical, very interesting, and allow us to interact on a closer basis.

Another thing they do at Memorial that's quite wonderful is hold informal brown-bag lunches with two or three senior people where we get to meet three or four members of MSK, including doctors, nurses, and administrators, that we ordinarily would not meet. They talk about their experiences, who they are, and where they came from. They're terrific sessions.

What are your typical board-related responsibilities?

The first task is oversight. I'm on the Joint Committee on Finance and Investment, which meets about four times a year. We go over every part of the hospital's capital budget, its relationships with government in terms of Medicare, its investment policy and returns, capital budget proposals, and costs. One of the big issues on the committee is the new facilities MSK has built, including in the suburbs. We go over all the data related to investments, returns, effective occupancy and the effect on the solvency of the institution.

The second task is ensuring quality of patient care, and I just joined that committee as well. The third is fundraising or fund-giving, which involves listening to see where the money *isn't* flowing — where there's a need but for some reason that's not being fulfilled. This is how we became involved with Marcel, since it seemed blood cancers aren't getting the same attention and money many other cancers get.

The fourth task is serving as a liaison to the hospital and to getting care. Trustees at Memorial, as at many hospitals, become an avenue for people who want to connect with doctors. So I get calls from people who say they've just learned they have cancer and want to go to Memorial. They want to know if I can direct them and be helpful.

What guiding principles do you keep in mind when making decisions that affect MSK patients and families?

I think a few things are really important. One of the achievements of Craig Thompson's is being sure that the clinical and research sides of MSK are aligned and both superior, that one does not dominate to the detriment of the other. We make sure that research is evolving, that the research is applied to the clinic, and that patients in clinic are treated as human beings and are offered the best quality of care when they're coping with a situation no one wants to be in.

"What we hoped we've achieved specifically from our efforts in blood cancers is accelerated discoveries of what causes certain blood cancers and the treatment of them."

What tangible effects have you witnessed from your board efforts?

What we hoped we've achieved specifically from our efforts in blood cancers is accelerated discoveries of what causes certain blood cancers and the treatment of them. We helped fund a three-year project with Marcel and liked the results of that, so increased the amount for another three years. What we were trying to achieve initially was better diagnosis that was faster, cheaper and more accurate.

In AML, for instance, the previous process tried to bring about a remission by using radiation and other treatments for 30 days, after which it was hoped patients would stay in remission. If they didn't, more dramatic action had to be taken, but by then the body was weakened and therefore the remedy was more dangerous and probably less effective. We wanted to make this quicker and more accurate, to determine at diagnosis if a patient was likely to stay in remission, and if not, use the more dramatic treatment option more quickly. I believe we've achieved this, and the payback has been extraordinary, not only in terms of dollars and cents, but in terms of patient care. So that was great.

How does your work at the Peter J. Solomon Company overlap with or complement your board work at MSK?

My involvement at Memorial makes me more aware of certain aspects of life, so I'm probably a better advisor to people. I'm an investment banker who does not believe that numbers are decisive in decision-making. I believe people make decisions based on qualitative issues, not quantitative issues. And one of the major issues in people's lives is their health. I've learned over my career that people make a lot of decisions on buying and selling businesses that are motivated by their health. One of the interesting aspects of my business is looking and listening to clients and prospective clients, and being sensitive to their own view of their health and how that will likely affect their decision-making.

So there's no direct correlation, but if you're exposed to lot of the medical world and to people affected by cancer, you understand that once someone has a health issue, no other issue is as important — that health issues focus the mind and drive out virtually every other consideration.

What aspects of being a board member do you find most gratifying?

There's an old saying, "You do well by doing good." It's like being a board member anyplace, where you think you're making a contribution to the greater good — of society, or to solving a problem. But the issue of life and death is at the heart of Memorial's work. The reason I've always been interested in medicine and science is because they're the bottom line. When your nephew dies of leukemia, you ask yourself, does that have to happen? Could you have figured something out?

What aspects of your board memberships do you find most challenging?

Understanding. Keeping up intellectually with what I'm being told and exposed to. I understand patient care. I really understand how to run an institution. I can fathom the economics. But the hardest thing is keeping up with the brilliance and insight and the science. It's sort of amazing, and in some ways it's awe-inspiring. I sometimes ask the doctors here, "Can you tell me that again? And very slowly, so I can actually process that information." Do I retain it for long? It's residual, and builds up over time. You don't leave a Memorial Sloan Kettering meeting without your mind having been stretched, and as a result, having a mild headache. ■

The Susan and Peter Solomon Divisional Genomics Program

INITIATED IN 2010, the Susan and Peter Solomon Divisional Genomics Program at MSK is a collaborative, multidisciplinary program comprised of clinical and research experts led by Marcel van den Brink, Ross Levine, and Elli Papaemmanuil. The Solomon Program has continued to support innovative discovery science and translation to the clinic, including genomic profiling of leukemia patients at MSK. This has been used as the basis for mechanism based clinical trials, and has directly led to two clinical trials (IDH2 and IDH1 inhibition) and one FDA approved AML therapy (enasidenib for IDH2 mutant AML). The investigators have continued to innovate and will soon begin combination therapy trials targeting multiple mutations in each patient, which wouldn't be possible without Solomon support.

In 2017, investigators were invited to submit their research applications for project support from the Solomon Divisional Genomics Program for the second year in a row. Out of the 15 applications, six unique projects were selected for funding including:

Elli Papaemmanuil, PhD:
"Integrative single cell genomics to study biological consequences of acquired mutations and treatment resistance in IDH mutant AML"

Gabriela Chiosis, PhD:
"Genetic and proteomic dissection of epichaperome dependence in cancer"

Alex Kentsis, MD, PhD:
"Functional profiling of AML leukemia stem cells"

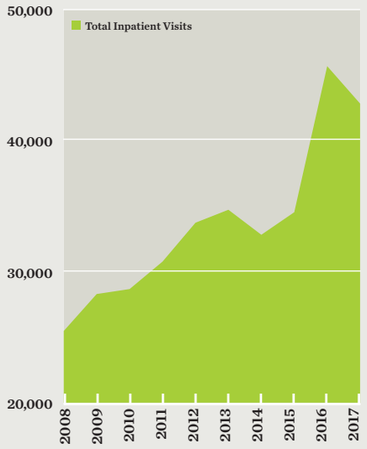
Raajit Rampal, MD, PhD:
"Analysis of the genomic and epigenomic architecture of Acute Myeloid Leukemia arising from an antecedent Myeloproliferative Neoplasm (post-MPN AML)"

David Scheinberg, MD, PhD:
"HLA ligandomes after epigenetic modulation"

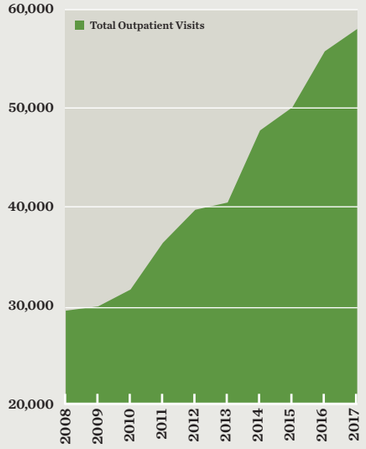
Roni Tamari, MD:
"Studying the impact of gene alterations pre and post allogeneic hematopoietic stem cell transplantation on engraftment and relapse in patients with Myelofibrosis"

2017 DIVISION OF HEMATOLOGIC ONCOLOGY METRICS

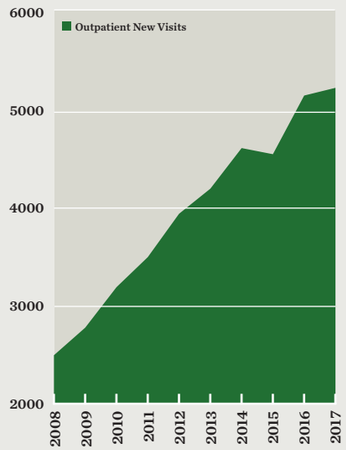
INPATIENT VISITS



OUTPATIENT VISITS



OUTPATIENT NEW VISITS

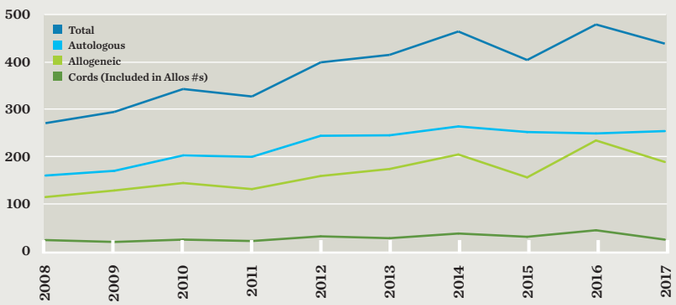


CLINICAL TRIAL ACCRUALS

PEER-REVIEWED PUBLICATIONS

AWARDED GRANTS & CONTRACTS

ADULT BONE MARROW TRANSPLANTS



REGIONAL NETWORK

MEMORIAL SLOAN KETTERING IS EXPANDING ITS FOOTPRINT IN LONG ISLAND.

Memorial Sloan Kettering is expanding its reach on Long Island with a new 114,000-square-foot freestanding cancer treatment center in Nassau County. Once complete, MSK Nassau will house the area's most comprehensive cancer care program, centrally located and staffed by the most forward-thinking and compassionate healthcare teams whose sole focus is caring for people with cancer.

On October 19, 2017, MSK's leadership and staff welcomed county officials, community leaders, and other special guests for an on-site beam-signing celebration marking the construction progress of MSK Nassau.

Construction of the new state-of-the-art facility is well underway. The building and adjacent five-story parking garage will neighbor NYCB Live, home of the new Nassau Veterans Memorial Coliseum, which recently underwent a significant transformation of its own. When MSK Nassau opens in late 2019, MSK will close its current Rockville Centre facility and move its staff and services into the new Nassau facility. Like other outpatient MSK locations on Long Island and in New Jersey and Westchester County, New York, patients will benefit from comprehensive cancer services and amenities in a single location at MSK Nassau. More than 20 cancer doctors covering multiple disciplines — such as medical and radiation oncology, radiology, and surgery — will provide the latest in cancer diagnosis and treatment at MSK Nassau. MSK Nassau will also provide our patients access to clinical research trials, including phase I trials.

Architect rendering of MSK Nassau, expected to open in 2019

Memorial Sloan Kettering Monmouth, located in Middletown, New Jersey

MSK'S PRESENCE IN NEW JERSEY ALSO CONTINUES TO GROW.

In the year since MSK Monmouth opened its doors in Middletown, New Jersey, the facility has become a vital part of the community. With a clinical and support staff of nearly 300, MSK Monmouth offers the same diagnostic and treatment capabilities that patients receive in Manhattan and our other regional sites. Services will include: chemotherapy; medical oncology; radiation therapy; radiology and imaging services; surgical consultations; screening services; neuro-oncology; personalized medicine; clinical trials; genetic testing; immunotherapy; support counseling; pre-surgical testing; and follow-up care.

As scheduled to open in mid-2018, MSK Bergen in Montvale, New Jersey, will offer the same expert cancer care patients except from Memorial Sloan Kettering, just closer to home. At MSK Bergen, residents of Bergen, Essex, Passaic, and Hudson counties in New Jersey, and those living in the lower New York counties of Orange and Rockland, will have easier access to the following MSK Services: surgical, medical, and radiation oncology consultations; chemotherapy; immunotherapy; radiation therapy; mammography, ultrasound, MRI, CT, and PET imaging; and clinical trials. The facility will also offer support groups for patients and educational events for community members and healthcare professionals. In the meantime, CT appointments are available Wednesdays and Fridays in the state-of-the-art, modular radiology unit at MSK Bergen. Patients should contact their primary physician for scheduling or questions. ■

HEMATOLOGIC ONCOLOGY FACULTY CURRENTLY PRACTICING IN THE REGIONAL NETWORK:

Philip Caron*	MSK Westchester
Pamela Drullinsky*	MSK Rockville Centre
Audrey Hamilton*	MSK Basking Ridge
Hani Hassoun	MSK Westchester
Virginia Klimek	MSK Monmouth
Neha Korde	MSK Basking Ridge and MSK Monmouth
Oscar Lahoud	MSK Rockville Centre and MSK Commack
Sham Mailankody	MSK Commack
Matthew Matasar	MSK Commack MSK Bergen †
Colette Owens*	MSK Monmouth
Andrew Zelenetz	MSK Westchester

* Primary location † Starting 2018

EXPERT CANCER CARE CLOSE TO HOME

MSK BASKING RIDGE
136 Mountain View Boulevard
Basking Ridge, NJ 07920

MSK BERGEN (Summer 2018)
225 Summit Avenue
Montvale, NJ 07645

MSK COMMACK
650 Commack Road
Commack, NY 11725

MSK HAUPPAUGE
800 Veterans Memorial Highway
Hauppauge, NY 11788

MEMORIAL SLOAN KETTERING CANCER CENTER
1275 York Avenue
New York, NY 10065

MSK NASSAU (2019)
Uniondale, NY 11553

MSK MONMOUTH
480 Red Hill Road
Middletown, NJ 07748

MSK ROCKVILLE CENTRE
1000 North Village Avenue
Rockville Centre, NY 11570

MSK WESTCHESTER
5000 Westchester Avenue
West Harrison, NY 10604

POWER OF DATA DRIVES HEMATOLOGY RESEARCH PROJECT COORDINATOR YIMEI MIAO'S EFFORTS TO HELP PATIENTS

EMIGRATING FROM CHINA to the United States as a little girl, Yimei Miao grew up with a younger sister who faced constant health issues, planting a passion for caretaking. But the chemistry graduate's current focus is dominated by research data and its ability to expand patients' treatment options — which, at its core, is also another way of taking care of people.

Miao has spent the entirety of her young career at Memorial Sloan Kettering, first as a research study assistant and now as a research project coordinator in the Hematology Service. Joining MSK in late 2014, she's relishing the process of synthesizing fundamental concepts to brainstorm new research topics, helping execute them and even presenting study results at major scientific conferences.

"When I was in college at Stony Brook University, I was told I should be very familiar doing research because that's the future of medicine, and medicine and science were changing rapidly before our eyes," Miao says. "So I got started doing translational research, bench research and a little clinical research ... and came to Sloan Kettering with that mindset, of getting more experience with research to eventually go to medical school and become one of the doctors."

"I love solving problems, and that resonates with me here at MSK doing research," she adds. "I'm very interested in maybe becoming a healthcare professional one day, but I love the research MSK does. Everyone here has a tie-in to do patient care and keep up with the news ... and change their practice for the greater good of patients."

ORGANIZATION, TEAMWORK KEY TO PROGRESS

Miao's current responsibilities veer from those of her previous job, which involved helping physicians during the patient consent process and answering questions about patient toxicities to clinical trial medications. Now she focuses much more on managing databases related to various MSK clinical trials — a role she acknowledges requires a hyper-level of organization.

Teamwork is also a watchword, since her ideas on how to structure data collection efforts must be discussed with and approved by each study's principal investigator, or PI, who has their own goals for the data at hand. She also credits MSK's "amazing" IT (information technology) group and CTMS (clinical trials management system) for smoothing her path.

"Many companies are just selling that data or trying to collect as much data as possible, like Google or Facebook, but for us, data tells the story of our patients."

"I love how respectful doctors and other PIs are of my feedback," Miao notes, "and encourage me to come up with ideas myself that lead to changes in study design."

Once the collaboration leads to a firm plan about how data will be gathered for a specific study, Miao is tasked with executing the approach. But her vision about the potential influence of that data far transcends mere numbers.

"Data is power," she explains. "Many companies are just selling that data or trying to collect as much data as possible, like Google or Facebook, but for us, data tells the story of our patients."

"If I'm able to collect data in a certain way to get meaningful results, that may help a drug get approved. I also provide an analysis for specific patient populations — including disease type, comorbidities and medical history — that the drug works best in," Miao continues. "I think about the trends in clinical events I see in data ... and we use those numbers as answers to pilot the next clinical trial as a key data point to collect. If it serves to benefit patients, the FDA or a pharmaceutical company will want to know about it."

CAREER HIGHS ALREADY APPARENT

Miao prefers to work on studies originating with MSK physicians rather than pharmaceutical companies. She reasons that these projects offer greater control of study design, including which data points are collected and how they will be analyzed to best exhibit the benefits of an experimental treatment.

"That's more compelling to me because you definitely have more flexibility, and it's a learn-as-you-go process," she says. "I feel it's more dynamic, where you see problems happening and have the option of changing a protocol based on those needs. There's more creativity there."

With the help of the IT team, Miao devised a way to automate patient queries for one clinical trial that enabled patient enrollment to climb so rapidly that MSK achieved the second-highest enrollment worldwide. "Our allotted enrollment numbers were also increased by 67% because of our enrollment success rate and seamless study conduct," she notes. "This allowed MSK to be recognized as the leader in this therapeutic area."

A career highlight so far was making an oral presentation at the American Society of Hematology (ASH) conference, "standing in front of the biggest masterminds in the field and presenting research to them on how to dose-reduce a drug in high-risk patients," Miao recalls. That experience, along with doing a poster presentation on influential early-stage research data, fuels her desire to stay put — for now.

"I'd like to focus my future on project management and healthcare strategy roles where I can serve to solve kinks in each research project and streamline processes," Miao says. "Also, with that I would like to head toward being a better supervisor and continue to lead my current team and the new generation through mentorship and leadership. I strive to lead by example and continue to produce work efficiently and with integrity." ■

2017 AMERICAN SOCIETY OF HEMATOLOGY (ASH) MEETING 2017

ATLANTA, GA

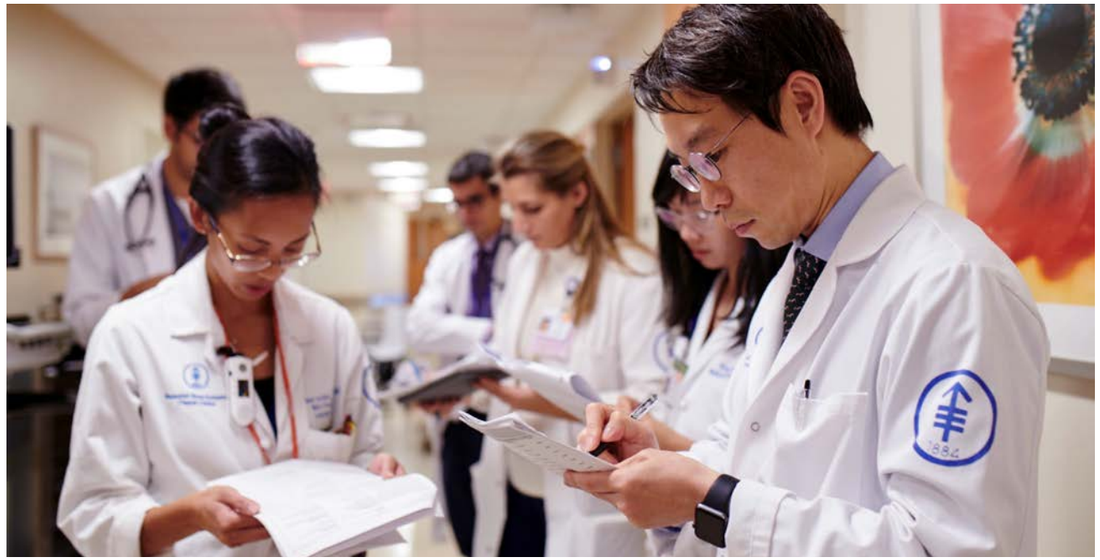
LEFT: Anas Younes, Andre Goy, Andrew Pecora; **TOP RIGHT:** Jacqueline Berto and Angelina Ellis; **BOTTOM RIGHT:** Parastoo Dahi, Roni Tamari Amer Assal, Adam Bryant, Richard Lin, Lizamarie Bachier-Rodriguez, Miguel Perales, Bart Getta

THE 59TH ANNUAL MEETING of the American Society of Hematology took place in Atlanta, Georgia from December 9-12, 2017.

Faculty from the Division was well-represented and reported advances in myeloma, lymphoma and histocytosis. Few advances include encouraging results from efforts to design and test CAR T cell therapy to treat advanced multiple myeloma by Dr. Eric Smith, promising results from a phase I trial that showed new important treatment options to offer people with advanced stage Hodgkins lymphoma by Dr. Anas Younes and recently FDA approved vemurafenib (Zelboraf) for the treatment of Erdheim-Chester disease (ECD), a histiocytic disorder, by Dr. Eli Diamond.

The 10th annual ASH reception for the Division of Hematologic Oncology was hosted by the Memorial Hospital Alumni Society at the Atlanta Marriott Marquis. It was attended by MSK alumni, current faculty, fellows, and colleagues from other institutions as well as invited guests of the Division of Hematologic Oncology. ■

ABOVE: Peter Maslak and Martin Tallman; **LEFT:** David Weinstock, Theresa Davey, Kerry Savage, Steven Horwitz, Alison Moskowitz, Niloufer Khan; **FAR LEFT:** Nika Klatt, Martin Klatt, and David Scheinberg



CLINICAL TRAINING & EDUCATION

PROGRAMS TRAIN THE LEADERS OF THE FUTURE

MEMORIAL SLOAN KETTERING CANCER CENTER attracts applicants from all over the world for two distinguished fellowships in Medical Oncology/Hematology and Bone Marrow Transplantation. Education in benign hematology is also provided by the Hematology Service to international medical students, internal medicine residents, and hematology/oncology fellows.

MEDICAL ONCOLOGY/ HEMATOLOGY FELLOWSHIP

Memorial Sloan Kettering's Medical Oncology/ Hematology Fellowship Training Program in the Department of Medicine has a tradition of developing the careers of leading physician-scientists by providing rigorous training in the diagnosis and treatment of neoplastic disorders as well as in the conduct of clinical and/or laboratory investigation. The training program has two main objectives: to provide comprehensive training in the evaluation and care of patients with cancer, leading to board eligibility in the subspecialties of Medical Oncology or both Medical Oncology and Hematology; and to develop highly qualified and productive investigators in clinical and/or laboratory-based cancer research.

The three-year program is the largest of its kind in the country, attracting over 500 applicants this past year for just 15 coveted spots. In addition to being outstanding physicians, fellows must have a specific interest in clinical research or laboratory investigation and demonstrate scientific curiosity and motivation. Fellows in the first year of the program concentrate on patient care, treating both inpatients and outpatients while rotating through a range of cancer subspecialties. In years two and three, fellows initiate and conduct clinical trials or work as postdoctoral researchers in a mentor's laboratory. Our fellows continue to perform world-leading research, which has led to many grant awards, impactful scientific publications, and allowed our fellows to become leaders in our field in their own right.

To learn more, visit **http://www.mskcc.org/education/fellowships/fellowship/medical-oncology-hematology.**

BONE MARROW TRANSPLANTATION AND CANCER IMMUNOTHERAPY FELLOWSHIPS

The Adult Hematopoietic Stem Cell Transplantation Fellowship Program at Memorial Sloan Kettering was launched in 2007 as an independent, one-year program designed to prepare physicians for academic careers in stem cell transplantation and cellular therapy, including experience with clinical research. The fellowship provides training in inpatient and outpatient settings, with a specific focus on the different subspecialties within hematopoietic stem cell transplantation and cellular therapy, as well as exposure to the different disciplines that relate to this field. These include radiation oncology and clinical laboratory rotations.

Fellows have opportunities to participate in ongoing research projects or to initiate an independent project. This process is helped by the assigning of a mentor throughout the fellowship, who ensures that the objectives of the fellow are met for the training year.

The program also includes a wide variety of conferences which complement the clinical aspects. These are based on a disease management concept and group physicians from different specialties who treat the disease in question. In addition to these patient-based conferences, a weekly research meeting is held.

Since 2007, the Program has trained 20 fellows. Eighteen of the 20 graduates are now full time faculty on BMT services in academic centers in the U.S. and abroad. One graduate is working in industry as senior director of clinical research at CRISPR Therapeutics.

Starting in July 2018, a new Fellowship in Cancer Immunotherapy will be launched. This comprehensive one-year fellowship is designed to prepare physicians who have completed training in Medical Oncology and/or Hematology for academic careers in Cancer Immunotherapy. The fellowship is offered jointly by the MSK Adult Bone Marrow Transplantation Service, Cellular Therapeutics Center (CTC) and the Parker Institute for Cancer Immunotherapy (PICI) at MSK, and is supported by the PICI at MSK. The structure of the fellowship is similar to the Adult BMT Fellowship, and fellows on the two tracks will benefit from the premier training and research environment at MSK.

To learn more, visit **http://www.mskcc.org/education/fellowships/fellowship/bone-marrow-transplantation.** ■

THE MORTIMER J. LACHER LECTURE & FELLOWS CONFERENCE

LEFT: Left to right, Santosha Vardhana, Christina Cho, Michael Scordo, Marcel van den Brink, Joachim Yahalom, Joanna Yang, Matthew Pianko, Sydney Lu; **TOP RIGHT:** Mortimer J. Lacher; **BOTTOM RIGHT:** Joachim Yahalom

THE EIGHTH ANNUAL Mortimer J. Lacher Lecture and Fellows Conference was hosted by the Division of Hematologic Oncology on June 2, 2017. The event honors Dr. Lacher, a longtime member of MSK's Lymphoma Service and the Sloan Kettering Institute, who joined the Lymphoma Service at Memorial Hospital in 1960 and served as a member of the Sloan Kettering Institute from 1960 until 1990. In 1965, he published a seminal report with John R. Durant describing the success of combining vinblastine and chlorambucil to treat Hodgkin disease.

Dr. Lacher is the co-founder and current President of The Lymphoma Foundation, and currently serves as a Consultant in MSK's Department of Medicine. The Lymphoma Foundation provides annual funding for Medical Oncology/Hematology fellows at MSK as well as specific projects in the laboratories of MSK physician-scientists.

The Eighth Annual Mortimer J. Lacher Lecture, "2017 and Beyond — A Paradigm Shift in the Use of Radiation Oncology for Hematological Malignancies," was delivered by Joachim Yahalom, MD, FACR, Attending Radiation Oncologist and Member at Memorial Sloan Kettering Cancer Center, and Professor of Radiation Oncology at Weill Cornell Medical College. Dr. Yahalom is internationally recognized for his lymphoma research and is the founder and Chairman of the International Lymphoma Radiation Oncology Group (ILROG). His organization ILROG, has developed and harmonized the modern radiation guidelines for Hodgkin lymphoma and for lymphoma involving all organ sites. ■

The 2017 Lacher Fellows are listed below along with their abstracts:

Christina Cho, MD (Mentor: Miguel-Angel Perales, MD)
"CMV viremia and T-cell reconstitution after CD34-selected allogeneic hematopoietic cell transplantation"

Sydney Lu, MD, PhD (Mentor: Omar Abdel-Wahab, MD)
"Hyperactivation of innate immune signaling in spliceosomal mutant leukemias"

Matthew Pianko, MD (Mentor: Alexander Lesokhin, MD)
"Induction of abscopal effects in plasma cell myeloma"

Michael Scordo, MD (Mentor: Sergio Giralt, MD)
"The impact of toxicities on outcomes after ex-vivo CD34+ selected allogeneic hematopoietic cell transplantation in adults with hematologic malignancies"

Jacob Soumerai, MD (Mentor: Andrew Zelenetz, MD, PhD)
"Time from diagnosis to 2nd treatment is a promising surrogate for overall survival in patients with advanced stage follicular lymphoma"

Santosha Vardhana, MD, PhD (Mentor: Craig Thompson, MD)
"Metabolic suppression of anti-tumor responses as a novel immune checkpoint in cancer"

Joanna Yang, MD (Mentor: Joachim Yahalom, MD, FACR)
"Cost-effectiveness analysis of first-line treatments for early-stage low-grade follicular lymphoma"

2017 NURSING AND PHYSICIAN ASSISTANT ACCOMPLISHMENTS

LEFT TO RIGHT: Kimberly Ford, Nicole Lestrange, Stephanie Kelly, Soni Brown, Abigail Cohen

Nicole Gioia

PROMOTIONS

- **Lauren Appollo, BSN, RN, OCN** was promoted to Clinical Nurse III.
- **Lindsay Donofrio, BSN, RN, OCN** was promoted to Clinical Nurse IV.
- **Sharon Lynch, BSN, RN, OCN** was promoted to Clinical Nurse IV.
- **Jay Mallari, BSN, RN, OCN** was promoted to Clinical Nurse III.

CERTIFICATIONS

- **Andrea Arvidson, BSN, RN, OCN** achieved the Bone Marrow Transplant Nurse Certification (BMTCN).
- **Jennifer DeAngelo, MS, RN-BC** completed her Masters in Nursing Education.
- **Cristina Fonalledas, BSN, RN, OCN** completed her Nurse Practitioner Program.
- **Mary Griffin, BSN, RN, OCN** achieved the Oncology Nurse Certification (OCN).
- **Jennifer McLaughlin, AGPCNP, MS, OCN** completed Gerontological/Adult Health Nurse Practitioner Program.
- **Hannah Morse, BSN, RN, OCN** achieved the Oncology Nurse Certification (OCN).
- **Anna Perry, BSN, RN, OCN** achieved the Oncology Nurse Certification (OCN).
- **Alison Reagan, BSN, RN, OCN** achieved the Oncology Nurse Certification (OCN).

ACCOMPLISHMENTS/HONORS

- **Maggie Brennan, BSN, RN, OCN** was elected to Chair-Elect of Outpatient Nursing Informatics Council.
- **Abigail Cohen ANP-BC, AOCNP, BMTCN** and **Jennifer McLoughlin MSN, RN, OCN** received a Geri and Me nursing grant for their work titled "Understanding Medication Adherence in the Adult Allogeneic Transplant population."
- **Jennifer DeAngelo, MS, RN-BC** received the Distinguished Student Award upon completion of her Masters in Nursing Education.
- **Morgan Kurpiel, BSN, RN, OCN** was elected to Chair of Outpatient Nursing Retention, Recruitment & Rewards Council.
- **Sharon Lynch, BSN, RN, OCN** was elected to Chair-Elect of Outpatient Nursing Quality Assurance Council.
- **Sue Posthumus, BSN, RN, OCN** was elected to Chair-Elect of Outpatient Nursing Practice Council.

ABSTRACTS/POSTERS/ PRESENTATIONS

- **Catherine Bender, MPAS, PA-C** presented at BMT Education Day (Nursing educational program), speaking on the complications of BMT in June 2017.
- **Lindsay Donofrio, BSN, RN, OCN** presented at Oncology Nursing Society National Congress in 2017 on *Homebound Transplant.*
- **Katie Hambright, BSN, RN, OCN** presented at Oncology Nursing Society National Congress in 2017 on *Homebound Transplant.*
- **Heather Hylton, MS, PA-C** served as the chair for the 2017 ASCO Annual Meeting education session *Collaborating with Advanced Practice Providers to Optimize Efficiency and Improve Care and presented Optimizing the Inpatient Experience for Bone Marrow Transplant Patients: The Role of the Advanced Practice Provider* as part of this education session in June 2017.
- **Heather Hylton, MS, PA-C** presented *Provided Burnout* at the South Carolina Oncology Conference (August 2017), the Virginia Association of Hematologists and Oncologists Leadership Day (September 2017), and at the 12th Annual New York Lung Cancers Symposium (November 2017).
- **Heather Hylton, MS, PA-C** was a co-presenter on **Legislative Updates** at the Advanced Practice Providers Oncology Summit in Philadelphia (July 2017).
- **Heather Hylton, MS, PA-C** was an invited faculty member for the ASCO University *Business of Healthcare Fundamentals* course which launched in 2017.
- **Nadia Kralovic, MS, PA-C** presented *Updates in Lymphoma* at the 2017 Imedex Lymphoma and Myeloma meeting in New York in October.
- **Kevin O'Hara, MMSc, MS, PA-C** presented at the American Academy of Physician Assistants Annual Conference in May 2017 on *Advanced Sexual and Gender Minority Health: Cases in Clinical and Preventive Medicine.*
- **Kevin O'Hara, MMSc, MS, PA-C** presented at the American Academy of Physician Assistants Annual Conference in May 2017 on *Comprehensive Management of Sexually Transmitted Infections Characterized by Genital Ulcer.*
- **Elaina Preston, MPH, MSHS, PA-C** was invited faculty for the NMDP/LLS Acute Myeloid Leukemia (AML): Treatment Options, including BMT, Care and Support Webinar.

Nancy Mansfield

- **Shah GL, Lin A, Schofield R, Sarubbi C, Preston EV, Devlin SM, Bhatt V, Harnicar SJ, Hoover E, Chung DJ, Dahi PB, Koehne G, Tamari R, Carlow D, Giralt SA, Landau H.** Feasibility, Tolerability, and Patient-Reported Outcomes with Pharmacokinetic (PK)-Directed Dosing of Evomela® (propylene glycol free melphalan) for Multiple Myeloma and AL Amyloidosis Patients Undergoing Autologous Hematopoietic Stem Cell Transplant (AHCT). Poster presentation at ASH (December 2017).

PUBLICATIONS

- **Collum K, Featherstone C, Beyer K, Farooki A, Hylton H, Irby S, Kelly S, Kenny S, Morcerf B, Patterson E, Taylor J, Jakubowski A**. Development of and Compliance With a Vitamin D Monitoring and Supplementation Program for Hematopoietic Stem Cell Transplant (HSCT) Patients. *Biol Blood Marrow Transplant* 2017;23(3):S156-157.
- **Hylton H**, Smith L. Collaborating With Advanced Practice Providers: Impact and Opportunity. ASCO *Education Book* 2017:e1-7.
- **O'Hara, KM.** Pontrelli, G. Kunstel, K. Introduction to Gastrointestinal Tract CMV Disease. *JAAPA*. 2017;30(10)
- **Scordo M, Shah GL, Peled JU, Preston EV, Buchan ML, Epstein JB, Barasch A, Giralt SA**. Unlocking the Complex Flavors of Dysgeusia after Hematopoietic Cell Transplantation. *Biol Blood Marrow Transplant* 2018;24(3):425-432. *Published online in 2017*
- Tetzlaff E, **Hylton H**, DeMora L, Ruth K, Wong Y. National Study of Burnout and Career Satisfaction Among Physician Assistants in Oncology: Implications for Team-Based Care. *J Oncol Pract* 2018;14(1):e11-22. *Published online in 2017*

SERVICE

- **Catherine Bender, MPAS, PA-C** served as a volunteer on a regular basis with the New York Cares organization in 2017.
- **Theresa Elko, MS, PA-C** completed a year-long palliative care champion program at NYU/CUMC. The program focused on enhancing knowledge and advocacy in the palliative care setting.
- **Heather Hylton, MS, PA-C** was appointed the American Academy of PAs' representative to the American Society of Clinical Oncology's CancerLinQ initiative. She continued to serve as AAPA's Medical Liaison to the American Society of Clinical Oncology in 2017 as well as on the American Academy of PAs' Commission on the Health of the Public. She was appointed to ASCO's Social Media Working Group in 2017 and continues to serve as an Associate Editor for the ASCO University Editorial Board. She was the Association of Physician Assistants in Oncology's representative to the AAPA House of Delegates in 2017.
- **Nadia Kralovic, MS, PA-C** served on the United Hospital Fund Outpatient Antibiotic Stewardship Initiative in 2017.
- **Shelley Levi, MSHS, MPH, PA-C** met with physicians in the Department of Hematology/Oncology at The Ruth Rappaport Children's Hospital of the Rambam Health Care Campus in Israel to discuss the PA profession and the role of the PA in BMT.
- **Kevin O'Hara, MMSc, MS, PA-C** was appointed to the American Academy of PAs' Commission on the Health of the Public and served as an ad hoc reviewer for the *Journal of the American Academy of Physician Assistants and the American Journal of Public Health.* ■

2017 PHARMACY ACCOMPLISHMENTS

PUBLICATIONS

- Horvat TZ, Seddon AN, Ogunniyi A, **King AC,** Buie LW, and **Daley RJ.** The ABCs of Immunotherapy for Adult Patients With B-Cell Acute Lymphoblastic Leukemia. *Ann Pharmacother*. 2018 Mar;52(3):268-276.

POSTER PRESENTATIONS

- Brianne N. Dixon, PharmD, Ryan J. Daley, PharmD, BCOP, Troy Z. Horvat, PharmD, BCOP, Larry W Buie, PharmD, BCOP, FASHP, Meier Hsu, MS, Sheron Latcha, MD, Renier J. Brentjens, MD, PhD and Jae H. Park, MD. **Risk of Hyponatremia and Associated Clinical Characteristics in Patients with Acute Lymphoblastic Leukemia after CD19 Targeted Chimeric Antigen Receptor (CAR) T-Cells,** *American Society of Hematology 59th Annual Meeting. Atlanta GA. December 2017*
- Amber C. King, PharmD, BCOP, Ryan J. Daley, PharmD, BCOP, Troy Z. Horvat, PharmD, BCOP, Meier Hsu, MS, Jae H. Park, MD. **Biomarkers for Predicting Toxicity and Response in Adult Acute Lymphoblastic Leukemia (ALL) Patients Treated with Blinatumomab.** *American Society of Hematology 59th Annual Meeting. Atlanta GA. December 2017*
- Aaron D Goldberg, MD, PhD, Troy Z. Horvat, PharmD, BCOP, Meier Hsu, MS, Sean M. Devlin, PhD, Bernadette M. Cuello, BSN, MSN, NP, RN, Ryan J. Daley, PharmD, BCOP, Amber C. King, PharmD, BCOP, Larry W Buie, PharmD, BCOP, FASHP, Jacob L Glass, MD, PhD, Michael J. Mauro, MD, Eytan M. Stein, MD, Ellin Berman, MD, Virginia M. Klimek, MD, and Martin S. Tallman, MD. **Venetoclax Combined with Either a Hypomethylating Agent or Low-Dose Cytarabine Shows Activity in Relapsed and Refractory Myeloid Malignancies.** *American Society of Hematology 59th Annual Meeting. Atlanta GA. December 2017*

continued on page 30

continued from page 29

TOP LEFT: BMT Clinical Pharmacy Specialists: Left to right: Meagan Griffin, Valkal Bhatt, Carmen Lau, Anthony Proli II, Lauren DeRespiris, Andrew Lin

TOP RIGHT: Leukemia Clinical Pharmacy Specialists: Left to right: Jeremy Pappacena, Amber King, Charlene Kabel, Ryan Daley

BOTTOM LEFT: Lymphoma & Multiple Myeloma Clinical Pharmacy Specialists: Left to right: (back row) Tim Peterson, Kristen Poppiti, Kathryn Maples, Brianne Dixon (front row) Thu Dang;

Not pictured: Laura Tang

- Lin A, Drill E, Proli A, Beyer K, Bhatt V, et al. **Impact of busulfan exposure on transplant outcomes for patients with multiple myeloma undergoing CD-34 selected allogeneic hematopoietic stem cell transplant.** *American Society of Blood and Marrow Transplantation Annual Meeting. Orlando FL. February 2017*
- Beyer K, Lin A, Proli A, Bhatt V, et al. **Outpatient Foscarnet Administration Incorporating Home Infusions Is Feasible Greatly Enhancing the Care of Hematopoietic Stem Cell Transplant Recipients.** *American Society of Blood and Marrow Transplantation Annual Meeting. Orlando FL. February 2017*
- Lin A, Hilden P, Maloy M, et al. **Impact of Omitting Post-transplant Mini-Methotrexate Doses in Allogeneic Hematopoietic Cell Transplant: a Single-Center Retrospective Study.** *American Society of Hematology 59th Annual Meeting. Atlanta GA. December 2017*
- Shah G, Landau H, Sarubbi C, Schofield R, Lin A, Bhatt V, Harnicar S et al. **Pharmacokinetics and Toxicities after Evomela®** (propylene glycol free melphalan) with Autologous Hematopoietic Stem Cell Transplant (AHCT) for Multiple Myeloma and AL Amyloidosis**.** *American Society of Hematology 59th Annual Meeting. Atlanta GA. December 2017*
- Shah G, Lin A, Schofield R, Sarrubi C, Preston E, Devlin SM, Bhatt V, Harnicar S, et al. **Feasibility, Tolerability, and Patient-Reported Outcomes with Pharmacokinetic (PK)-Directed Dosing of Evomela®** (propylene glycol free melphalan) for Multiple Myeloma and AL Amyloidosis Patients Undergoing Autologous Hematopoietic Stem Cell Transplant (AHCT). *American Society of Hematology 59th Annual Meeting. Atlanta GA. December 2017*

NATIONAL PRESENTATIONS

Larry Buie:

- Invited speaker: "Insight into Cytokine Release Syndrome (CRS)" Hematology/Oncology Pharmacy Association 2017 Annual Conference, Anaheim, CA
- Invited speaker: "Updates in Management of Acute Myeloid Leukemia (AML)" Hematology/Oncology Pharmacy Association BCOP 2017 Updates Course, Chicago, IL

Laura Tang:

- Invited speaker: "Managing the Ramp-Up with Venetoclax" Hematology/Oncology Pharmacy Association 2017 Annual Conference, Anaheim, CA

Anthony Proli:

- Invited speaker: "Challenging Cases — HCT in CNS Lymphoma" American Society of Blood and Marrow Transplantation Annual Meeting, Orlando FL, February 2017

NATIONAL COMMITTEE REPRESENTATION

Larry Buie:

- At-large Member of the Hematology/Oncology Pharmacy Association (HOPA) Board of Directors
- Chair of the Hematology Oncology Practice and Research Network for the American College of Clinical Pharmacy (ACCP) Practice and Research Network

Valkal Bhatt:

- Appointed Chair of the BMT CTN Pharmacy Committee

Ryan Daley:

- Alliance for Clinical Trials in Oncology Pharmacy Committee Appointment ■

SURVIVORS / THRIVERS

THE 22ND ANNUAL CELEBRATION for the survivors/thrivers of Blood and Marrow Transplant (BMT) was held on October 24th, 2017. This event brought together over 550 recipients of bone marrow transplant and their loved ones, including family members, friends, donors, doctors, nurses, and other MSK staff who played a vital role in their transplantation and recovery. This year's event shifted focus slightly, celebrating not just surviving transplantation, but thriving by living full, healthy lives. The evening to honor the strength, courage, and continued success began with a short speaking program followed by live jazz music, food, and drinks. The festive atmosphere keeps participants coming back year after year to see fellow survivors, thrivers and members of their care team who supported them through their transplant process. ■

TOP: Robin Roberts and Sergio Giralt; **BOTTOM LEFT: LEFT TO RIGHT:** April Jakubauskas, Father Dennis Billy and Nidha Mubdi; **BOTTOM RIGHT:** Patient Survivors / Thrivers Poster

After Tim Waples was diagnosed with stage IV anaplastic large cell lymphoma (ALCL), he came to Memorial Sloan Kettering to enroll in a clinical trial testing a new treatment. Today, Tim is fully recovered and enjoying life with his wife, Melissa, and their two boys.

TIM'S STORY

As a 29-year-old teacher looking forward to the birth of his first child, Tim suddenly found himself in a fight for his life against a rare form of non-Hodgkin lymphoma. A specialist at Memorial Sloan Kettering enrolled Tim in a clinical trial testing a new treatment, allowing him to resume his life.

IN OCTOBER 2011, Tim Waples and his wife, Melissa, were eagerly awaiting the birth of their first child. It was a hectic time. Melissa's doctor had ordered several months of bed rest after a troubling episode in the pregnancy. Tim, then 29, had just begun a new year as a special education teacher at an elementary school in Passaic, New Jersey. So when he noticed a rash and some swelling on his back, it was the least of his concerns.

When the symptoms of what seemed like a benign cyst didn't go away, Tim had blood tests and biopsies at a hospital in New Jersey. He was diagnosed with stage IV anaplastic large cell lymphoma (ALCL), a rare but aggressive type of non-Hodgkin lymphoma.

"I was super tired with no strength, and it was really wearing me down," Tim says. The anxiety was heightened by the timing and the circumstances of both he and Melissa being largely incapacitated. To address this, Melissa temporarily moved in with her parents, and Tim's parents came up from Florida to stay with him at the family's home in Nyack, New York.

Tim initially planned to be treated in New Jersey with chemotherapy. He braced himself for an arduous regimen. But his primary-care physician encouraged him to seek a second opinion, and she had someone

"When you're giving standard treatments for rare diseases, you may not be giving patients the best chance to succeed. A clinical trial can make that difference."

MATTHEW J. MATASAR, Medical oncologist

HIGHLIGHTS

- Tim was diagnosed with stage IV anaplastic large cell lymphoma. His personal physician recommended he get a consultation at MSK.
- MSK oncologist Matthew Matasar enrolled Tim in a clinical trial testing a new treatment.
- Today, Tim is cancer free and recently welcomed his second child with his wife.

Memorial Sloan Kettering medical oncologist Matthew Matasar was confident that a clinical trial incorporating a new drug would increase Tim's chances of successful treatment.

specific in mind: Memorial Sloan Kettering medical oncologist Matthew Matasar. She had trained under Dr. Matasar at Columbia University Medical Center and knew of his expertise in rare forms of lymphoma.

Tim met with Dr. Matasar and immediately knew he had come to the right place.

"I felt very comfortable within the first five minutes of being in the room with him," Tim says. "He said I was the perfect candidate for a clinical trial that was just starting, and he explained everything in detail. He even called Melissa to make sure she understood what it entailed and to answer all her questions."

A NOVEL TREATMENT

Although Tim's condition was grave — CT scans showed that tumors were rampant across his entire trunk — Dr. Matasar was confident that the treatment being tested in the trial would wipe out the cancer. It involved using a new drug called brentuximab vedotin (Adcetris®).

Standard treatment for ALCL is a chemotherapy cocktail known as CHOP, which involves four drugs. Brentuximab vedotin had already been approved as monotherapy (meaning it is given alone) for patients whose ALCL had returned after CHOP. The clinical trial would evaluate the effectiveness of substituting brentuximab vedotin for one of the four CHOP drugs in newly diagnosed patients like Tim.

"Tim was very sick and needed immediate treatment, so the timing was perfect with the trial," Dr. Matasar says. "He was young and in great physical shape, so I was optimistic we could beat the cancer. I thought a treatment plan incorporating brentuximab vedotin was definitely going to skew the odds in his favor."

The approach involved six cycles of the combination, given once every three weeks. Tim began to feel better soon after treatment began, and he was amazed when Dr. Matasar showed him a scan taken after only two cycles. "The old scans looked completely black from my throat to my pelvis. After two treatments, I was able to see all of my organs, and there was not much cancer anywhere."

Throughout the process, Dr. Matasar constantly updated Melissa to help her feel connected to Tim's treatment and his healing. "I didn't want the burden of communication to fall completely on Tim's shoulders, so I would call her after every treatment to let her know how he was doing and that everything was going according to plan."

Tim's health improved enough over the first few months that he was able to be present for the birth of his son in January 2012. The only significant side effect was nausea from the chemotherapy, which he alleviated with his own personal elixir that seemed to do the trick.

"I drank a lot of chocolate milk to coat my stomach," he says. "I would have one every time I got home from treatment. I've been telling everyone who goes on chemo to try it and see if it helps."

GETTING ON WITH LIFE

Tim didn't let the illness affect the life he had always planned. He says Dr. Matasar gave him the confidence that everything was going to be OK. "I just stayed focused on the future and thought about my next step once I beat this."

Today, five years later, he and Melissa have two sons, the second born in 2016. Tim recently earned a master's degree in educational leadership and hopes to become a supervisor in the school system. He still sees Dr. Matasar twice a year to make sure the cancer hasn't returned, but his outlook is excellent. "At this point, I believe he's been cured," Dr. Matasar says.

Tim's experience underscores the importance of being treated at an institution with vast experience in rare cancers, says Dr. Matasar. MSK offers one of the largest and most innovative clinical trial programs for lymphoma in the world.

"There are diseases such as ALCL that are individually rare but collectively common," Dr. Matasar says. "When you're giving standard treatments for rare diseases, you may not be giving patients the best chance to succeed. A clinical trial can make that difference."

Tim sometimes looks back on the experience and can hardly believe it happened. "It's just something that was dealt with quickly because of the people at Memorial Sloan Kettering, and here I am back to normal." ■

LINK: https://www.mskcc.org/experience/hear-from-patients/tim

THE DAVID H. KOCH CENTER FOR CANCER CARE — "TOPPING-OFF" CEREMONY

CONSTRUCTION CONTINUES ON The David H. Koch Center for Cancer Care, between 73rd and 74th Streets, overlooking the FDR Drive. The 23-story, 750,000-square-foot building will provide a dynamic outpatient setting for leading-edge cancer treatments. Hospital officials and Julia and David H. Koch attended a "topping-off" ceremony on May 11, 2017, marking a milestone in construction of the facility due to open in 2019.

TOP: Left to right: Jose Baselga, Douglas A. Warner III, David H. Koch, Julia Koch, Sergio Giralt, Craig B. Thompson; **LEFT:** David H. Koch signing the beam; **BOTTOM:** Rendering of the Koch Building

The facility is the latest example of MSK's creative approaches to redesigning the way cancer care is delivered. It will allow MSK to achieve the greater efficiencies and lower costs — and the enhanced patient comfort and convenience — that come with providing treatment on an outpatient basis.

Novel clinical trials will also be offered, giving patients access to the latest treatment options. And a pioneering outpatient bone marrow transplant unit will provide lifesaving procedures that in the past required strict isolation and a lengthy hospital stay. The facility will also offer MSK's full array of diagnostic and therapeutic services, such as interventional radiology, as well as programs for patients with lung, head and neck, and hematologic cancers. This new center will be the future home of our Division.

The building is made possible by a commitment of $150 million from long-time MSK board member, David H. Koch. His gift is the largest in MSK's history. ■

MSK CENTER FOR HEMATOLOGIC MALIGNANCIES

Levine lab with former Vice President Joe Biden

THE CENTER FOR HEMATOLOGIC MALIGNANCIES (CHM) serves patients with blood cancers, including leukemia, lymphoma, and myeloma. Our leadership in the field means we are able to support emerging research and move discoveries from the lab to the patient's bedside.

In September 2017, CHM held its first Center of Hematologic Malignancies Scientific Retreat at Skytop Lodge in Skytop, Pennsylvania. This highly anticipated event fostered interactions between clinical and laboratory investigators in an effort to promote translational research and new collaborations. The retreat was attended by 175 CHM members, and included formal talks and breakout sessions aimed to foster new research directions and interactions. Adolfo Ferrando from Columbia University was the keynote speaker, and CHM leadership and faculty presented well received talks on current capabilities, strategic priorities and new research directions. *We are planning our next retreat for spring 2019.* ■

PARKER INSTITUTE FOR CANCER IMMUNOTHERAPY

LEFT TO RIGHT: Scott James, Santosha Vardhana

THE PARKER INSTITUTE IS A collaboration between MSK; Stanford Medicine; the University of California, Los Angeles; the University of California, San Francisco; the University of Pennsylvania; and The University of Texas MD Anderson Cancer Center. The goal is to accelerate the development of breakthrough immune therapies capable of turning most cancers into curable diseases. The institute was created through a $250 million grant from The Parker Foundation.

The Parker Institute's three programs for young researchers in cancer immunotherapy — the Parker Scholars, the Parker Bridge Scholars and the Parker Fellows — provides up to $3.46 million for six 2017 awardees as well as mentorship, access to resources, and early access to data from clinical trials and pre-published papers. The goal is to give the awardees the support necessary to help them advance the field and translate their discoveries to benefit cancer patients.

The three programs were launched in spring of 2016. The Parker Scholars program supports graduate students and researchers entering their first postdoctoral appointment who are focused on high-impact, high-risk projects. The Parker Bridge Scholars program supports senior postdoctoral investigators as they transition to faculty positions. The Parker Fellows program supports senior-level researchers who have recently completed their MD or PhD and are ready to establish a laboratory or independent program in cancer immunotherapy.

The 2017 awardees were chosen from a pool of eligible candidates from the institute's partner research institutions. They were selected on the basis of their academic achievement, scientific approach, innovation, the significance of the proposed work to advance the field and the promise of their research to advance the mission and goals of the Parker Institute.

In 2017, Dr. Scott James, a hematology/oncology fellow in Dr. Marcel van den Brink's lab, and Dr. Santosha Vardhana, a medical oncology/postdoctoral fellow in Dr. Craig Thompson's lab, were both selected for awards from the Parker Institute for Cancer Immunotherapy. Dr. James, who now is an Assistant Attending L1 on the Adult Bone Marrow Service in the Division of Hematologic Oncology at MSK, has been named a Parker Bridge Scholar and Dr. Vardhana, who now is an Instructor in the Lymphoma Service in the Division of Hematologic Oncology at MSK, is a Parker Fellow. Dr. James and Dr. Vardhana join 2016 Parker Scholar, Roberta Zappasodi, a research fellow in Dr. Jedd Wolchok's lab, who was part of the inaugural class of scholars.

We congratulate and wish Drs. James and Vardhana great success in their research endeavors. ■

HEMATOLOGIC ONCOLOGY TISSUE BANK

FRONT: Amber Turner, Juliann Orfini, Keimya Sadeghi; **MIDDLE:** Haivy Luu, Jessica Schulman, Amanda Ciardiello; **BACK:** James Young, MD, Sean Quach, Jason Mironidis

THE DIVISION OF HEMATOLOGIC ONCOLOGY established the Hematologic Oncology Tissue Bank (HOTB) in 2010 to support the many different research projects of Memorial Hospital and Sloan Kettering Institute investigators.

The HOTB is a centralized, comprehensive resource for banking of human biological specimens to support research using primary human cells and tissue. This facility provides appropriate cell and tissue-based specimens from patients with hematologic and lymphoid malignancies for investigator-initiated experimentation *in vitro.* These biospecimens are also distinct from those handled by the Precision Pathology Biobank Center (PPBC) because they are not fixed but instead cryopreserved in a manner that allows recovery of viable cells. Comparable materials are also available from healthy volunteers, although these are more limited in quantity and scope.

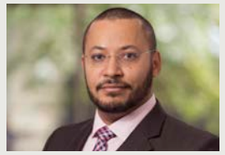
When the bank was created, about 150 samples were processed each month. Sample processing has steadily increased with no signs of slowing down; currently the HOTB processes more than 2,750 samples per month. The HOTB currently has an inventory of more than 220,000 aliquots, including peripheral blood components (plasma, serum, granulocyte pellets and mononuclear cells), buccal swabs for DNA, bone marrow mononuclear cells, skin, and lymphoid tissue.

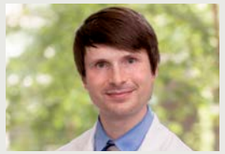
Research specimens are collected from the following services: Leukemia, Lymphoma, Multiple Myeloma, Bone Marrow Transplant, Pediatrics, DTC, ITC, and Dermatology, as well as from the MSK Regional Network Sites. In addition to tissue banking, the HOTB also supports specimen processing for over 45 clinical trials within MSK. The samples from the HOTB have facilitated research in exploring genetic mutations of cancer diagnoses, testing multiple mass spectrometry-based assays, xenograft profiling of hematologic malignancies and many more areas.

The biobank has become an invaluable resource for biospecimens linked to clinical data annotations. Its value is further enhanced by samples collected both before and after treatment from patients with lymphoid and hematologic malignancies. ■

2017 APPOINTMENTS


Christina Cho


Anthony Daniyan


Mark Geyer


Aaron Goldberg


Malin Hulterantz


Scott James

CHRISTINA CHO, MD

IN AUGUST 2017, Christina Cho joined the Adult BMT Service as an Assistant Attending L1 Physician. Dr. Cho received her MD from Columbia University College of Physicians and Surgeons and completed her residency at the University of California in San Francisco, CA. She then completed a Hematology-Oncology fellowship at MSK. Dr. Cho's research focuses on allogeneic hematopoietic cell transplantation.

ANTHONY DANIYAN, MD

IN SEPTEMBER 2017, Anthony Daniyan joined the Leukemia Service as an Assistant Attending L1 Physician. Dr. Daniyan received his MD from University of Miami Miller School of Medicine in Miami, FL. He completed his residency in Internal Medicine at New York Presbyterian Hospital/ Weill Cornell Medical Center and completed a Fellowship in Medical Oncology at MSK. He received ASCO's Young Investigator Award and the K12 Paul Calabresi Career Development Award for Clinical Oncology at MSK. Dr. Daniyan is primarily responsible for the research and clinical inpatient care and consultation of patients on the Leukemia Service. He is also a member of MSK's Cellular Therapeutics Center, working to develop the next generation of CAR T therapy.

MARK B. GEYER, MD

IN JULY 2017, Mark Geyer joined the Leukemia Service as an Assistant Attending L1 Physician. Dr. Geyer received his MD degree from Columbia University College of Physicians and Surgeons and completed residency in internal medicine at Massachusetts General Hospital in Boston, MA. He then completed fellowship in Hematology-Oncology at MSK. Dr. Geyer has been awarded the Lymphoma Research Foundation Postdoctoral Grant and the American Society of Hematology Scholar Award. He is also a member of the Center for Cell Engineering and Cellular Therapeutics Center. His research interests include development of novel cellular therapeutics for hematologic malignancies, and optimizing ALL care for younger and older adults at all stages of disease, including incorporation of immunotherapy into contemporary treatment strategies.

AARON GOLDBERG, MD, PHD

IN JULY 2017, Aaron Goldberg joined MSK as an Assistant Attending L1 Physician on the Leukemia Service. Dr. Goldberg received his MD from Weill Cornell Medical College and his PhD from Rockefeller University. He completed his residency in Internal Medicine at Brigham and Women's Hospital and a Fellowship in Hematology-Medical Oncology at MSK in which he was awarded the ASCO Young Investigator Award. Since joining the faculty, he has received the 2017 Advancing Science through Pfizer Investigator Research Exchange (ASPIRE) Oncology/Hematology Clinical Research Award, and the 2018 ASH Fellow Scholar Award in Clinical Research. Dr. Goldberg leads multiple clinical trials evaluating new treatments designed to target acute myeloid leukemia, including combination epigenetic therapy and immunotherapy to eradicate minimal residual disease.

MALIN HULTCRANTZ, MD, PHD

IN AUGUST 2017, Malin Hultcrantz joined the Myeloma Service as an Assistant Attending L1 Physician. Dr. Hultcrantz received her MD and PhD from Karolinska Institute in Sweden. She completed her Internal Medicine Residency at the University Hospital Orebro in Sweden and completed her fellowships in Hematology and Internal Medicine at the Karolinska University Hospital and an Advanced Oncology Fellowship at MSK. Dr. Hultcrantz's clinical expertise focuses on Multiple Myeloma, Smoldering Myeloma, Monoclonal Gammopathy of Undetermined Significance (MGUS) and Related Plasma Cell Disorders. Her research is focused on genomic features of multiple myeloma and high-risk profiles for disease progression particularly in early disease stages.

SCOTT JAMES, MD, PHD

IN JULY 2017, Scott James joined the Adult BMT Service as an Assistant Attending L1 Physician. Dr. James received his MD and PhD from the University of Washington in Seattle, Washington. He completed his internal medicine residency at the University of Washington and then went on to complete a Hematology-Oncology Fellowship at MSK. Dr. James specializes in stem cell transplantation to treat hematologic malignancies. His research is focused on using genetic engineering to improve the safety and effectiveness of cellular therapies, including stem cell transplantation and adoptive T cell immunotherapy.

OSCAR LAHOUD, MD

IN JULY 2017, Oscar Lahoud joined the Division of Network Medicine Services as an Assistant Attending Physician. Dr. Lahoud received his MD from the University of Michigan Medical School and completed his residency in internal medicine and fellowship in Hematology-Oncology at Maimonides Medical Center/ Albert Einstein College of Medicine. He then went on to complete a fellowship in Bone Marrow Transplant at MSK. Dr. Lahoud specializes in treating lymphoma, leukemia and myeloma, as well as blood and marrow stem cell transplantation patients. He sees patients at MSK-Manhattan, MSK-Rockville Centre, and MSK-Commack.

IOANNIS POLITIKOS, MD

IN SEPTEMBER 2017, Ioannis Politikos joined the Adult BMT Service as an Instructor. Dr. Politikos received his MD from the University of Athens Medical School in Athens, Greece and completed an Internal Medicine Internship and Residency at Mount Auburn Hospital in Boston, MA. He then completed a Hematology-Oncology Fellowship at Beth Israel Deaconess Medical Center in Boston, MA followed by an Adult BMT Fellowship at MSK. Dr. Politikos's clinical and research interests are focused on the use of cord blood as an alternative stem cell source for people who need an allogenic transplant but don't have a suitable donor.

MICHAEL SCORDO, MD

IN AUGUST 2017, Michael Scordo joined the Adult BMT Service as an Assistant Attending L1 Physician. Dr. Scordo received his MD from Rutgers New Jersey Medical School and completed his residency in Internal Medicine at New York-Presbyterian Weill Cornell Medical Center in New York, NY. He then completed a Medical Oncology-Hematology Fellowship at Memorial Sloan Kettering Cancer Center. Dr. Scordo's clinical research focuses on introducing novel approaches to help reduce the side effects and toxicity associated with hematopoietic cell transplantation. In the clinic, he focuses on the treatment of patients with multiple myeloma and lymphoma undergoing hematopoietic cell transplantation.

JUSTIN TAYLOR, MD

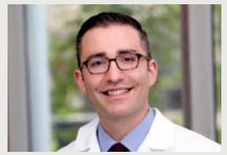
IN SEPTEMBER 2017, Justin Taylor joined the Leukemia Service as an Instructor. Dr. Taylor received his MD from the University of New Mexico and completed his residency in Internal Medicine at Brigham and Women's Hospital of Harvard Medical School. He then went on to complete his Fellowship in Medical Oncology at MSK. His research focuses on discovering how mutations that occur in MDS, chronic lymphocytic leukemia, hairy cell leukemia and other hematologic malignancies contribute to disease development and progression and whether these mutations can be targeted with novel therapeutic agents. His research helped to define new mutations in hairy cell leukemia, the role of nuclear export mutations in CLL and a novel spliceosome inhibitor for splicing factor mutant MDS.

SANTOSHA VARDHANA, MD, PHD

IN JULY 2017, Santosha Vardhana joined MSK as an Instructor in the Lymphoma Service. Dr. Vardhana received his MD and PhD from New York University School of Medicine. He completed his residency in Internal Medicine at New York-Presbyterian Hospital/Weill Cornell Medical Center and completed a Medical Oncology Fellowship at MSK. During his fellowship at MSK, Dr. Vardhana was awarded an ASCO Young Investigator Award, an AACR Fellowship in Lymphoma Research, and was named a Parker Institute for Cancer Immunotherapy Parker Fellow. Dr. Vardhana specializes in treating and researching Hodgkin and non-Hodgkin lymphomas. His research focuses on manipulating cellular metabolism to improve anti-tumor immune responses. ■


Oscar Lahoud


Ioannis Politikos


Michael Scordo


Justin Taylor


Santosha Vardhana

2017 PROMOTIONS


Omar Abdel-Wahab


Parastoo Dahi


Andrew Intlekofer


Heather Landau

OMAR ABDEL-WAHAB, MD

DR. OMAR ABDEL-WAHAB was promoted to the rank of Associate Member at MSK, Associate Attending Physician on the Leukemia Service in the Department of Medicine, Associate Member in the Human Oncology and Pathogenesis Program (HOPP), and Associate Professor of Medicine at the Weill Cornell Medical College. Dr. Abdel-Wahab completed his MD at Duke University School of Medicine and his internship and residency in Internal Medicine at Massachusetts General Hospital. He first joined MSK in 2007 as a Hematology/Oncology fellow, and was appointed as a faculty member on the Leukemia Service in 2010. In addition, he was appointed as an Assistant Member in HOPP in 2012, where he directs a research lab and Assistant Professor of Medicine at Weill Cornell Medical College in 2013. Dr. Abdel-Wahab's research focuses have been in the areas of molecular genetics in both common and uncommon myeloid and lymphoid malignancies, which has contributed to our understanding of the fundamental biology of disease and directly translated to novel therapeutic approaches. In addition to being a rising star in the field of Hematologic Malignancies, Dr. Abdel-Wahab is also an exceptional mentor and serves as a co-director of the Hematologic/Medical Oncology fellowship program at MSK.

PARASTOO DAHI, MD

DR. PARASTOO DAHI was promoted to the rank of Assistant Member at MSK, Assistant Attending Physician in the Adult BMT Service in the Department of Medicine, and Assistant Professor of Medicine at Weill Cornell Medical College. Dr. Dahi received her MD from Azard University School of Medicine in Tehran, Iran, and completed her internship and residency in Internal Medicine in 2008, followed by fellowship in Hematology & Medical Oncology in 2011 at the SUNY Downstate Medical Center. In 2011, she joined MSK as an advanced fellow in Bone Marrow Transplantation (BMT), and completed her Adult BMT fellowship in 2013. Dr. Dahi joined the Adult BMT Service Faculty as an Assistant Member Level 1 in 2013. Dr. Dahi's research focus is the development of preventive strategies that could result in improved quality of life by understanding the biology of early and late toxicities of ASCT in older Lymphoma patients. She seeks to investigate clinical and biologic markers for predicting toxicities in this population which will allow for better identification of patients that are at risk for excessive toxicity and provide the opportunity to therapeutically target these processes to help improve the treatment tolerability in older patients. She also became a certified inspector for the Foundation of Accreditation for Cellular Therapies (FACT), and has conducted at least 3 independent national inspections. She was appointed to Lead MSK FACT Taskforce in 2017.

ANDREW INTLEKOFER, MD, PHD

DR. ANDREW INTLEKOFER was promoted to the rank of Assistant Member at MSK, Assistant Attending Physician on the Lymphoma Service in the Department of Medicine, Assistant Member in the Human Oncology and Pathogenesis Program (HOPP) and Assistant Professor of Medicine at Weill Cornell Medical College. He received his MD/PhD from the University of Pennsylvania School of Medicine and completed his internal medicine residency at New York-Presbyterian Hospital/Weill Cornell Medical College. Dr. Intlekofer began his fellowship in Medical Oncology at MSK in 2011 and joined the Lymphoma Service as an Assistant Attending L1 Physician in 2015. Dr. Intlekofer conducted postdoctoral research training in the laboratory of Dr. Craig Thompson. The Intlekofer lab investigates how cellular metabolic pathways regulate the differentiation and function of normal stem cells, immune cells, and cancer cells, with the goal of therapeutically targeting metabolic machinery as a strategy to improve stem cell function, boost immune responses, or inhibit cancer cell growth. Dr. Intlekofer's clinical research focuses on identifying genetic abnormalities that cause lymphoma and translating that knowledge to improve care for people with lymphoma.

HEATHER LANDAU, MD

DR. HEATHER LANDAU was promoted to the rank of Associate Member at MSK, Associate Attending Physician on the Adult BMT Service in the Department of Medicine and Associate Professor of Medicine at Weill Cornell Medical College. She received her BS from Duke University and her MD degree from Upstate Medical University. Dr. Landau then completed her internship and residency in Internal Medicine at the University of Colorado Health Sciences Center. She started a Hematology/Oncology fellowship at MSK in 2004, joined the Adult BMT Service faculty as an Assistant Member L1 in 2007, and was promoted to the rank of Assistant Member in 2011. Dr. Landau has grown into an independent clinical researcher and international expert in plasma cell disorders, including multiple myeloma and light chain (AL) amyloidosis. She leads two investigator initiated multicenter trials using Ixazomib for upfront treatment of Amyloidosis and maintenance in high risk patients, and has designed a phase 1 trial to study the CD38 antibody daratumumab in combination with a novel anti-amyloid antibody. She is studying novel conditioning regimens, including pharmacokinetic (PK) directed dosing of melphalan prior to autologous stem cell transplant. Dr. Landau has helped develop the Outpatient Transplant program at MSK and is piloting a Homebound Transplant program. She not only leads the Amyloidosis Multidisciplinary Group at MSK but is also a founding member of the Amyloidosis Research Consortium Collaborative Network and member of the Board of Directors of the Amyloid Foundation.

BRIAN SHAFFER, MD

DR. BRIAN SHAFFER was promoted to the rank of Assistant Member at MSK, Assistant Attending Physician in the Adult BMT Service at Memorial Hospital and Assistant Professor of Medicine at Weill Cornell Medical College. Dr. Shaffer was recruited to MSKCC from the National Institute of Health, where he completed his fellowship in Hematology and Oncology in 2013. Dr. Shaffer is an outstanding clinical scientist with a growing practice focused on mismatched related (haplo-identical) hematopoietic cell transplantation, in addition to assisting Dr. Katherine Hsu in translating her NK cell and killer Ig-like receptor (KIR) immunogenetics discoveries from the lab into the clinic. His research in Dr. Hsu's lab explores the role of donor KIR in defining outcomes after HLA haploidentical allogenic transplantation and has a multicenter study examining the prospective use of KIR in the selection of unrelated donors for patients undergoing transplantation for acute myelogenous leukemia. In addition, Dr. Shaffer is also an active member of our Clinical Council, Infectious Disease Working Group, and Donor Selection Committee.

MELODY SMITH, MD

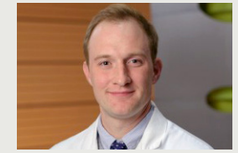
DR. MELODY SMITH was promoted to the rank of Assistant Member L1 at MSK, Assistant Attending Physician on the Adult BMT Service in the Department of Medicine and Instructor of Medicine at Weill Cornell Medical College. After receiving her MD degree with Distinction in Research from the University of Texas Southwestern Medical School in Dallas, she completed an internship and residency in Internal Medicine at the University Texas Southwestern. She joined MSK as a Medical Oncology/Hematology Fellow in 2012 and was appointed to an Instructor faculty position on the Adult BMT Service in 2015. Dr. Smith is actively involved in translational studies, primarily in the areas of cellular immunotherapy and post-transplant immune reconstitution. While working in the laboratories of Drs. Marcel van den Brink and Michel Sadelain, Melody uncovered the mechanism for the unexpected but positive finding that donor CD19 CAR T cells provide potent graft versus tumor (GVT) activity while reducing graft versus host disease (GVHD) when they are given following an allogeneic cell transplant (allo-HCT). Her preclinical work provided the clinical basis for the development of a Phase I clinical study in which patients with relapsed or refractory CD19-expressing hematologic malignancies will receive a consolidative dose of donor-derived, allogeneic CD19 CAR T cells following a T cell depleted allo-HCT in an effort to prevent relapse of disease. Dr. Smith is part of the founding class of cellular therapists developing expertise in gene modified T cells both within and outside the high-dose chemotherapy field.

RONI TAMARI, MD

DR. RONI TAMARI was promoted to the rank of Assistant Member at MSK, Assistant Attending Physician on the Adult BMT Service in the Department of Medicine and Assistant Professor of Medicine at the Weill Cornell Medical College. Originally from Israel, she completed her Internal Medicine training at Jacobi Medical Center and Hematology and Oncology fellowship at Montefiore Medical Center. Dr. Tamari began her academic career as an Assistant Member L1 at MSK immediately after completing her BMT Fellowship here in July 2013. Since then she has developed into an independent clinical researcher, and is recognized as a national figure in transplant for MDS and myelofibrosis. In addition, she is a collaborator on a large retrospective comparative analysis of CD34 selection allogenic stem cell transplant versus unmodified transplant, demonstrating superior chronic graft vs host disease free survival for patients receiving the CD34 selected graft. Dr. Tamari is also involved with clinical research outside of MSK, through activities with the Center of International Blood and Marrow Transplant Research (CIBMTR).

AARON VINY, MD, MS

DR. AARON VINY was promoted to the rank of Assistant Member L1 at MSK, Assistant Attending Physician on the Leukemia Service in the Department of Medicine, and Instructor at Weill Cornell Medical College. Dr. Viny received his MD/MS Master's in Biomedical Investigation from the Cleveland Clinic Lerner College of Medicine. He then completed residency training at the New York-Presbyterian Hospital/Weill Cornell Medical Center and fellowship in Hematology and Oncology at MSK where he was chief fellow. He was a postdoctoral fellow in the lab of Dr. Ross Levine and was recruited to the Leukemia Service as an Instructor-level physician. His research, funded by a postdoctoral fellowship from the Damon Runyon Cancer Research Foundation, focuses on the characterization of cohesin mutations which have been associated with poor survival in patients with myeloid malignancies, particularly in acute myeloid leukemia and myelodysplastic syndromes. Dr. Viny has distinguished himself as a young investigator with important discoveries and contributions to the field of myeloid malignancies. His special interests in bone marrow failure and myeloid neoplasms aim to translate epigenetic insights into novel treatment approaches. ■


Brian Shaffer


Melody Smith

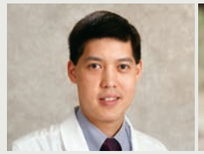

Roni Tamari

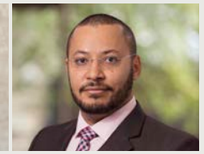

Aaron Viny

2017 AWARDS & RECOGNITION


Omar Abdel-Wahab


Connie Batlevi


Stephen Chung


Anthony Daniyan


Mark Geyer


Aaron Goldberg


Paul Hamlin


Alan Hanash


Katharine Hsu


Andrew Intlekofer


Scott James


Ola Landgren


Nikoletta Lendvai


Alexander Lesokhin

Not pictured: Andrew Dunbar

The following faculty members received the **Steven Greenberg Lymphoma Research Awards**:

Dr. Connie Batlevi (2017), **Dr. Andrew Intlekofer** (2017), **Dr. Hans-Guido Wendel** (2017), **Dr. Lia Palomba** (2017)

The following faculty members received the **Sawiris Foundation Myeloma and Transplant Research Awards**:

Dr. Gunjan Shah (2017), **Dr. Jonathan Peled** (2017), **Dr. Nikoletta Lendvai** (2017), **Dr. Alexander Lesokhin** (2017)

The following MSK faculty members and fellows in our Division received the **ASCO Young Investigator Awards**:

- **Dr. Anthony Daniyan:** *"The Development of a Genetically Engineered Dendritic Cell-based Immunotherapy Platform for the Treatment of Chronic Lymphocytic Leukemia"*
- **Dr. Aaron Goldberg:** *"Development of combination epigenetic therapy and immunotherapy as a novel therapeutic modality to eradicate minimal residual disease in acute myeloid leukemia"*
- **Dr. Justin Taylor:** *"Spliceosomal Modulation in the Therapy of Spliceosomal Mutant Myeloid Neoplasia"*
- **Dr. Andrew Dunbar:** *"Role of concurrent ASXL1 and JAK2 mutations in myeloproliferative neoplasms (MPN)"*

BMT

Dr. Alan Hanash received the NIH R01 (N006069601) for his project *"In Vivo Prevention of Murine GVHD."*

Dr. Katharine Hsu received the below grant awards in 2017:

- Leukemia and Lymphoma Society Career Development Award for her project, *"Ensuring AML eradication in HLA-matched allogeneic stem cell transplantation by harnessing donor natural killer cell activity."*
- Technology Development Fund award for her project, *"Anti-KIR3DL1 Blocking Antibodies for the Enhancement of Innate Immune Effects Against Malignancy."*

Dr. Jonathan Peled received the below grant awards in 2017:

- Parker Institute for Cancer Immunotherapy Career Development Award for his project "Microbiota biomarkers & mechanisms of gastrointestinal inflammation: GVHD and checkpoint-blockade colitis"
- Parker Institute for Cancer Immunotherapy Pilot Grant Award for his project "Investigation of immunoglobulin A coating intestinal bacteria in multiple myeloma."

Dr. Doris Ponce's project, *"Restoring Gastrointestinal Damage Caused by Acute Graft-Versus-Host Disease,"* was awarded funds under the New York State Empire Clinical Research Investigator Program.

Dr. Melody Smith received the below grant awards in 2017:

- Physician-Scientist Training Award from the Damon Runyon Cancer Research Foundation for her project *"Physician-Scientist Training Award: CD19 targeted donor T cells improve graft versus tumor activity and reduce graft versus host disease."*
- Burroughs Wellcome Fund Postdoctoral Enrichment Program Award

Dr. Melody Smith and **Dr. Scott James** were awarded the Parker Institute for Cancer Immunotherapy Pilot Grant Award for their project *"Induction of tissue-specific tolerance to inhibit graft vs. host responses while retaining graft vs. malignancy using synthetic biology approach."*

Dr. Scott James was the recipient of the Parker Institute for Cancer Immunotherapy Bridge Scholars Award for his project,*"Chimeric antigen receptors to enhance graft vs. malignancy activity, while inhibiting graft vs. host disease".*

HEMATOLOGY

Dr. Jodi Mones received the MSK Hematology Teaching Attending of the Year Award in 2017.

LEUKEMIA

Dr. Omar Abdel-Wahab was elected to the American Society for Clinical Investigation and was awarded the American Society for Clinical Investigation's Seldin-Smith Award for Pioneering Research.

Dr. Stephen Chung received the following awards in 2017:

- 2017 Paul Sherlock Housestaff Teaching Award
- Dresner Foundation Early Career Award in MDS Research for his project "The goals of this project are to characterize MDS hematopoietic stem cells in the post-allogeneic bone marrow transplant setting to identify biomarkers of disease relapse and candidate therapeutic targets."
- NIH/NCI K08 award for his project "Characterization of CD99 as a Therapeutic Target in the Myelodysplastic Syndromes and Acute Myeloid Leukemia."

Dr. Mark Geyer was awarded the Lymphoma Research Foundation Postdoctoral Fellowship Award for his project "Project: CD19-targeted CAR T-cells engineered to secrete IL-12 for relapsed or refractory CLL and B-cell NHL."

Dr. Ross Levine received Outstanding Investigator Awards from the National Cancer Institute and was elected to the Association of American Physicians and gave a new member talk as part of the induction ceremony.

Dr. Jae Park received the following grant awards in 2017:

- Leukemia and Lymphoma Society Translational Research Program Award for his project *"Chemotherapy-Free Targeted Therapeutic Approaches for New and Relapsed Hairy Cell Leukemia".*
- MSK Technology Development Fund Award for his project *"Novel IL-18 Secreting Chimeric Antigen Receptor (CAR) T-cell Therapy for the Treatment for Acute Lymphoblastic Leukemia".*

LYMPHOMA

Dr. Paul Hamlin was appointed as the Medical Director for the David H. Koch Center for Cancer Care. In this capacity, he will oversee planning activities and provide strategic and operational medical staff leadership for the facility after it opens in 2019.

Dr. Matthew Matasar received the Leukemia and Lymphoma Society Dr. John J. Kenny Award and was appointed as the Chief at Bergen Medical Oncology Services, Division of Network Medicine Services. Dr. Matasar has established a reputation as a superb clinician and excellent investigator specializing in the treatment of patients with Hodgkin and non-Hodgkin lymphoma.

Dr. Craig Moskowitz received the 2017 MSK's Junior Faculty Council's Excellence in Mentor Award.

Dr. Santosha Vardhana received the Parker Institute for Cancer Immunotherapy Fellow Award for his project *"Metabolic suppression of anti-tumor responses as a novel immune checkpoint in cancer."*

Dr. Anas Younes and Lou Staudt (NIH) were awarded the NIH Moonshot Program: Development of Precision Medicine for DLBCL Award for their project "Divide and Conquer Combination (DiCoCo) Master Trial in Lymphoma."

MYELOMA

Dr. Ola Landgren is the recipient of a Perelman Family Foundation and the Multiple Myeloma Research Foundation award for his project, "Molecular characterization of early myeloma and minimal residual disease."

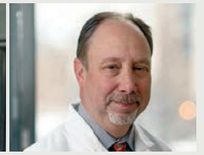
Dr. Eric Smith received the below awards in 2017:

- ASH Scholar Clinical Research Fellow Award for his project *"Investigating CAR T-cell therapy for multiple myeloma in patients and patient derived xenografts."*
- Leukemia and Lymphoma Society Special Fellow/Career Development Award for his project *"Optimizing CAR T cell therapy for Multiple Myeloma".* His project seeks to advance our understanding of how CAR T cell biology and function can be influenced by the myeloma microenvironment in lab models and patients, as well as lead to the development and pre-clinical evaluation of rational next generation CAR constructs with enhanced efficacy for relapsed myeloma patients. ■


Ross Levine


Jodi Mones


Matthew Matasar


Craig Moskowitz


Lia Palomba


Jae Park


Jonathan Peled


Doris Ponce


Gunjan Shah


Eric Smith


Melody Smith


Justin Taylor


Santosha Vardhana


Hans-Guido Wendel


Anas Younes

FRED'S TEAM

PARTICIPANTS FROM THE DIVISION INCLUDE (CLOCKWISE FROM TOP LEFT):
Stephen Chung
Michael Mauro
Marcel van den Brink

FRED'S TEAM, named after a running legend Fred Lebow, is Memorial Sloan Kettering Cancer Center's (MSK) athletic fundraising program dedicated to bringing us closer to a world without cancer. By competing in marathons, half-marathons, triathlons, cycling races, and other endurance events worldwide, Fred's team participants fundraise to further MSK's pioneering research and support the Aubrey Fund for Pediatric Cancer Research.

Over 875 Fred's Team members took part in the 47th New York City Marathon on November 5th, 2017, and raised over $5.2 million dollars. In total, over $75 million has been raised since 1995.

There are 50 areas of cancer research supported by Fred's Team. ■

For more information, please visit:
www.fredsteam.org

MEMORIAL SLOAN KETTERING CANCER CENTER
FRED'S TEAM
IMAGINE A WORLD WITHOUT CANCER

SWIM ACROSS AMERICA

SWIM ACROSS AMERICA
MAKING WAVES TO FIGHT CANCER

LEFT: Several teams from this year's event, including Team Transplant
RIGHT: Jedd Wolchok at 2017 Swim Across America Event

SWIM ACROSS AMERICA (SAA) was established in 1987 by cancer survivor Jeff Keith and his childhood friend Matt Vossler, two former Run Across America participants who transitioned from running to swimming for a cure. Since the first fundraiser was held in Nantucket, Massachusetts, SAA has raised over $70 million to fund cancer research and clinical trials at world-renowned research institutes and organizations.

One of its major research beneficiaries is MSK, which has received $7 million in support of research that has led to historic breakthroughs in the burgeoning field of immunotherapy and cancer. Today, over 5,000 recreational swimmers, master swimmers, and even kayakers and boaters participate in 15 experiential open water swimming fundraising events and over 100 pool swim fundraisers.

Dr. James Young, Attending Physician on the Adult Bone Marrow Transplantation (BMT) Service and avid distance swimmer, began swimming the Long Island Sound Open Swim in 2006. The Long Island Sound chapter was founded in 1992 and has grown to be the largest in the organization.

MSK's **Team Transplant** was founded in 2009 at the suggestion of Dr. Young's patient, a fellow swimmer who had undergone an allogeneic transplant for acute leukemia. The funds raised by Team Transplant support MSK's Adult BMT program. In July 2017, **Team Transplant** participated in its ninth consecutive swim at the SAA Long Island Sound Open Swim for the 30th year anniversary of Swim Across America and raised nearly $20,000. In 2017, Swim Across America raised over $1.1 million.

Since 2009, Team Transplant has raised over $200,000 for much needed support of the research efforts that ensure the successful use of transplantation to cure patients with leukemia, lymphoma, multiple myeloma, and other cancers of the blood and bone marrow. ■

Swim Across America's webpage:
www.swimacrossamerica.org

Team Transplant's webpage:
www.swimacrossamerica.org/site/TR/OpenWater/LongIslandSound?pg=team&fr_id=4754&team_id=19779

CYCLE FOR SURVIVAL

LEFT TO RIGHT: Founder Dave Linn and Miguel Perales; Virginia Klimek, Ross Levine and his wife Erica Pollack Levine

MEMORIAL SLOAN KETTERING'S Cycle for Survival is a high-energy indoor team cycling event that allows participants to fight rare cancers in a tangible way.

Cycle for Survival is determined to beat rare cancers by powering groundbreaking research to help patients who often have few or no options. With support from our founding partner, Equinox, Cycle for Survival had its biggest fundraising year so far in 2017. Raising $34 million this year—and more than $160 million during our first eleven years—was only possible because of our dedicated community of riders, supporters, patients, researchers, and doctors.

Over 31,000 people across 16 cities participated in 2017. Within six months of the annual events, all money raised goes directly to lifesaving research. Every dollar empowers researchers to pursue revolutionary ideas that lead to lifesaving breakthroughs. We are proud to support the advancement of several comprehensive initiatives at MSK, which span across many critical areas of research. MSK is on the front line of the battle against rare cancers. ■

CYCLE FOR SURVIVAL
MEMORIAL SLOAN KETTERING | EQUINOX

PARTICIPANTS FROM THE DIVISION INCLUDE:

BSK Med Onc Riders
Randi Ackerman
Janice Berliner
Abigail Go
Anthony Greene
Kellee Greene
Paul Hamlin
Michelle Martinez
Jennifer Tota

Dean's Cell Cyclers
Rajiv Agarwal
Allison Betof
Imane El Dika
Mark Geyer
Malin Hultcrantz
Natash Kamal
Vicky Lai
Deaglan McHugh
Kamal Menghrajani
Matt Pianko
Joshua Sabari
Fernando Santini
Ali Schram
Jessie Tao
Neil Vasan

Leukemia2017
Margaret Buff
Isabella Cazacu
Alan Dubbs
Debbie Dubbs
Ashley Foster
Tawni Goodman
Adam Kurnick
Casey Konys
Rivky Litvin
Michael Mauro
Janine Morice
Oby Nwankwo-Otti
Jessica Schulman
Adrienne Spears
Anna Trakhtenberg
Kira Yasuda
Yasaman Zarbafian

PMBL Pulverizers
Jessica Ardizzone
Katherine Cherry
Christina Dominguez
Flavia Geada
Rene Geada
Missy Kvitko
Amanda Lewis
Deborah Lynn
Diane Meier
Sean Morrison
Craig Moskowitz
Danielle Moskowitz
Robin Moskowitz
Jaclyn Rahmlow
Cristina Savasta
Nick Savasta
Edith Schussler
Megan Tenet

Sarcoma Cyclopaths
Jason Barriuso
Tim Barz
Timothy Bowler
Ellie Cangialosi
Mercedes Condy
Sandra D'Angelo
Reena Dholakia
Theresa Gold
Victoria Gross
Jessie Holland
Michael Jordan
Holly Koo
Sue Lee
Li Liang
Katherine McCarthy
Chloe McFadyen
Ashley Motta
Amanda Mouzakes
Lee Schneider
Kaylin Terhune
Heather Ugolini
Taylor Vonya
Anthony Zarski

T-cell Racers
Heather Coggins
Steven Horwitz
Nadia Kralovic
Stephen Randolph
Janelle Walkley

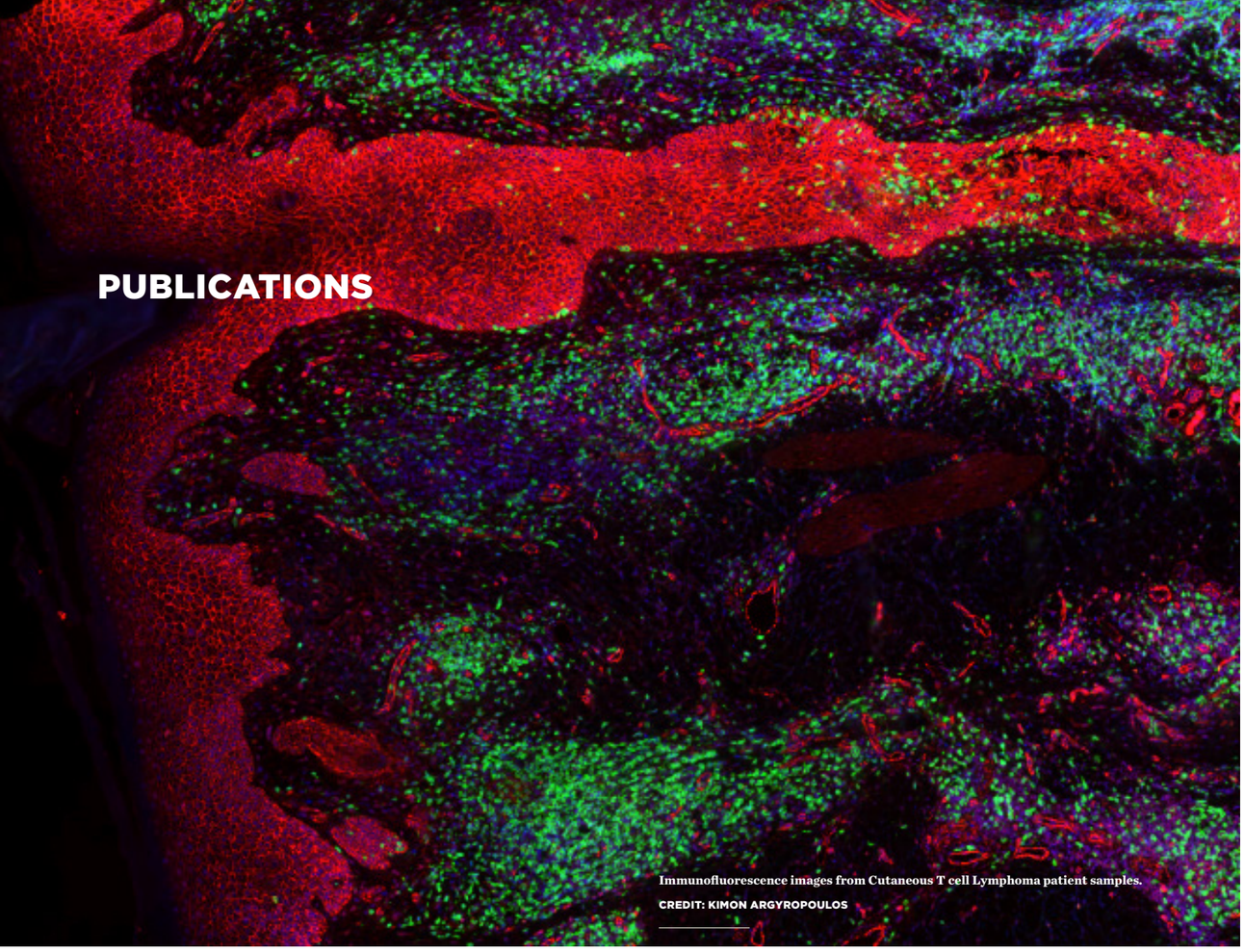
Team HOPP
Liz Adams
Mary Ann Donnarumma
Jane Barnet
Jose Baselga
Silvia Baselga
Alexis Bodenheimer
Sarat Chandarlapaty
Bryan Chuck
Kelli Cocuzza
Farzeen Correia
Emily Delgado
Dominique Donnarumma
Juliet Dunn
Daniel Fabian
Sarah Fabian
Lee Fine
Dylan Freedman
Joel Freedman
Sharon Freedman
Denise Freiberg
Jay Freiberg
Julie Gamboa
Amy Goldstein
Neil Goldstein
Danielle Hanley
Emma Hatton
Zachary Heins
Nicole Hill
Jessie Hillsberg
Peggy Holian
Jillian Horowitz
Matt Horowitz
David Hyman
Gopakumar Iyer
Wouter Karthaus
Laura Krug
Lee Krug
Eugine Lee
Tullia Lindsten
Karen Lu
Monica Machado
Liz Mann
Phil Mann
Debra Mesnick
Jason Meyers
Lindsay Meyers
Daniella Mira
Ping Mu
Liam Murtagh
Lisa Newman
Zachary Newman
Angelica Ochoa
Sumie Okazaki
Christie Park
Naomi Press
Franck Rapaport
Jen Resnick
Zack Resnick
Craig Richardson
Philip Ross
Charles Sawyers
Sam Sawyers
Sophie Sawyers
Susan Sawyers
Carrie Schein
Jeremy Schein
Garner Smythe
Paul Snitzer
Barbara Solit
David Solit
Juliet Solit
Richard Solit
Margaret Sung
Craig Thompson
Kajsa Thompson
Bill Wagner
David Wise
Venkata Yellapantula
Zeda Zhang
Bobby Zimmer
Jamie Zimmer
Jessica Zimmer
Kathy Zimmer

Team HOPP – Long Island
Beth Freifeld
Douglas Jaffe
Marisa Jaffe
Craig Kandel
Elisa Kandel
Julia Kandel
Lara Kandel
Marcy Kandel
Erica Levine
Ross Levine

Team HOPP Kreb's Cycle
Elsa Bernard
Sheng Cai
Yanyang Chen
Andrew Dunbar
Chris Famulare
Jacob Glass
Corinne Hill
Kristina Knapp Jack
Richard Koche
Erica Levine
Ross Levine
Matahi Moarii
Minal Patel
Irene Phillip
Franck Rapaport
Shira Redlich
Young Rock Chung
Craig Thompson
Kajsa Thompson
Santosha Vardhana
Aaron Viny
Dagmar Walter
Nancy Wishmeier
Brittany Woods
Teja Yellapantula
Sara Zarnegar

The Mobilizers
Antara Afrin
Alyssa Avallon
Sara Bekele
Catherine Bender
Valkal Bhatt
Taylor Borrill
Kristina Caban
Stephanie Chinapen
Samira Fatmi
Alexandra Jacob
Priscila Laforet
Shelley Levi
Christopher Mazis
Gillian Moore
Christina Muggeo
Kristine Naputo
Kanish Patel
Emily Patterson
Miguel Perales
Ioannis Politikos
Elaina Preston
Whitney Quitta
Jarrell Robinson
Craig Sauter
Megan Solberg
Christoph Stein-Thoeringer
Christian Uruburo

The Nutcrackers
Sebastian Abbot
Nicky Agate
Garett Awad
Hilary Awad
Tom Berenberg
Matt Dellinger
Jay Erickson
Darren Feldman
Brooke Grove
Julia Holmes
Jeni Howe
Jonathan Howe
Rachel Kaplan
Monica Klug
Benjamin Levine
Paul Marcazzo
Richard Nisa
Debra Pedrow
Katie Rose Hillegass
Page Sargisson
Gina Skarka
Joy Skarka
Kevin Skarka
Luisa Skarka
Zachary Skarka
Jason Valdina
James Vanek



PUBLICATIONS

Immunofluorescence images from Cutaneous T cell Lymphoma patient samples.

CREDIT: KIMON ARGYROPOULOS

These are a few peer-reviewed publications selected from the 269 total articles published by the Hematologic Oncology faculty in 2017 and early 2018.

BMT

- **Donor CD19 CAR T cells exert potent graft-versus-lymphoma activity with diminished graft-versus-host activity.**

  Ghosh A, Smith M, James SE, Davila ML, Velardi E, Argyropoulos KV, Gunset G, Perna F, Kreines FM, Levy ER, Lieberman S, Jay HV, Tuckett AZ, Zakrzewski JL, Tan L, Young LF, Takvorian K, Dudakov JA, Janq RR, Hanash AM, Motta ACF, Murphy GF, Liu C, Schietinger A, Sadelain M, van den Brink MRM.

  Nature Medicine. 2017. 23(2):242-249. (commentary in Nature Medicine 2017; 23(2):147-148.) PMID: 28067900; PMC5528161

  Bone marrow transplant (BMT), a treatment in which a patient's cancerous cells are replaced with healthy cells from another person, can help people with blood cancers who haven't responded to other treatments. Unfortunately, there are risks involved including graft versus host disease (GVHD), which can occur if the newly transplanted cells attack the donor tissue as "foreign". MSK scientists have recently discovered that the administration of donor T cells engineered to express a CD19 chimeric antigen receptor (CAR) can help prevent this dangerous condition while also eradicating tumor. The mechanism for this finding is that the CD19 CAR T cells become overly activated and exhausted resulting in the death of the cells that would see the donor as "foreign" and thereby cause GVHD.

- **Impact of Toxicity on Survival for Older Adult Patients after CD34+ Selected Allogeneic Hematopoietic Stem Cell Transplantation.**

  Shah GL, Scordo M, Kosuri S, Adrianzen Herrera D, Cho C, Maloy M, Nieves JL, Devlin S, Borill T, Carlow D, Avecilla ST, Meagher R, O'Reilly R, Koehne G, Shaffer B, Perales MA, Gyurkocza B, Castro-Malaspina H, Giralt SA, Tamari R.

  Biol Blood Marrow Transplant. 2017 Sep 22. pii: S1083-8791(17)30711-5. doi: 10.1016/j.bbmt.2017.08.040. [Epub ahead of print]. PMID: 28951193

  In this study, we compared the toxicities seen after a CD34+ selected donor stem cell transplant and compared them between older and younger patients. We found that certain toxicities in the older patients predicted for worse outcomes, but that overall the side effects of the more intense chemotherapy regimen may be balanced out by patients not having toxicities related to graft verus host disease prevention medicines.

- **Ex vivo CD34 selected T-cell depleted peripheral blood stem cell grafts for allogeneic stem cell transplantation in acute leukemia and myelodysplastic syndrome is associated with low incidence of acute and chronic graft-versus-host disease and high treatment response.**

  Barba P, Hilden P, Devlin SM, Maloy M, Dierov D, Nieves J, Garrett MD, Sogani J, Cho C, Barker JN, Kernan NA, Castro-Malaspina H, Jakubowski AA, Koehne G, Papadopoulos EB, Prockop S, Sauter C, Tamari R, van den Brink MR, Avecilla ST, Meagher R, O'Reilly RJ, Goldberg JD, Young JW, Giralt S, Perales MA, Ponce DM.

  Biol Blood Marrow Transplant. 2017;23(3):452-458. PMID: 28017734.

  Ex vivo CD34 selected T-cell depleted allogeneic stem cell transplantation has been historically associated with less incidence of a complication know as graft-versus-host disease (donor cells attacking the recipients' body). However, this complication has not been fully characterized. In this study, we evaluated patients with acute leukemia and myelodysplastic syndrome who received an ex-vivo CD34 selected T-cell depleted transplant at Memorial Sloan Kettering Center and found that there is a low risk of both acute and chronic graft-versus-host disease and in patients who developed graft-versus-host disease, the treatment response was high, particularly if occurred before the initial 100 days after transplant. These results are encouraging and supports the use of ex vivo CD34 selected stem cell grafts.

- **Intestinal microbiota and relapse after hematopoietic-cell transplantation.**

  Peled JU, Devlin SM, Staffas A, Lumish M, Khanin R, Littmann ER, Ling L, Kosuri S, Maloy M, Slingerland JB, Ahr KF, Porosnicu Rodriguez KA, Shono Y, Slingerland AE, Docampo MD, Sung AD, Weber D, Alousi AM, Gyurkocza B, Ponce DM, Barker JN, Perales MA, Giralt SA, Taur Y, Pamer EG, Jenq RR, van den Brink MRM.

  J Clin Oncol. 2017;35(15):1650-1659. PMID: 28296584.

  Predicting whether cancer will relapse after a bone-marrow transplant is notoriously difficult. This study suggests that certain bacteria residing within the gut are associated with a lower risk of relapse. Ongoing work seeks to understand whether these bacteria are helping the immune system fight cancer.

- **Updated analysis of CALGB (Alliance) 100104 assessing lenalidomide versus placebo maintenance after single autologous stem-cell transplantation for multiple myeloma: a randomized, double-blind, phase 3 trial.**

  Holstein SA, Jung SH, Richardson PG, Hofmeister CC, Hurd DD, Hassoun H, Giralt S, Stadtmauer EA, Weisdorf DJ, Vij R, Moreb JS, Callander NS, van Besien K, Gentile TG, Isola L, Maziarz RT, Bashey A, Landau H, Martin T, Qazilbash MH, Rodriguez C, McClune B, Schlossman RL, Smith SE, Hars V, Owzar K, Jiang C, Boyd M, Schultz C, Wilson M, Hari P, Pasquini MC, Horowitz MM, Shea TC, Devine SM, Linker C, Anderson KC, McCarthy PL.

  Lancet Haematol. 2017 Sep;4(9):e431-e442. doi: 10.1016/S2352-3026(17)30140-0. Epub 2017 Aug 17

  This practice changing study which MSKCC participated in as one of the largest contributors now has more than 5 years follow up and confirms the benefit of lenalidomide maintenance.

HEMATOLOGY

- **Outcomes after inferior vena cava filter placement in cancer patients diagnosed with pulmonary embolism: risk for recurrent venous thromboembolism.**

  Coombs C, Kuk D, Devlin S, Siegelbaum RH, Durack JC, Parameswaran R, Mantha S, Deng K, Soff G.

  J Thromb Thrombolysis. 2017 Nov;44(4):489-493. PMID: 28993967

  There has been a knowledge gap about the safety and efficacy of the IVC filters in cancer patients. This report analyzed the MSKCC experience and clarifies the extent of benefit and risk for IVC filters in our population.

- **Treatment of central venous catheter-associated deep venous thrombosis in cancer patients with rivaroxaban.**

  Laube ES, Mantha S, Samedy P, Wills J, Harnicar S, Soff GA.

  Am J Hematol. 2017 Jan;92(1):E9-E10. PMID: 27766659 PMCID: PMC5213126

  This report was the first to demonstrate that rivaroxaban may be used effectively for central line associated thrombosis, with an excellent rate of resolution of the symptoms of thrombosis as well as central line preservation.

- **Enoxaparin Dose Reduction for Thrombocytopenia in Patients with Cancer: A Quality Assessment Study.**

  Mantha S, Miao Y, Wills J, Parameswaran R, Soff GA.

  J Thromb Thrombolysis. 2017 May;43(4):514-518.

  In this study, we performed a retrospective assessment of the safety and efficacy of a simple enoxaparin dose-adjustment algorithm for patients with thrombocytopenia. Outcomes were satisfactory and we still use this dosing method in everyday clinical practice.

- **Rivaroxaban for Stroke Prevention in Patients With Nonvalvular Atrial Fibrillation and Active Cancer.**

  Laube ES, Yu A, Gupta D, Miao Y, Samedy P, Wills J, Harnicar S, Soff GA, Mantha S.

  Am J Cardiol. 2017 Jul 15;120(2):213-217. PMID: 28549819

  We evaluated the outcomes of patients with active cancer who were treated with rivaroxaban for atrial fibrillation. The risks of stroke and severe bleeding were relatively low.

- **Determinants of fatal bleeding during induction therapy for acute promyelocytic leukemia in the ATRA era.**

  Mantha S, Goldman DA, Devlin SM, Lee JW, Zannino D, Collins M, Douer D, Iland HJ, Litzow MR, Stein EM, Appelbaum FR, Larson RA, Stone R, Powell BL, Geyer S, Laumann K, Rowe JM, Erba H, Coutre S, Othus M, Park JH, Wiernik PH, Tallman MS.

  Blood. 2017 Mar 30;129(13):1763-1767. PMID: 28082441

continued on page 46

continued from page 45

We incorporated data from several major clinical trials to determine risk factors of fatal bleeding in patients presenting with acute promyelocytic leukemia. The white blood cell count turned out to be the most important predictor of bleeding mortality in this setting.

LEUKEMIA

- **Enasidenib in mutant IDH2 relapsed or refractory acute myeloid leukemia.**

  Stein EM, DiNardo CD, Pollyea DA, Fathi AT, Roboz GJ, Altman JK, Stone RM, DeAngelo DJ, Levine RL, Flinn IW, Kantarjian HM, Collins R, Patel MR, Frankel AE, Stein A, Sekeres MA, Swords RT, Medeiros BC, Willekens C, Vyas P, Tosolini A, Xu Q, Knight RD, Yen KE, Agresta S, de Botton S, Tallman MS.

  Blood. 2017 Aug 10;130(6):722-731. PMID: 28588020

  IDH2 mutations occur in approximately 20% of patients with acute myeloid leukemia (AML). Enasidenib is a potent and specific inhibitor of the IDH2 mutant protein. When given to patients with IDH2 mutant relapsed and refractory AML, the overall response rate was 40.3 percent and the median overall survival was 8.8 months. Patients who achieved a complete remission, had a median overall survival approaching two years. The data from this study and reported in this manuscript led to the FDA approval of Enasidenib for the treatment of AML.

- **Therapy-Related Clonal Hematopoiesis in Patients with Non-hematologic Cancers Is Common and Associated with Adverse Clinical Outcomes.**

  Coombs CC, Zehir A, Devlin SM, Kishtagari A, Syed A, Jonsson P, Hyman DM, Solit DB, Robson ME, Baselga J, Arcila ME, Ladanyi M, Tallman MS, Levine RL, Berger MF.

  Cell Stem Cell. 2017 Sep 7;21(3):374-382.e4. PMID: 28803919

  We show that patients with solid tumors have a high frequency of having genetic events in their blood cells which increase the risk of subsequent blood cancers. We can use this to identify patients at risk for blood cancers and to intervene at an earlier stage.

- **Enasidenib induces acute myeloid leukemia cell differentiation to promote clinical response.**

  Amatangelo MD, Quek L, Shih A, Stein EM, Roshal M, David MD, Marteyn B, Farnoud NR, de Botton S, Bernard OA, Wu B, Yen KE, Tallman MS, Papaemmanuil E, Penard-Lacronique V, Thakurta A, Vyas P, Levine RL.

  Blood. 2017 Aug 10;130(6):732-741 PMID: 28588019

  We used genetic studies of patients on a phase I clinical trial to understand the mechanism of action of enasidenib, a newly approved targeted leukemia therapy. These studies showed that this drug induces differentiation of leukemia cells, which then induces clinical response.

- **Genomic analysis of hairy cell leukemia identifies novel recurrent genetic alterations.**

  Durham BH, Getta B, Dietrich S, Taylor J, Won H, Bogenberger JM, Scott S, Kim E, Chung YR, Chung SS, Hüllein J, Walther T, Wang L, Lu SX, Oakes CC, Tibes R, Haferlach T, Taylor BS, Tallman MS, Berger MF, Park JH, Zenz T, Abdel-Wahab O.

  Blood. 2017 Oct 5;130(14):1644-1648. PMID: 28801450

  Hairy cell leukemia is a form of chronic leukemia where nearly 100% of patients have a mutation in the gene BRAF but few other genetic alterations were known to be found in this condition. Here we performed genetic analysis of >50 patients with this form of leukemia to comprehensively determine the genetic alterations present in this disease and identify genetic causes for treatment resistance.

- **Cooperative Epigenetic Remodeling by TET2 Loss and NRAS Mutation Drives Myeloid Transformation and MEK Inhibitor Sensitivity.**

  Kunimoto H, Meydan C, Nazir A, Whitfield J, Shank K, Rapaport F, Maher R, Pronier E, Meyer SC, Garrett-Bakelman FE, Tallman M, Melnick A, Levine RL, Shih AH.

  Cancer Cell. 2018 Jan 8;33(1):44-59.e8 PMID: 29275866

  The study shows how two frequently mutated genes, TET2 and NRAS, cooperate to induce leukemia from hematopoietic stem cells. It also identifies a potential therapeutic approach using specific inhibitors and markers that can help select patients who may benefit.

LYMPHOMA

- **Targeting Bruton tyrosine kinase with ibrutinib in relapsed/refractory marginal zone lymphoma.**

  Noy A, de Vos S, Thieblemont C, Martin P, Flowers CR, Morschhauser F, Collins GP, Ma S, Coleman M, Peles S, Smith S, Barrientos JC, Smith A, Munneke B, Dimery I, Beaupre DM, Chen R.

  Blood. 2017 Apr 20;129(16):2224-2232. PMID: 28167659

  Marginal zone lymphoma is a chronic disease where treatment needs to take into account quality of life. This work led to FDA approval of an oral, well tolerated approach for MZL for patients with prior therapy. It is also the first treatment specifically approved for MZL.

- **Prognostic significance of baseline metabolic tumor volume in relapsed and refractory Hodgkin lymphoma.**

  Moskowitz AJ, Schoder H, Gavane S, Thoren KL, Fleisher M, Yahalom J, McCall SJ, Cadzin BR, Fox SY, Gerecitano J, Grewal R, Hamlin PA, Horwitz SM, Kumar A, Matasar M, Ni A, Noy A, Palomba ML, Perales MA, Portlock CS, Sauter C, Straus D, Younes A, Zelenetz AD, Moskowitz CH.

  Blood. 2017 Nov 16;130(20):2196-2203. PMID: 28874350

  Metabolic tumor volume is a measurement of tumor bulk using PET-imaging. This study showed that baseline metabolic tumor volume is one of the strongest prognostic factors for patients with relapsed or refractory Hodgkin lymphoma. If confirmed in additional studies, metabolic tumor volume may aid in optimization of therapy by providing a tool for individualizing therapy.

- **KEYNOTE-087. Phase II Study of the Efficacy and Safety of Pembrolizumab for Relapsed/Refractory Classic Hodgkin Lymphoma.**

  Chen R, Zinzani PL, Fanale MA, Armand P, Johnson NA, Brice P, Radford J, Ribrag V, Molin D, Vassilakopoulos TP, Tomita A, von Tresckow B, Shipp MA, Zhang Y, Ricart AD, Balakumaran A, Moskowitz CH;

  J Clin Oncol. 2017 Jul 1;35(19):2125-2132. PMID: 28441111

  This was the registration trial that ultimately got pembrolizumab approved in the United Stated for Hodgkin Lymphoma.

- **International Working Group consensus response evaluation criteria in lymphoma (RECIL 2017).**

  Younes A, Hilden P, Coiffier B, Hagenbeek A, Salles G, Wilson W, Seymour JF, Kelly K, Gribben J, Pfreunschuh M, Morschhauser F, Schoder H, Zelenetz AD, Rademaker J, Advani R, Valente N, Fortpied C, Witzig TE, Sehn LH, Engert A, Fisher RI, Zinzani PL, Federico M, Hutchings M, Bollard C, Trneny M, Elsayed YA, Tobinai K, Abramson JS, Fowler N, Goy A, Smith M, Ansell S, Kuruvilla J, Dreyling M, Thieblemont C, Little RF, Aurer I, Van Oers MHJ, Takeshita K, Gopal A, Rule S, de Vos S, Kloos I, Kaminski MS, Meignan M, Schwartz LH, Leonard JP, Schuster SJ, Seshan VE.

  Ann Oncol. 2017 Jul 1;28(7):1436-1447. PMID: 28379322. PMCID: PMC5834038

  This is an international collaboration that resulted in a new response criteria for lymphoma that is more harmonized with RECIST. It is based on review of thousands of measurements from published clinical trials. It is now being implemented in new clinical trials for lymphoma.

- **Dual inhibition of histone deacetylases and phosphoinositide 3-kinase enhances therapeutic activity against B cell lymphoma.**

  Mondello P, Derenzini E, Asgari Z, Philip J, Brea EJ, Seshan V, Hendrickson RC, de Stanchina E, Scheinberg DA, Younes A.

  Oncotarget. 2017 Feb 21;8(8):14017-14028. PubMed PMID: 28147336; PMCID: PMC5355158.

  This preclinical work established the mechanism of action of the novel, chemically designed, dual inhibitor of both HDAC and PI3K. The results were the basis for phase-I clinical trial in patients with lymphoma.

MYELOMA

- **Baseline mutational patterns and sustained MRD negativity in patients with high-risk smoldering myeloma.**

  Mailankody S, Kazandjian D, Korde N, Roschewski M, Manasanch E, Bhutani M, Tageja N, Kwok M, Zhang Y, Zingone A, Lamy L, Costello R, Morrison C, Hultcrantz M, Christofferson A, Washington M, Boateng M, Steinberg SM, Stetler-Stevenson M, Figg WD, Papaemmanuil E, Wilson WH, Keats JJ, Landgren O.

  Blood Adv. 2017 Sep 29;1(22):1911-1918. PMID: 29296837. PMC5728141

  Patients with high-risk smoldering myeloma treated with modern 3-drug combinations have deep and durable responses with 63% MRD negativity. In this study, we assessed baseline mutations in high-risk smoldering myeloma and newly diagnosed myeloma and find they are different, which suggests a more treatment-responsive biology for high-risk smoldering myeloma.

- **MRD detection in multiple myeloma: comparison between MSKCC 10-color single-tube and EuroFlow 8-color 2-tube methods.**

  Roshal M, Flores-Montero JA, Gao Q, Koeber M, Wardrope J, Durie BGM, Dogan A, Orfao A, Landgren O.

  Blood Adv. 2017 May 3;1(12):728-732. PMID: 29296716. PMCID: PMC5728052

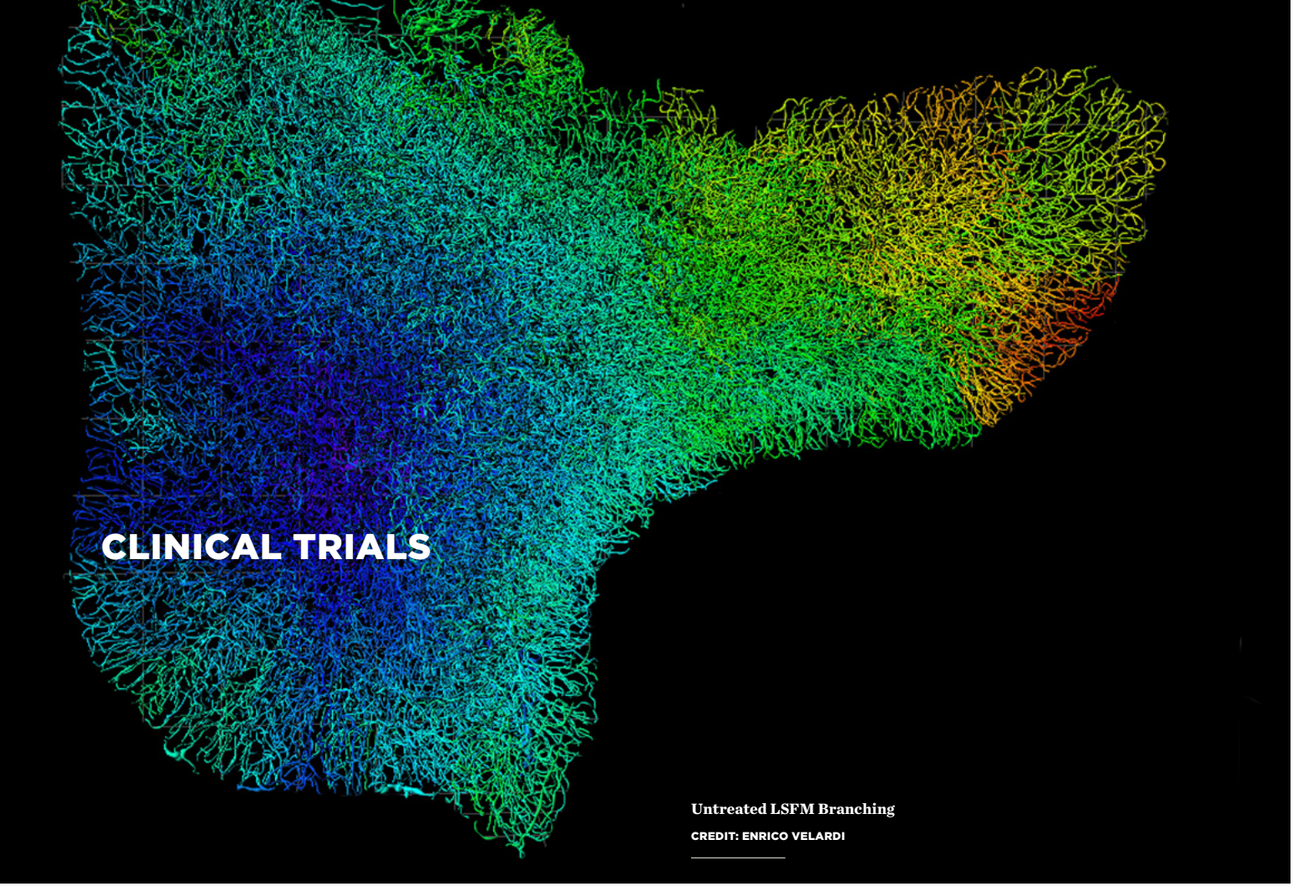
  In collaboration with investigators in Salamanca, Spain we have demonstrated that our novel test for minimal residual disease in multiple myeloma is equally sensitive and easier to use than the gold standard clinical test.

- **Prevalence of myeloma precursor state monoclonal gammopathy of undetermined significance in 12372 individuals 10-49 years old: a population-based study from the National Health and Nutrition Examination Survey.**

  Landgren O, Graubard BI, Kumar S, Kyle RA, Katzmann JA, Murata K, Costello R, Dispenzieri A, Caporaso N, Mailankody S, Korde N, Hultcrantz M, Therneau TM, Larson DR, Cerhan JR, Rajkumar SV.

  Blood Cancer J. 2017 Oct 20;7(10):e618. PMID: 29053158. PMCID: PMC5678222

  This population-based screening focusing on people below the age of 50 is the first study designed to define at what age myeloma precursor disease (MGUS) starts. It shows that it starts around age 30 and prevalence increases by older age. This observation is quite unexpected given that multiple myeloma has an average age of onset around age 70. Compared to whites, African Americans have 10 years earlier age of onset of both multiple myeloma and its precursor disease; suggestive of susceptibility genes playing a role in the onset of the disease. ■



CLINICAL TRIALS

Untreated LSFM Branching

CREDIT: ENRICO VELARDI

These are the few highlighted therapeutic clinical trials in the Division of Hematologic Oncology. For more information, please visit: **https://www.mskcc.org/cancer-care/clinical-trials**

BMT

- **IIT: Allogeneic Hematopoietic Stem Cell Transplantation of an a/ß+ T-Lymphocyte Depleted Grafts Conditioned with a Reduced Intensity Regimen in Patients with Myeloid Malignancies**

  IRB # 17-639; PI: Roni Tamari, Co-PIs: Avecilla Scott, Miguel-Angel Perales, Brian Shaffer

  T cell depleted transplants have been performed at MSKCC for many years with very good outcomes, particularly with very low incidence of graft versus host disease. However, it has been done only with using a high intensity conditioning regimen which is limited to younger patients and those without major other medical problems. This study will explore the option of using a reduced intensity conditioning regimen with a T cell depleted transplant. This study will also include addition of a new method to deplete T cells which is expected to improve the immune recovery after transplant.

- **A Phase I/II Study of Rituximab, Bendamustine and Melphalan conditioning and Autologous Stem Cell Transplantation for Treatment of Relapsed/Refractory Diffuse Large B-cell Lymphoma (rel/ref DLBCL) in Elderly Patients**

  IRB # 17-373; PI: Dahi Parastoo, Co-PIs: Paul Hamlin, Craig Sauter, Armin Shahrokni

  Despite the large number of older patients affected by lymphoma, autologous stem cell transplantation is deferred in most patients older than age 70 due to its associated toxicities. In the absence of transplant, goals of therapy are generally palliative. This clinical trial is evaluating a novel reduced-intensity regimen for stem cell transplant in older patients with lymphoma. This regimen is likely better tolerated and yet effective in older patients with lymphoma.

- **Phase II Study of Interleukin 6 Blockade With Siltuximab to Decrease Symptom Burden in Patients age 60-75 Undergoing Autologous Stem Cell Transplantation for Multiple Myeloma and AL Amyloidosis**

  IRB # 17-365; PI: Gunjan Shah, Co-PIs: Sergio Giralt, Heather Landau

  Fatigue is one of the most common side effects after stem cell transplant. In this study, we evaluate if patients will have less fatigue if we block an inflammatory protein (Interleukin 6).

- **A Phase 1b, Open Label, Multi-Center Trial of AB-110 in Adults with Hematologic Malignancies Undergoing Cord Blood Transplantation**

  IRB # 17-358; PI: Juliet Barker, Co-PI: Marjorie Zauderer

  Cord blood transplants have proven to be highly effective for the treatment of otherwise lethal cancers of the blood and bone marrow. Now MSKCC is investigating a variety of approaches to further improve the outcomes of these transplants. These include the use of cord blood cells expanded in the laboratory designed to speed the patients' recovery.

- **A Phase IIa Study of Recombinant Human Interleukin-22 IgG2-Fc (F-652) in Combination with Systemic Corticosteroids for the Treatment of Newly Diagnosed Grade II-IV Lower Gastrointestinal Acute Graft-versus-Host Disease (aGVHD) in Hematopoietic Stem Cell Transplantation Recipients**

  IRB # 15-284; PI: Doris Ponce, Co-PI: Alan Hanash

  Patients with lethal cancers of the blood and bone marrow can be cured by transferring the blood-forming stem cells from a healthy donor. While this treatment can be highly effective, it can be associated with severe complications. One of the most serious complications is known as graft-versus-host disease in which the newly transplanted donor cells attack the recipient's body. Graft-versus-host disease can attack several organs including the gut, liver and/or skin. However, gut involvement is associated with worse graft-versus-host disease severity, lower response to therapy and higher risk of death. Experiments in mice have demonstrated that certain small proteins known as cytokines can affect the behavior and/or the environment of cells in the gut compartment. At Memorial Sloan Kettering Cancer Center, Drs Hanash and van den Brink discovered that cytokine interleukin-22 plays an important role in the maintenance of the gut epithelium barrier. Mice deficient of IL-22 developed worse graft-versus-host disease whereas treatment with IL-22 promoted healing of the gut epithelium and overall recovery. We designed the first tissue-targeted clinical trial in graft-versus-host disease using IL-22. This is a phase IIa protocol evaluating the efficacy and safety of recombinant human IL-22 known as F-652 in combination to corticosteroids for patients who develop graft-versus-host disease of the gut. Our goal is to increase the healing of the gut and have a better response to therapy compared to the traditional treatment of corticosteroids alone. This clinical trial is currently open to accrual and has expanded to two additional centers including MD Anderson Cancer Center in Texas and City of Hope in California.

- **IIT: Rational Use of Broad-spectrum Antibiotics as Empiric Antibiotic Therapy in Febrile Neutropenia in Recipients of Allogeneic Hematopoietic Cell Transplantation**

  IRB # 17-097; PI: Boglarka Gyurkocza, Co-PIs: Jonathan Peled, Susan Seo

  This study aims to compare the effects of different antibiotics on the community of friendly bacteria in the gut of patients undergoing allogeneic stem cell transplant for the treatment of blood cancers. Prior, retrospective studies have shown, that certain broad-spectrum antibiotics, such as cefepime and aztreonam, may have less of an effect on the friendly bacteria occupying the gut, than other antibiotics, like the commonly used piperacillin. These retrospective studies suggested that protecting the community of friendly bacteria in the gut could result in reducing complications and improving survival after stem cell transplantation. In this study, we compare the effects of piperacillin and cefepime followed by aztreonam on the community of friendly bacteria inhabiting the gut, when neutropenia and fever develops during the course of stem cell transplantation. The Infectious Disease Society of America considers piperacillin and cefepime followed by aztreonam safe options to treat neutropenia and fever.

HEMATOLOGY

- **Romiplostim for Chemotherapy Induced Thrombocytopenia**

  IRB # 13-132; PI: Gerald Soff, Co-PIs: Rekha Parameswaran

  This landmark, first-in-kind trial has demonstrated that romiplostim is both highly effective (>90%) and safe to correct Chemotherapy Induced Thrombocytopenia, and allow resumption of chemotherapy, without recurrence of CIT

- **Efficacy and Safety of Rivaroxaban Prophylaxis Compared with Placebo in Ambulatory Cancer Patients Initiating Systemic Cancer Therapy and at High Risk for Venous Thromboembolism**

  IRB # 16-375; PI: Gerald Soff, Co-PIs: Rekha Parameswaran, Jodi Mones, Simon Mantha

  This is a phase III, multi-center clinical trial of rivaroxaban as thrombosis prophylaxis in high risk cancer patients. This study has now completed enrollment.

- **Rivaroxaban for Venous Thromboembolic Disease and Atrial Fibrillation in the Setting of Cancer**

  IRB # 16-864; PI: Simon Mantha, Co-PIs: Gerald Soff

  This study aims to evaluate the safety and efficacy of rivaroxaban in patients with cancer. Right now, we are finalizing a report on a large cohort of individuals with venous thromboembolic disease.

- **Efficacy and Thrombotic Adverse Events of Romiplostim Use in Patients with Thrombocytopenia Related to Underlying Malignancies**

  IRB # 16-1681; PI: Gerald Soff, Co-PIs: Rekha Parameswaran, Jodi Mones, Simon Mantha

  This was an institutional retrospective analysis of the safety and efficacy of romiplostim, as used in our ongoing clinical trial, as well as off-study/off-label use. We demonstrated that romiplostim is both highly effective and safe in a range of indications.

LEUKEMIA

- **BAML-16-001-M1: A Master Protocol for Biomarker-Based Treatment of AML (The Beat AML Trial) (WIRB)**

  IRB # 17-135; PI: Eytan Stein, Co-PIs: Ross Levine, Martin Tallman

  In AML, multiple molecular mutations, either alone or in combination, lead to the disease. The BEAT AML master trial aims to identify the specific mutations in individual patients that have led to their AML and then allocate patients to a personalized medicine, targeted therapy approach, to go-after the mutations that are causing their disease. This is the first "Basket Trial" for patients with AML.

continued on page 50

continued from page 49

- **AG120-221-C-001: A Phase 1, Multicenter, Open-Label, Safety Study of AG-120 or AG-221 in Combination with Induction Therapy and Consolidation Therapy in Patients with Newly Diagnosed Acute Myeloid Leukemia with an IDH1 and/or IDH2 Mutation**

  IRB # 16-012; PI: Eytan Stein, Co-PI: Martin Tallman

  This study aims to move the use of IDH inhibitors to the up-front, untreated, setting by combining, AG-120 for IDH1 mutant AML and AG-221 for IDH2 mutant AML with standard of care induction chemotherapy. The hope is that these combinations will lead to fewer relapses and improved overall survival compared with induction chemotherapy alone.

- **A Phase I Trial of CD19-Targeted EGFRt/19-28z/4-1BBL "Armored" Chimeric Antigen Receptor (CAR) Modified T Cells in Patients with Relapsed or Refractory CD19+ Hematologic Malignancies**

  IRB # 16-1570; PI: Jae Park, Co-PIs: Connie Batlevi, Lia Palomba, Craig Sauter

  Our previous clinical trial with the autologous T cells genetically modified to express a 2nd generation CD19-targeted chimeric antigen receptor (CAR) (19-28z) demonstrated that an overall response rate of 40-50% in patients with relapsed chronic lymphocytic leukemia (CLL) and non-Hodgkin's lymphoma (NHL) (IRB #06-138). While encouraging, the response rate was modest compared to the complete response rate of 80% in patients with acute lymphoblastic leukemia (ALL). Therefore, we have further modified and created an "armored" CAR T cells expressing 4-1BBL, designed to better stimulate the T cells and educate other immune cells to more completely eradicate cancer cells. This phase I clinical trial is currently enrolling patients with relapsed CLL and NHL to test the safety and efficacy of this new armored CAR T cells.

- **A Phase I, Multicenter, Open-label Study of Oral ABL001 in Patients with Chronic Myelogenous Leukemia or Philadelphia Chromosome-positive Acute Lymphoblastic Leukemia**

  IRB # 14-168; PI: Michael Mauro, Co-PI: Ellin Berman

  ABL001, an oral 'next-generation', myristoyl pocket-binding kinase inhibitor (TKI) against the activated BCR-ABL driver of Philadelphia chromosome positive leukemias, showed both the ability to overcome resistance to prior TKIs as well as combine safely with available TKIs, both with remarkable safety. MSKCC played a lead role in the phase I trial of this agent and will continue to pursue additional trials including combination treatment using ABL001 to potentially stop TKI treatment in second attempts to achieve 'treatment free remission'.

- **H3B-8800-G000-101: An Open-label, Multicenter Phase 1 Trial to Evaluate the Safety, Pharmacokinetics and Pharmacodynamics of Splicing Modulator H3B-8800 for Subjects With Myelodysplastic Syndromes, Acute Myeloid Leukemia, and Chronic Myelomonocytic Leukemia**

  IRB # 17-120; PI: Virginia Klimek, Co-PI: Stephen Chung

  In MDS we frequently see mutations in "splicing" genes. We think these "splicing" gene mutations cause low blood counts in MDS. H3B-8800 is a new type of therapy that blocks the effects of these mutations, and may help to improve bone marrow function and blood counts in MDS patients.

LYMPHOMA

- **A phase IB Study of Buparlisib plus Ibrutinib in Patients with non-Hodgkin Lymphoma**

  IRB # 16-009; PI: Connie Batlevi, Co-PIs: Anas Younes

  Ibrutinib, a irreversible covalent inhibitor of Bruton's tyrosine kinase (BTK), and PI3K inhibitors target cancer driving pathways in lymphoma and both demonstrates clinical activity in a variety of non-Hodgkin lymphomas. In the laboratory, combining ibrutinib with PI3K inhibitors show synergism likely through suppressing parallel survival pathways for lymphoma. Buparlisib and copanlisib are two such PI3K inhibitors. The clinical trial using ibrutinib and buparlisib tests this hypothesis in mantle cell lymphoma, follicular lymphoma and diffuse large B cell lymphoma. Promising results are being seen in mantle cell lymphoma and a follow up study is being developed to investigate the combination of copanlisib and ibrutinib in relapsed mantle cell lymphoma patients.

- **A Phase I/II Study of Lenalidomide plus Obinutuzumab and Atezolizumab Immunotherapy in Patients with Recurrent or Persistent Follicular Lymphoma**

  IRB # 16-799; PI: Lia Palomba, Co-PI: Anas Younes

  This is a chemotherapy-free clinical trial for patients with a history of Follicular Lymphoma that returned after at least 1 prior therapy. Lenalidomide is an oral medication that is part of a class of drugs called immunomodulators and can help the immune system to kill the lymphoma cells. Obinutuzumab is a monoclonal antibody that recognizes CD20, a molecule found on all the B cells, including the lymphoma cells. Once it binds to those cells, it triggers cells death. Finally, Atezolizumab is a monoclonal antibody against a protein called PD-L1. By binding to this protein on the cancer cells, it allows a type of cells of the immune system called T cells to become much better equipped to recognize and kill lymphoma cells. We have already shown that the combination of Lenalidomide plus a CD20 antibody is very effective against Follicular Lymphoma. By adding a third drug that makes the T cells more powerful, we hope to obtain even better results and longer remissions.

- **A Phase I Study of Nivolumab Immunotherapy plus Standard Chemotherapy for Newly Diagnosed High-Risk Hodgkin Lymphoma**

  IRB # 16-1536; PI: Alison Moskowitz, Co-PIs: Heiko Schoder, Anas Younes

  This study aims to improve the outcomes for patients with high risk Hodgkin lymphoma through incorporation of nivolumab into frontline treatment.

- **A Phase II Study of Rituximab plus Lenalidomide for Untreated Mantle Cell Lymphoma**

  IRB # 15-196; PI: Anita Kumar, Co-PIs: Anas Younes, Andrew Zelenetz

  In this study, we aim to evaluate if the addition of lenalidomide to standard sequential induction chemotherapy followed by rituximab (R) and lenalidomide maintenance will result in improvement in outcomes for untreated MCL. In this study, after induction therapy (lenalidomide-RCHOP x 4 cycles and R-high dose cytarabine x 2 cycles), patients receive R-lenalidomide maintenance for six months. We hypothesize that this maintenance therapy will be equally or potentially more efficacious, and certainly less toxic, compared with high-dose therapy and autologous stem cell transplant in eradicating microscopic residual tumor cells at the end of therapy, resulting in deep and prolonged remission durations. In this clinical trial, we will assess early biomarkers for response, including post-induction PET/CT and minimal residual disease assessment using a novel deep-sequencing platform. Preliminary analysis of interim and end of treatment PET/CT results suggest that this treatment program is highly active in MCL.

- **A Phase I Study of ADCT-301 in Patients with Persistent or Recurrent Hodgkin or Non-Hodgkin Lymphoma**

  IRB # 15-300; PI: Steven Horwitz, Co-PI: Alison Moskowitz

  This phase I study of ADCT–301–and ADC conjugated to a CD25 antibody has shown high rates of response during the phase I, primarily in patients with Hodgkin lymphoma. This preliminary data was presented at the American Society of Hematology meeting in Atlanta in December 2017. The study is continuing to try to more precisely define optimal dosing — both dose level and duration of therapy as well as continue to explore efficacy in both Hodgkin and non-Hodgkin lymphomas.

- **A Phase 1, Multicenter, Open-label Study of JCAR017, CD19-targeted Chimeric Antigen Receptor (CAR) T cells, for Relapsed and Refractory (R/R) B-cell Non-Hodgkin Lymphoma (NHL)**

  IRB# 15-295; PI: Lia Palomba, Co-PIs: Jae Park, Anas Younes

  The immune system is very complex and comprises different type of blood cells, including T cells, which can be very potent in eliminating anything that the immune system recognizes as "non-self". Cancer cells have the ability to evade the immune system. CAR T cells are "improved" T cells. They are produced from a patient's own T cells, genetically modified in the laboratory to express a molecule that recognizes and connect to the lymphoma cells. Once the T cells are ready, they are reinfused into the patient, travel through the blood and attach to the lymphoma cells, where they can become activated and efficiently kill them. This technique was pioneered at MSKCC. We have a very long experience and have learned a big deal along the way, particularly on how to improve the efficacy and the safety of such a high-tech therapy.

MYELOMA

- **Carfilzomib, Lenalidomide, and Dexamethasone in Newly-Diagnosed Multiple Myeloma: A Clinical and Correlative Phase I/II Dose Escalation Study**

  IRB # 15-326; PI: Neha Korde, Co-PI: Ola Landgren

  The study uses a combination therapy with carfilzomib, lenalidomide and dexamethasone to treat newly diagnosed multiple myeloma patients. The purpose of this study is to test whether giving high doses of carfilzomib along with the other drugs (lenalidomide and dexamethasone) is safe and which dose is best tolerated by patients. In addition, the study is uniquely designed to see if a minimal residual disease or response based platform can be used to drive the number of cycles of chemotherapy a patient receives.

- **H125001: An Open-Label Phase 1/2 Study of JCARH125, BCMA-targeted Chimeric Antigen Receptor (CAR) T Cells, in Subjects with Relapsed or Refractory Multiple Myeloma**

  IRB # 18-043; PI: Sham Mailankody, Co-PI: Craig Sauter

  CAR T-cell therapy is a form of immunotherapy currently used to treat some patients with leukemia and lymphoma, and it is under study for patients with other types of cancer. In this study, we are determining the best dose and preliminary effectiveness of CAR T-cell therapy targeting BCMA in patients with multiple myeloma that has come back or continued to grow despite treatment.

- **Daratumumab, Carfilzomib, Lenalidomide, and Dexamethasone in Newly-Diagnosed Multiple Myeloma: A Clinical and Correlative Phase II Study**

  IRB # 17-352; PI: Ola Landgren, Co-PI: Neha Korde

  This is the first phase 2 study integrating the highly efficacious Carfilzomib, Lenalidomide and Dexamethasone combination therapy (KRd) together with the highly efficacious monoclonal antibody drug daratumumab. The design of the study is to test the hypothesis that using this combination of currently available best drugs in newly diagnosed multiple myeloma patients, a high proportion of patients will become minimal residual disease (MRD) negative. Consistent data from large studies show that MRD negativity is the strongest predictor of long progression-free survival and overall survival in multiple myeloma.

- **An Investigator-Initiated Phase I Study of Selinexor (KPT-330), Ixazomib, and Low Dose Dexamethasone in Patients with Relapsed and/or Refractory Multiple Myeloma**

  IRB # 15-310; PI: Nikoletta Lendvai, Co-PI: Ola Landgren

  Selinexor is the first member of a new class of drugs that work by inhibiting XPO1, a protein that normally functions to traffic proteins out of the nucleus of the cell and into the cytoplasm. In this study, we combine ixazomib, an FDA approved proteasome inhibitor drug, and dexamethasone with selinexor, resulting in an all oral drug regimen. The study is designed to determine the optimal dose of selinexor in combination with ixazomib and dexamethasone in patients whose myeloma relapsed or is refractory to therapy.

- **Ixazomib (MLN9708) and Dexamethasone in High Risk Smoldering Multiple Myeloma: A Clinical and Correlative Pilot Study**

  IRB # 15-294; PI: Sham Mailankody, Co-PI: Ola Landgren

  In this study, we are evaluating the safety and preliminary effectiveness of combining the drugs ixazomib and dexamethasone in patients with smoldering multiple myeloma that has a high risk of becoming symptomatic. Ixazomib is approved for treating multiple myeloma; its use in this study is considered investigational. Dexamethasone is an anti-inflammatory drug commonly used in cancer care. ■

PHILANTHROPIC DONORS OVER $50,000

The Division of Hematologic Oncology is supported in part by the generous donations of our benefactors.

We wish to thank those who have contributed to the many successes of our Division.

Below is a list of patrons who donated $50,000 or more in 2017.

Anonymous

Alex's Lemonade Stand Foundation

Joyce Ashley

The David R. and Patricia D. Atkinson Foundation

Mr. and Mrs. Melvin R. Berlin Family

David A. and Merle L. Brown

Mr. and Mrs. Norman Brownstein

Brownstein Hyatt Farber Schreck

Anne M. and Donald G. Calder

CURE Childhood Cancer Foundation

Frederick A. DeLuca Foundation

Alcides & Rosaura Diniz Foundation

Robert and Cheryl Goldberg

Joyce & Irving Goldman Family Foundation

Mr. and Mrs. Kenneth S. Goldstein

David J. Grais and Lisa A. Cutler

The Dr. Seema Gupta Endowed Visiting Professor and Lectureship Fund

Kate Medina Guthart and Leo A. Guthart

Hairy Cell Leukemia Research Foundation

Ted and Laura Hromadka

Barbara and Tom Israel

Kern Family Fund

Layla and Ed Khalily

Jeffrey Klein and John Goldwyn

Fran and Ralph Levine

The Lymphoma Foundation

Lymphoma Research Foundation

Mr. and Mrs. Howard A. Matlin

The Max Cure Foundation

Yvonne and Arthur Moretti

Lisa and Marcelo Mottesi

Multiple Myeloma Research Foundation

Nonna's Garden Foundation

George L. Ohrstrom, Jr. Foundation

Mr. and Mrs. Martin Raphael

Christine and Mark Reichenbaum

The May and Samuel Rudin Family Foundation

Damon Runyon Cancer Research Foundation

St. Baldrick's Foundation

Mr. Nassef Sawiris

Rob and Karen Schneider

The Silver Family Foundation

Society for Immunotherapy of Cancer

The Susan and Peter J. Solomon Family Foundation

The Adam R Spector Foundation

Arthur A. Stamm

Swim Across America

The Henry & Marilyn Taub Foundation

The Terry Fox Run For Cancer Research (NYC)

Thomas N. Tryforos

Daniel P. and Grace I. Tully Foundation

The V Foundation

John and Barbara Vogelstein Foundation

Worldwide Cancer Research

YOU CAN HELP

PHILANTHROPY

The Campaign for Memorial Sloan Kettering is an ambitious fundraising initiative designed to support every area of the Center's mission. Contributions to the Campaign can take a variety of forms including gifts of cash paid outright in a single installment or as a pledge to be fulfilled over a period of several years.

Other ways of giving include:

- Gifts of securities
- Planned gifts (life income plans or a bequest)
- Gifts of real estate and personal property
- Gifts from qualified plans such as a 401 (k) or 503 (b)
- For additional information or to make a gift, please call 866-815-9501.

DONATING BLOOD

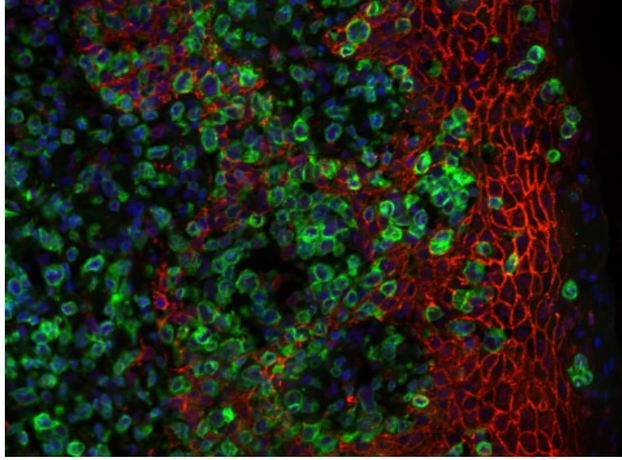
Blood donations can be designated for a particular patient or for our general blood inventory. For more information or an appointment, call 212-639-8177 or 212-639-7648.

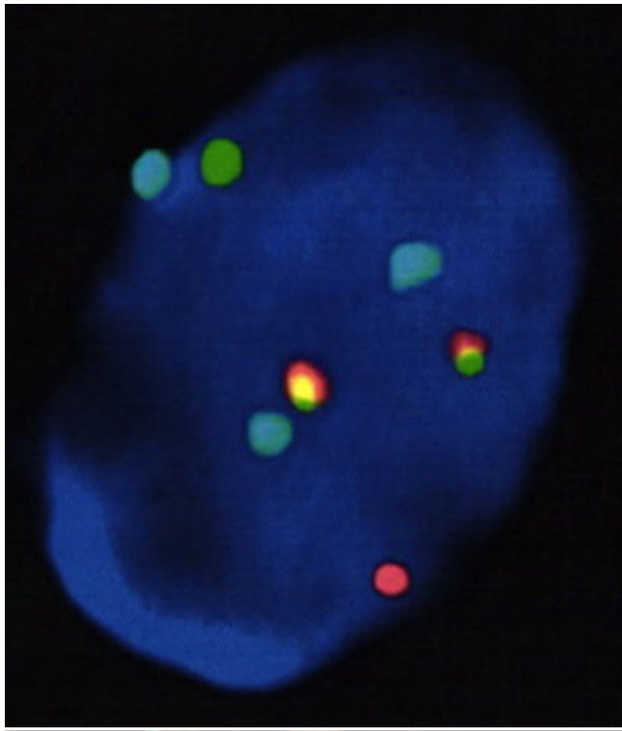
DONATING TO FRED'S TEAM

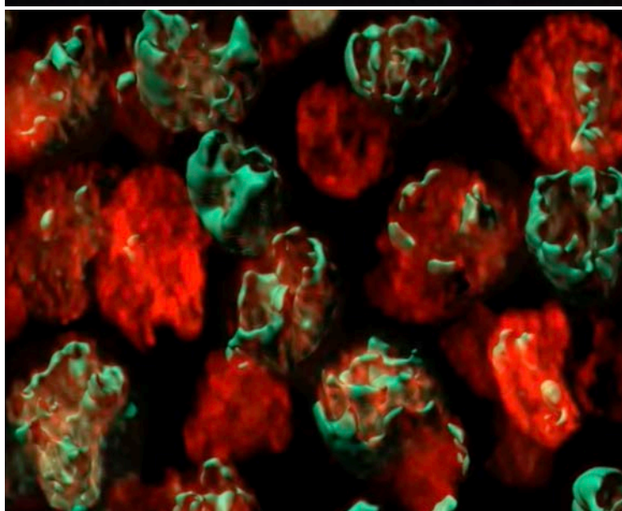
For information on donating, visit Fred's Team at: www.fredsteam.org.

DONATING TO CYCLE FOR SURVIVAL

For information on donating, visit Cycle for Survival at: www.cycleforsurvival.org.







TOP: Cutaneous T cell Lymphoma patient samples
CREDIT: KIMON ARGYROPOULOS

CENTER: PDL1 rearrangement and over expression in CHL
CREDIT: AHMET DOGAN

BOTTOM: Nucleolar fragmentation in Stag2 null mouse bone marrow
CREDIT: AARON VINY

Architectural rendering of MSK's 74th Street building, the future home of our Division.

DIVISION HEAD OF HEMATOLOGIC ONCOLOGY

646-888-2304

1275 YORK AVENUE

NEW YORK, NY 10065

GENERAL INFORMATION

212-639-2000

PHYSICIAN REFERRAL SERVICE

800-525-2225

ON THE INTERNET

WWW.MSKCC.ORG

FOLLOW US

WWW.FACEBOOK.COM/SLOANKETTERING

HTTPS://TWITTER.COM/SLOAN_KETTERING

WWW.YOUTUBE.COM/MSKCC

@SLOANKETTERING

Memorial Sloan Kettering Cancer Center

FOLLOW OUR MDS ON TWITTER

Connie Batlevi . . . . . @DrConnieBatlevi
Sheng Cai . . . . . @shengfcai
Parastoo Dahi . . . . . @BahramiD
Mark Geyer . . . . . @MarkGeyerMD
Sergio Giralt . . . . . @sgiraltbmtdoc
Alan Hanash . . . . . @AlanHanash
Malin Hultcrantz . . . . . @malinhultcrantz
Guenther Koehne . . . . . @GuentherKoehne
Anita Kumar . . . . . @DrAnitaKumar
Ola Landgren . . . . . @DrOlaLandgren
Alexander Lesokhin . . . . . @LesokhinMD
Ross Levine . . . . . @rosslevinemd
Sham Mailankody . . . . . @ShamMailankody
Matthew Matasar . . . . . @DrMatasar
Anthony Mato . . . . . @anthonymatomd
Michael Mauro . . . . . @mjmauroMD
Craig Moskowitz . . . . . @CMoskowitzMD
Ariela Noy . . . . . @ArielaNoyMD
Lia Palomba . . . . . @LiaPalomba
Miguel Perales . . . . . @DrMiguelPerales
Craig Sauter . . . . . @DrCraigSauter
Gunjan Shah . . . . . @GunjanLShah
Melody Smith . . . . . @MelodySmithMD
David Straus . . . . . @DrDavidStraus
Marcel van den Brink . . . . @DrMvandenBrink
Santosha Vardhana . . . . . @SantoshVardhana
Aaron Viny . . . . . @TheDoctorIsVin
Anas Younes . . . . . @DrAnasYounes