

The Society of MSK Campaign 2022–2023

Innovations in Immunotherapy

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Advancements in Immunotherapy

Memorial Sloan Kettering Cancer Center (MSK) is a global leader in immunotherapy, the revolutionary treatment approach that uses the body's own immune system to fight cancer. Home to the first immunotherapy experiments more than a century ago, MSK continues to drive the field forward with discoveries that improve the lives of people worldwide. While immunotherapy has brought hope to many who thought they had run out of treatment options, it does not work for every person or every type of cancer. MSK scientists are exploring sophisticated new ways to enable more people with cancer to benefit from immunotherapy and accumulating the data necessary to seed life-changing breakthroughs in the years to come.

A New Era for CAR T Cells

At the heart of this mission is chimeric antigen receptor (CAR) T cell therapy and gene therapy. CAR T cell treatments involve collecting infection-fighting T cells from a patient's blood, modifying those cells to recognize cancer, and infusing them back into the bloodstream, where they multiply and attack cancer cells. Gene therapy involves the transfer of genes to patients to treat a disease or improve the body's ability to fight a disease.

MSK researchers played a pioneering role in developing CAR T cell therapy and demonstrating its safety and effectiveness in patients. Today, they are focused on creating a new generation of CAR T cells with formidable enhancements. These powerful CARs promise to both increase the effectiveness of this treatment and make it capable of targeting more types of cancer. In addition, MSK researchers are designing off-the-shelf CAR T cell therapy, which involves using T cells from the blood of donors instead of a patient's own T cells, a more cost-effective, ready-to-use option.

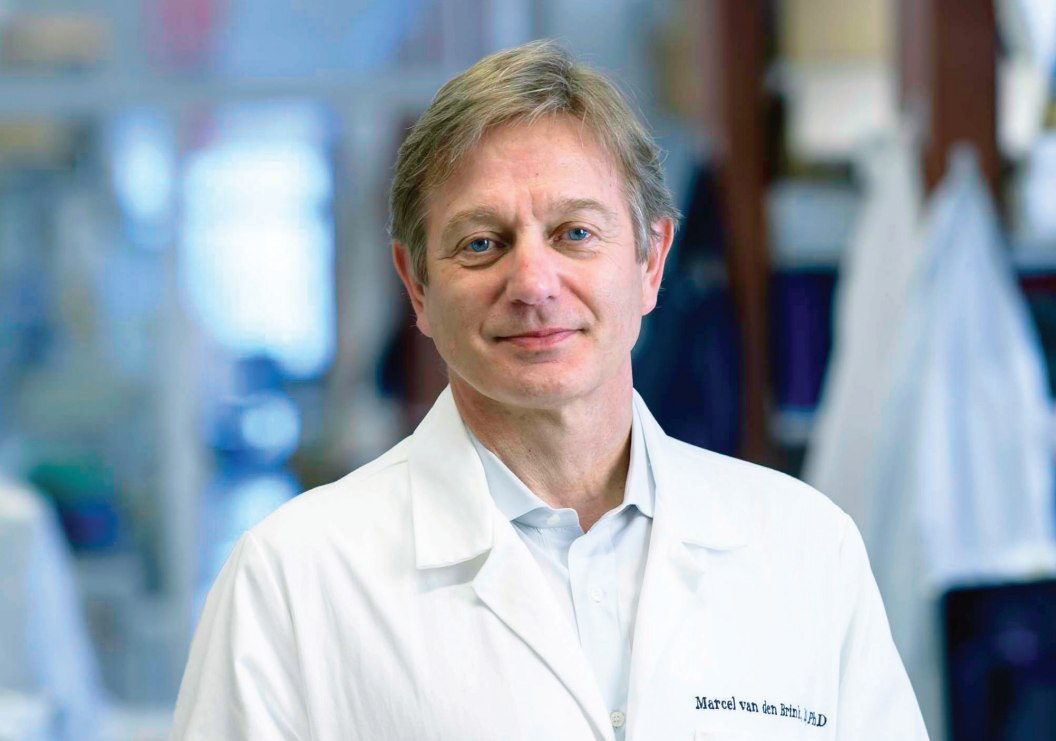
Innovation Beyond CAR T Cells

MSK physicians and scientists look at every aspect of an individual's care. Not only do they focus on the type of CAR T cells or gene therapy given to a patient but they also take the critical step of preparing the patient's immune environment before treatment to make way for the healthy cells and enhance the cells' effectiveness with minimal side effects. Driving the effort to improve access and outcomes for patients who could benefit from these novel therapies is Sergio Giralt, MD, Deputy Division Head of the Division of Hematologic Malignancies and Melvin Berlin Family Chair in Multiple Myeloma. Together with a team of MSK's internationally recognized leaders in cell therapy, Dr. Giralt is working on the following key initiatives.

- **Identifying Barriers to Cell Therapies:** Many patients are not able to receive CAR T cell therapy for a variety of reasons. MSK has partnered with New York Cancer & Blood Specialists to study the barriers that prevent people with myeloma from undergoing CAR T cell therapy.
- **Building a Better Cell:** To uncover why certain patients respond better than others, advanced genetic studies will explore how CAR T cells' complex array of genes and proteins change over time. CAR T cell engineers will use this information to design more effective cell therapies for the future.
- **Understanding the Whole Patient:** While the quality of the cell or gene used in treatment is key, how a patient's immune system changes after CAR T cell therapy determines how well a treatment works and the side effects a patient experiences. Recognizing this, Jaap-Jan Boelens, MD, PhD, Chief of the Pediatric Stem Cell Transplantation and Cellular Therapies Service and Richard J. O'Reilly Chair in Honor of Kevin Zoltan Merszei, is leading research to discover measurable indicators known as biomarkers in the immune system that will flag patients who are at an increased risk for relapse or greater side effects.
- **Tailoring the Right Dose:** MSK investigators have proven that standard drug doses cause too much variability among patients. To improve predictability and effectiveness, they identified what drugs matched best to various cell therapies. Future studies will focus on confirming the optimal doses and further individualize treatments to establish precision drug dosing as the standard of care.

Sergio Giralt, MD





Unlocking the Microbiome

Marcel van den Brink, MD, PhD, Head of the Division of Hematologic Malignancies, Co-Director of the Parker Institute for Cancer Immunotherapy at MSK, and Alan N. Houghton Chair, has spent more than a decade deepening the understanding of how populations of bacteria and other microbes collectively known as the gut microbiome influence the outcome of immune-based cancer treatments. Dr. van den Brink and colleagues recently discovered that the gut microbiome directly affects the makeup of the immune system. This work sheds light on ways to make cell and gene therapies, including bone marrow transplants, safer by regulating gut microbiota while rebuilding a patient's immunity after treatment and enhancing the effects of cell therapies.

“This research could eventually suggest ways to make bone marrow transplants and immunotherapy treatments safer by more closely regulating the microbiome. At MSK, we have the talent and mindset to develop novel therapies.”

—Marcel van den Brink, MD, PhD

Building a Centralized Hub for Cell Therapy Operations

As MSK expands these farsighted initiatives to lead the world in immunotherapy, there is an increasing need to establish a centralized hub where experts can continue to accelerate the transformation of discoveries made in the laboratory into treatments for patients. A Cell Therapy Correlative Core would support MSK's cell therapy efforts at all stages, including enrolling patients for clinical trials, performing genetic prescreening, setting standard protocols for studies, developing research plans, and collecting and processing patient samples. To operate this exciting new facility will require clinicians, data managers, protocol developers, and technicians. A 360-degree center that handles such robust operations for immunotherapies and microbiome studies will further distinguish MSK from other institutions.

How Your Support Will Help

The Society of MSK Campaign 2022–2023 will be a driving force behind institution-wide transformations that will lead to worldwide innovations in immunotherapy. Funding is critical to propel these important initiatives forward and enables MSK to realize its full potential in the field. With your partnership, MSK can continue to build on its track record of discovery and leadership — creating a lasting impact for people with cancer for years to come.

“The Society’s longtime support has allowed MSK to pursue promising ideas to improve detection, diagnosis, and treatment of some of the most challenging cancers in the world. We are deeply grateful for this generous and visionary philanthropic partnership.”

—Lisa DeAngelis, MD

Physician-in-Chief, Chief Medical Officer, and
Scott M. and Lisa G. Stuart Chair at MSK



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