New Developments in Pediatric Cancer Research

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In 2016, Andrew Kung joined MSK as the new Chair of the Department of Pediatrics. With a lifelong dedication to cancer research and to caring for children, Dr. Kung is inspired by progress that has led to the survival of 80 percent of all children diagnosed with cancer—but he wants to do better.

His primary goals are to further improve survival rates while working to decrease the toxicity of treatments. Under his guidance, additional personalized therapies for pediatric cancers are being developed, with MSK researchers leveraging gene sequencing technology to analyze the biology of each patient’s tumor. This allows them to better match patients with drugs that most precisely target the molecular drivers of the disease.

“Because childhood cancers are rare, every child with cancer deserves to be treated in an academic medical center by a team with the experience and knowledge to ensure the best outcomes.”

– Andrew Kung, MD, PhD

The Human Oncology and Pathogenesis Program (HOPP)

The Human Oncology and Pathogenesis Program (HOPP), led by hematologic oncologist Charles Sawyers, addresses challenges presented by cancer research in the era of targeted therapies. Targeted therapies are different from other treatments because they are developed to target genetic mutations in a tumor rather than in what organ or tissue it originated. HOPP is uniquely positioned to speed the translation of research into a clinical setting, focusing on identifying new mutations and developing therapies to address those genetic alterations that underlie the development and growth of cancer.

The HOPP team conducts research on a wide array of cancers and includes investigators from diverse fields, including neurology, endocrinology, and pathology. Its uniting characteristic is that all HOPP members are physician-scientists who work in both the laboratory and the clinic. And, because HOPP has an established infrastructure for conducting molecular profiling studies of patient tumor samples, the information can guide the testing of new targeted therapies in clinical trials at MSK.

2017 Strategic Initiatives Fund Priorities

With a deepening understanding of cancer biology, an explosion in targeted therapies, and more drugs in the pipeline, we’re living in the most exciting time in cancer research history. We cannot overstate the impact research is having on individuals’ lives—lives that have been lengthened and saved by virtue of discoveries made in our laboratories and others across the U.S. and around the world. It’s imperative that we increase funding at this moment of unprecedented opportunity—because every discovery our investigators make will contribute to a future without cancer. The following report highlights some of the most important and promising research funded through the Strategic Initiatives Fund last year, and that remain top priorities for 2017.
Treating Brain Cancer with Radiation Plus Immunotherapy

Brain metastases—tumors that have spread from primary cancers in other parts of the body to the brain—are about ten times more common than primary brain tumors. For cancers such as melanoma, non-small cell lung cancer, and breast cancer, the incidence of brain metastases in patients with stage IV diagnoses range from 30 to 40 percent.

Recent advances have been made at MSK using radiation in conjunction with immunotherapy. Success was achieved using stereotactic radiosurgery (SRS)—highly focused beams of radiation to kill a tumor—in combination with the immunotherapy drug ipilimumab for patients with melanoma. Positive outcomes led MSK radiation oncologists to use a similar combination for patients with brain metastases.

Utilizing an immunotherapy drug called pembrolizumab with SRS, MSK scientists observed very rapid responses in the patients, and in certain cases a complete response. The results of the combination therapy were significantly better than in patients who only received SRS, and patients did not show any unusual toxicity with the combination approach.

To test this combination of radiation and immunotherapy in other cancers, MSK is planning a study for patients with non-small cell lung cancer that has spread to the brain, as well as treating primary brain tumors with a combination of immunotherapy drugs and radiation.

Historically, if you had melanoma and brain metastases, the median survival was four months. Now we have about 20 percent of patients who have been alive many years after their brain metastases have been treated with SRS and immunotherapy and they appear cured. — Kathryn Beal, MD, Radiation Oncologist

Search and Destroy: A New Way to Target Latent Cancer Cells

Imagine a patient whose doctor tells him or her, “You’re cancer-free.” And then the cancer returns—possibly decades later. Unfortunately, cancer recurrence after successful initial treatment is far too common. Researchers at MSK are working to understand how cancer cells can lie dormant, sometimes for many years. A new study led by Joan Massagué, Director of the Sloan Kettering Institute and head of MSK’s Center for Metastasis Research, recently revealed how cancer cells can go into hiding only to flare up later—a phenomenon called latent (or dormant) metastasis.

Scientists in Dr. Massagué’s lab created a new model to understand latent metastasis and used it to uncover—for the first time—the mechanisms that underlie cancer’s stealth mode. By labeling tumor cells with a fluorescent tag, researchers tracked the cells that died versus those that survived, lurking in organs such as the lungs or kidneys. These “stealth cells” remained in a state of suspended animation, becoming undetectable to the immune cells that routinely patrol the body looking for dangerous invaders. Over time, these cancer cells may also acquire additional mutations that allow them to escape immune patrol completely and cause a cancer recurrence.

This new revelation from MSK helps open the door to new treatment options, as our investigators continue the research they hope will lead to the development of new therapies.
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“Understanding latent metastasis is the biggest untapped opportunity to have a major impact on cancer.”

– Joan Massagué, PhD, Director of Sloan Kettering Institute
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