Dr. Neville Sanjana Receives 2020 Cancer Research Institute Technology Impact Award for Pancreatic Cancer Immunotherapy Research

Grant supports genome engineering study to discover modifier genes that can boost the effectiveness of CAR T-cell therapy for pancreatic cancer patients.

NEW YORK, NY (August 5, 2020) – Neville Sanjana, PhD, Core Faculty Member at the New York Genome Center, Assistant Professor of Biology, New York University, and Assistant Professor of Neuroscience and Physiology, NYU School of Medicine, is the recipient of a 2020 Technology Impact Award from the Cancer Research Institute (CRI). Dr. Sanjana received this award to support his research study utilizing a new, high-throughput approach to overcome T-cell immunosuppression in pancreatic cancer.

Dr. Sanjana and his lab team will deploy innovative genome engineering technologies to manipulate in a high-throughput fashion all genes in the human genome. The objective is to comprehensively map all genes that can boost the effectiveness of CAR T-cell therapy to combat pancreatic ductal adenocarcinoma (PDAC), which accounts for nearly 90 percent of all pancreatic cancer cases. Despite decades of research and numerous clinical trials, there are no effective treatments for PDAC, and the median overall survival rate remains at under six months.

To date, chimeric antigen receptor (CAR) T cells — which are immune cells genetically engineered with an antibody linked to a T-cell activator — have met with limited success in treating PDAC. Like other immunotherapies, CAR T-cell therapy uses the body’s immune system to attack tumors.

“We are pleased that the Cancer Research Institute has recognized Dr. Sanjana for his innovative use of new genomic engineering technologies to translate genomics into clinical solutions to improve outcomes for cancer patients,” said Tom Maniatis, PhD, Evnin Family Scientific Director and Chief Executive Officer, NYGC. “The genetic targets discovered in this work might also be transferrable to other solid tumors where no effective therapies are currently available.”

The Cancer Research Institute is the world’s leading nonprofit organization dedicated exclusively to advancing immunotherapy to treat, control, and cure all types of cancers. “We are excited to be funding Dr. Sanjana’s promising research,” said Jill O’Donnell-Tormey, PhD, Chief Executive Officer and Director of Scientific Affairs, Cancer Research Institute. “The Technology Impact Awards are part of the continued investment CRI makes in brilliant young scientists conducting research that closes the gap between technology development and clinical application of cancer immunotherapies.”

“I am grateful to the Cancer Research Institute for supporting this new approach to improving cancer treatment through precision medicine,” said Dr. Sanjana. “Our goal is to combine genome engineering and single-cell analysis in primary human T cells to identify new genes that enhance the effectiveness of CAR T-cell therapy for pancreatic cancer. This approach may open novel avenues for the development of improved immunotherapies capable of overcoming immunosuppressive tumor microenvironments for many solid tumors and give us insight into fundamental mechanisms of a successful immune response.”
Historically, identifying genes that modulate anticancer responses has posed a major challenge because there are nearly 20,000 genes in the human genome that encode various proteins. Finding such modulators requires a systematic and high-throughput approach. Researchers use libraries of CRISPR gene-editing reagents that make it feasible to target every gene in the genome in a pooled fashion. Typically, these libraries are composed of multiple, independent genetic perturbations that target the same gene. Previously, Dr. Sanjana developed the first genome-wide CRISPR screens for immunotherapy in collaboration with researchers at the National Cancer Institute, creating an innovative ‘two-cell type’ CRISPR assay system (2CT CRISPR) that specifically examines how genetic mutations in one cell can affect the interaction between tumors and immune cells. A manuscript on this earlier work was published in 2017.

Dr. Sanjana’s project supported by the Cancer Research Institute will encompass deploying pooled CRISPR screens to identify genes that control T-cell responses; validating novel targets using primary human cells in vitro and in vivo; and dissecting mechanisms of improved targeting of PDAC via a multimodal toolkit of single-cell analysis technologies to capture transcriptomic, proteomic and epigenomic states of gene-perturbed cells.

Reference: Cancer Research Institute Technology Impact Award (CRI Award # CRI3283)

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About the New York Genome Center

The New York Genome Center (NYGC) is an independent, nonprofit academic research institution focused on furthering genomic research that leads to scientific advances and new insights and therapies for patients with neurodegenerative disease, neuropsychiatric disease, and cancer. Leveraging our strengths in whole genome sequencing, genomic analysis, and development of new genomic tools, the NYGC serves as a nexus for collaboration in disease-focused genomic research for the New York medical and academic communities and beyond.

NYGC harnesses the expertise and builds on the combined strengths of our faculty, staff scientists, member institutions, scientific working groups, affiliate members, and industry partners to advance genomic discovery. Central to our scientific mission is an outstanding faculty who lead independent research labs based at the NYGC, and hold joint tenure-track appointments with one of our member institutions.

Institutional founding members of the NYGC are: Cold Spring Harbor Laboratory, Columbia University, Albert Einstein College of Medicine, The Jackson Laboratory, Memorial Sloan Kettering Cancer Center, Icahn School of Medicine at Mount Sinai, NewYork-Presbyterian Hospital, New York University, Northwell Health, The Rockefeller University, Stony Brook University, and Weill Cornell Medicine. Institutional associate members are: American Museum of Natural History, Georgetown Lombardi Comprehensive Cancer Center, Hackensack Meridian Health, Hospital for Special Surgery, The New York Stem Cell Foundation, Princeton University, Roswell Park Cancer Institute, and Rutgers Cancer Institute of New Jersey.

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