Bloomberg Philanthropies, Johns Hopkins University School of Medicine, and The New York Stem Cell Foundation Research Institute Announce an Unprecedented Effort to Advance Precision Medicine

Unmatched Scope of Resources Will Identify Distinctive Disease Mechanisms in Small Patient Subgroups, Supporting Development of Custom Therapeutic Approaches

New York, NY (October 22, 2019) – Bloomberg Philanthropies, Johns Hopkins University School of Medicine (JHUSOM), and The New York Stem Cell Foundation (NYSCF) Research Institute today announced an initiative to fundamentally advance and expand the science of precision medicine, in which diagnostic disease markers are defined with pinpoint accuracy to help researchers understand disease pathways and customize therapeutic approaches. The collaboration will combine the renowned clinical and medical expertise of Johns Hopkins with the unique stem cell technologies and research capabilities of the NYSCF Research Institute to accelerate Hopkins' pioneering Precision Medicine Initiatives.

"Johns Hopkins is working intensively to realize the great promise of precision medicine for all those in our care, locally and globally," said Johns Hopkins President Ronald J. Daniels. "This significant new collaboration with Bloomberg Philanthropies and NYSCF moves us ever closer to that aim as we join together our far-reaching research capacities to advance knowledge and deliver better health outcomes for populations and people around the world."

This collaboration will also establish an unprecedented cache of human disease models available to researchers worldwide – thus promoting the real world application of precision medicine and driving a new paradigm for understanding and improving the approach to human disease.

"Bloomberg Philanthropies' mission is to ensure better, longer lives for the greatest number of people," said Michael R. Bloomberg, founder of Bloomberg LP and Bloomberg Philanthropies. "For years, Johns Hopkins University and the New York Stem Cell Foundation have shared that mission – and we're honored to deepen our partnerships with them as they explore new, innovative ways to save lives through the application of precision medicine."

Diseases manifest themselves differently in different patients. To understand the basis of these differences and to tailor treatments for specific patients, researchers need more accurate biological tools. Stem cell models provide a "biological avatar" of the patient from which they were created, allowing scientists and clinicians to better understand, define, and account for differences in individual patients and groups of patients.

The new initiative will use induced pluripotent stem cells to study disease characteristics in subgroups of patients, identifying markers that lead to varying disease manifestations. For example, by examining stem cells from seemingly similar patients with different forms of multiple sclerosis, we may be able to better understand the full range of disease mechanisms and pathways.

The Johns Hopkins Precision Medicine Initiative already includes 16 Precision Medicine Centers of Excellence (PMCOE), each focusing on a specific disease, and is now working to develop 50 Precision Medicine Centers in the next five years. Johns Hopkins believes that this advancement in the study and application of precision medicine has the potential to transform the diagnosis and

management of many diseases. Often, what is now categorized as a single disease is actually made up of multiple diseases that display similar symptoms, but require quite different therapies. Using a wide range of data sources, precision medicine seeks to better elucidate these differences, so that doctors can treat patients with precisely targeted therapies. At Johns Hopkins, dozens of researchers are bringing this idea to reality across a spectrum of debilitating and life-altering diseases.

In this collaboration, the process will begin with the full consent of patients in JHUSOM PMCOEs who wish to participate. Biological samples from the JHUSOM PMCOEs will be collected by the NYSCF Research Institute where scientists will create stem cell models of disease using the NYSCF Global Stem Cell Array®, the world's first end-to-end automated system for generating human stem cells in a parallel, highly controlled process. Integrating robotics and machine learning, NYSCF's technology reprograms skin or blood cells into stem cells, differentiates them into disease-relevant cell types, and performs genome editing to unravel the genetic basis of disease.

"The NYSCF Research Institute has invented and scaled the most advanced methods of human cell manipulation, which is critical for studying disease at the level of the individual patient," explained NYSCF CEO Susan L. Solomon. "By combining our capabilities with Johns Hopkins' extensive clinical data and expertise, we will be able to develop effective, personalized therapies for patients suffering from diseases with a high unmet need."

The stem cells generated by NYSCF will be used to research and drive effective therapeutic and diagnostic development in a wide range of diseases that include, but are not limited to, Multiple Sclerosis, Alzheimer's, chronic renal failure, and cancers of the lung, breast, prostate, pancreas, and bladder. These stem cell lines will reside in the NYSCF Repository and serve as an extraordinary resource in perpetuity for the disease research community. This vast collection will allow scientists unprecedented insights into the biochemical and genetic mechanisms underlying different diseases and subtypes thereof, thereby illuminating avenues for effective, tailored interventions.

"Stem cell science holds enormous potential for the treatment of a wide range of diseases," said Paul B. Rothman, dean of the School of Medicine and CEO of Johns Hopkins Medicine. "By combining this approach with Johns Hopkins' groundbreaking work on precision medicine, we are creating a scientific powerhouse that will help us advance medicine and science at an even faster pace. I am excited to see the discoveries and innovations that will be produced by this collaboration."

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About Bloomberg Philanthropies
Bloomberg Philanthropies invests in 510 cities and 129 countries around the world to ensure better, longer lives for the greatest number of people. The organization focuses on five key areas for creating lasting change: Arts, Education, Environment, Government Innovation, and Public Health. Bloomberg Philanthropies encompasses all of Michael R. Bloomberg's giving, including his foundation and personal philanthropy as well as Bloomberg Associates, a pro bono consultancy that works in cities around the world. In 2018, Bloomberg Philanthropies distributed $767 million. For more information, please visit bloomberg.org or follow us on Facebook, Instagram, YouTube, and Twitter.

About The New York Stem Cell Foundation Research Institute
The New York Stem Cell Foundation (NYSCF) Research Institute is an independent non-profit organization accelerating cures and better treatments for patients through stem cell research. The NYSCF global community includes over 180 researchers at leading institutions worldwide, including the NYSCF – Druckenmiller Fellows, the NYSCF – Robertson Investigators, the NYSCF – Robertson Stem Cell Prize Recipients, and NYSCF Research Institute scientists and engineers. The NYSCF Research Institute is an acknowledged world leader in stem cell research and in developing pioneering stem cell technologies, including the NYSCF Global Stem Cell Array® and in manufacturing stem cells for scientists around the globe. NYSCF focuses on translational research in an accelerator model designed to overcome barriers that slow discovery and replace silos with collaboration. For more information, visit www.nyscf.org or follow us on Twitter, Facebook, and Instagram.

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