ADVANCING THE FUTURE OF TRANSFUSION MEDICINE

 **Regenerative Medicine**

* New York Blood Center’s (NYBC) world-renowned researchers are challenged with solving blood science’s most perplexing problems to save lives today and into the future. Central to that future is regenerative medicine and the creation of a Regenerative Medicine Institute focused on the restoration of function in diseased or aged tissues through revitalization of existing cells or transplantation of new cells.
* While medicine has historically been a means to cure or treat symptoms of disease or the aging process, regenerative medicine enables the body to repair, replace, restore, and regenerate damaged or diseased cells, tissues, and organs. NYBC’s interdisciplinary team of experts who work to translate scientific discovery into lifesaving clinical therapies, recognize the power of regenerative medicine to revolutionize health care.
* Regenerative medicine offers the ability to grow red blood cells and platelets from cord blood cells, thereby eliminating the risk of transferring infectious disease—growing red cells and platelets from cord blood cells is a practice that NYBC researchers are farther along in developing than many of their peers around the world.
* Though regenerative medicine includes aspects of many disciplines, it most directly includes cellular therapies—the injection of cellular materials into a patient, which positions NYBC to play a specific and profound role in its evolution.
* NYBC’s National Cord Blood Program’s established and originating history provides the foundation upon which all of NYBC’s cell therapy manufacturing capabilities can grow.
* In addition to NYBC’s tradition of excellence in the field, NYBC is already an FDA-regulated cell manufacturing facility, which befits the type of state-of-the-art, quality-controlled environment this work requires.

 **Groundbreaking Research**

* NYBC’s Lindsley F. Kimball Research Institute (LFKRI) carries on its tradition of excellence through transformative research. Whether growing platelets from stem cells or pooling the blood of multiple donors to create a safer, more plentiful blood product for patients, NYBC research continues to focus on innovations that greatly improve patient care.
* Platelet Biology Laboratory primary investigator Dr. William Beau Mitchell’s pioneering research focuses on the biology of platelets in patients with blood disorders as well as the generation of platelets from stem cells, including developing technology for large-scale production of platelets from stem cells; studying the inflammatory role of platelets in sickle cell disease; and studying platelet biology of patients with rare platelet disorders.
* LFKRI is at the forefront of research efforts to rid the blood supply of pathogens of all types, leading to the development of many technologies to eradicate pathogens without harming the blood cells or generating toxic chemical agents, including solvent detergent that inactivates hepatitis and HIV viruses from donated plasma.
* Blood supply safety and reliability is central to providing the highest quality transfusion products to patients in need. Though tests used to screen blood and blood products must meet vigorous standards set by the FDA, there are still infectious diseases that available tests cannot detect. LFKRI researchers are working diligently to develop a standardized, pathogen-inactivated red cell product to enhance safety in blood transfusion.
* LFKRI’s Laboratory of Membrane Biology received a significant grant from the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health to develop a comprehensive mechanistic understanding of the regulation of terminal erythroid differentiation in the production of red blood cells in normal and disease states. This research will lead to a better understanding of erythroid cell development and differentiation and provide insight into disordered red cell production in several human red cell disorders that considerably impact global health, including Cooley's anemia, malarial anemia, congenital dyserythropoietic anemia, Diamond-Blackfan Anemia, and various bone marrow failure syndromes such as myelodysplasia.

**Blood Products and Services**

* While NYBC’s pioneering scientific breakthroughs will always be moving forward, the Blood Center still relies on the only source of blood for patients in need: blood donors. Some 2,000 volunteer donors are needed each day to meet the daily blood and transfusion service needs of the more than 20 million people in New York City, Long Island, Hudson Valley, New Jersey, Connecticut, and Pennsylvania.
* More than one million blood products are delivered to nearly 200 hospitals each year—blood products that bring life to cancer and surgery patients, accident and burn victims, newborn babies and delivering mothers, AIDS and sickle cell anemia patients, organ transplant recipients and many others.
* Over 1,200 dedicated employees oversee donor recruitment and the collection, processing, and distribution of blood products 24 hours a day, 7 days a week, 365 days a year.
* NYBC operates 18 blood donation centers and 50 mobile blood drives each day, moving some 2,800 pieces of equipment to support blood operations. The Blood Center also delivers 1,300 supplies and makes 200-300 hospital deliveries each day to support patient blood needs.