Transplant Surgery Scientist Training Program (TSSTP) Project

Determining Factors Associated with Increased Risk of Mortality among Patients with Cirrhosis Independent of MELD Score Using Large Population EMR Data (HealthLNK)
Kofi Atiemo, MD (Primary Mentor: Daniela Ladner, MD, MPH)
Dr. Kofi Atiemo has dedicated two years of research as part of the Transplant Surgery Scientist Training Program (TSSTP) through the Northwestern University Outcomes Research Collaborative (NUTORC) track, under the guidance of Dr. Daniela Ladner (outcomes research), Dr. Abel Kho (Bioinformatics) and Dr. Lihui Zhao (Biostatistics and Epidemiology). Over these 2 years, Dr. Atiemo gained new skills in large data acquisition, statistical programming and data analysis through mentored projects, and by pursuing a Master’s degree in Biostatistics and Epidemiology. Dr. Atiemo’s project mainly worked with HEALTHLNK data, aggregated electronic health record data obtained from 6 healthcare institutions in the Chicago metropolitan area including Northwestern. His main project involved identifying patients with cirrhosis who had a greater risk of death than predicted by the model for end-stage liver disease (MELD) score, and examining whether some of these patients could potentially benefit from liver transplantation. This project was presented at the American Transplant Congress (ATC) 2016 & 2017 and the American Society of Transplant Surgeons (ASTS) winter symposium 2017. Dr. Atiemo’s main project has been recently published in the American Journal of Transplantation.

Development and Evaluation of Synthetic 3D Scaffolds for Maintenance of Viability and Function of Primary Hepatocytes
Jessica Hoch Brown, PhD. (Primary Mentor: Jason Wertheim, MD, PhD)
Dr. Jessica Hoch Brown dedicated her T32 Scientist training to finding alternative approaches such as liver cell-based therapies and liver tissue engineering utilizing hepatocytes, the main cells of the liver. Dr. Brown’s research efforts through the T32 Northwestern University Collaborative for Transplant Research in Immunobiology and Biomedical Engineering (NUCTRIBE) track have focused on the development of a biocompatible scaffold that can provide an environment for the preservation of hepatic function and viability in vitro. With close guidance from her mentor, Dr. Jason Wertheim, she has employed a novel liquid-electrospinning technique to produce a highly porous, three-dimensional (3D) nanofibrous scaffold composed of a biocompatible polymer, PLGA. Her project’s goal was to assess if these 3D nanofibrous scaffolds could serve as a platform for evaluating the maintenance of primary hepatocyte viability and function. Results from the study demonstrate that primary hepatocytes cultured on electrospun PLGA ECM-modified nanofibers show preservation of liver-specific functions and liver-specific gene expression. These 3D electrospun scaffolds have potential to be used as a platform for further studies on how to uphold the function of hepatocytes in vitro.

Defining Mechanisms of Neutrophil Influx into the Allograft after Lung Transplantation
Stephen Chiu, MD (Primary Mentor: Ankit Bharat, MD)
Under the guidance of Dr. Ankit Bharat, as part of his Transplant Surgery Scientist Training Program (TSSTP), Dr. Stephen Chiu has been investigating the mechanisms by which injurious activated neutrophils are recruited into transplanted organs and cause primary graft dysfunction, the clinical syndrome responsible for the majority of early post-transplant organ failure. In collaboration with the Comprehensive Transplant Center Microsurgery Core and the divisions of Pulmonary Critical Care Medicine and Rheumatology, they have identified donor-derived non-classical monocytes as the primary drivers of neutrophil recruitment into the transplanted lung. Ongoing studies involving the targeting of non-classical monocytes in organ donors will determine mechanisms by which these cells could be depleted or their activation dampened. In the future, this could help prevent early post-transplant organ failure and improve outcomes for organ recipients.

Immune mechanisms of lung ischemia reperfusion injury
Ramiro Fernandez, MD (Primary Mentor: Ankit Bharat, MD)
Dr. Ramiro Fernandez has focused his NIH T32 training, under the Northwestern University Collaborative for Transplant Research in Immunobiology and Biomedical Engineering (NUCTRIBE) track, on the mechanisms of lung injury after lung transplantation, more specifically, how the immune system may be involved in lung dysfunction after lung transplantation. Under the guidance of his mentor, Dr. Ankit Bharat, Dr. Fernandez is studying the mechanisms by which certain subsets of immune cells traffic to the lung and mediate injury. The findings of this research have the potential to greatly improve outcomes after lung transplantation by developing novel targeted therapies to improve lung graft function after transplant.

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