The Comprehensive Transplant Center (CTC) Endowment Fund has been used to support ambitious, audacious and innovative research that is not typically funded by federal agencies and industry partners. The first pilot cycle of the endowment grant, issued in FY18, is now complete. Below are the awardee’s findings which was made possible by the CTC endowment and their plans for future research.

Katherine Hekman, MD, PhD was awarded funds for her study entitled, “Metabolic Reprogramming in Nephron Progenitor Cell Directed Differentiation”. The goal is to identify key metabolic regulators and drivers of in vitro differentiation of nephron progenitor cells (NPCs) and kidney organoids. Through a comprehensive metabolic screening, her study team previously identified glutamine and related metabolites as the most significantly changed, and in this project they validated these findings by performing differentiation of human pluripotent stem cells to NPCs and to kidney organoids in the presence and absence of glutamine and its related metabolites. These studies further demonstrated the critical role of glutamine in NPC and kidney organoid differentiation as glutamine deprivation led to a more complex population of podocytes by single cell RNA-seq analysis. Together these findings illustrate a critical role for glutamine in the kidney’s development and regeneration.

Mary Rinella, MD was awarded funds for her study, “Noninvasive Diagnosis of Disease Recurrence in Patients Transplanted for NASH Cirrhosis”. The study objective was to identify novel metabolites able to differentiate NASH from other causes of liver dysfunction and assess the accuracy of a metabolomic biomarker panel to identify patients with NASH recurrence following liver transplantation. Grant funds are being used to collect and process subject samples, store samples in a growing biorepository, and cover costs associated with metabolite analysis. The initial pilot study identified several promising biomarkers and her team will pursue additional funding to support an expanded study that evaluates the utility of metabolomic biomarkers to identify recurrent NASH in the liver transplant population and reduce the need for liver biopsy.

Sarah A. Taylor, MD was awarded funds for her research entitled “The Mechanistic Implications of a Limited Immunoglobulin Repertoire in Biliary Atresia”. With funding for this study she advanced the understanding of the role for B cells in the immune pathogenesis of biliary atresia through a combination of monoclonal antibody synthesis and scRNA-sequencing analysis. Transcriptional data produced from this study contributed to earning additional funding from the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) Young Investigator Award. Data from the endowment grant will also supply key preliminary data for upcoming National Institute of Health grant applications.

Lisa Van Wagner, MD was awarded funds in support of her research entitled, “Change in Body Composition in Liver Transplant Recipients Over Time and Impact on Clinical Outcomes”. The data suggests that body composition profiling (BCP), such as adipose tissue and muscle volumes, may be more accurate markers of liver transplant risk. This study sought to assess the feasibility of a rapid six minute magnetic resonance (MR)-protocol for BCP in liver transplant candidates and to describe the distribution and change over time in BCP in relation to body mass index (BMI). The study found that MR-assessed body composition changes substantially over time in waitlisted liver transplant candidates and recipients. Future studies will focus on how these markers correlate with clinical outcomes and whether or not interventions, such as muscle strengthening and diet/physical activity, can change these patterns in order to improve clinical outcomes among liver transplant recipients. Her team continues to perform deep phenotypic analysis of the data with plans to submit for additional funding to support a multicenter study addressing the impact of BCP on clinical outcomes in liver transplant waitlist candidates and recipients in 2020.

To learn more about the CTC Transplant Innovation Endowment Grant please email ctc@northwestern.edu.