Transplant Immunology / Histocompatibility Core

Organ and Stem-Cell transplantation have become the treatment of choice for end-stage organ failure and some hematologic malignancies. A critical component in achieving successful outcomes after transplantation is assuring histocompatibility between the recipient and his/her organ or stem-cell donor. The mission of the Histocompatibility core is to develop and provide state of the art tools, services and consultation to improve donor selection as well as monitor donor-specific immune responses or engraftment after transplantation in order to detect and treat potential rejection episodes or recurrence of original malignancy.

Histocompatibility antigens are cell surface markers that are quite unique to each individual. They are determined genetically and therefore can be shared between family members, increasing the likelihood of better matching between the donor and the recipient. These molecules are identified (typed) in our laboratory by a variety of polymerase chain reaction (PCR)-based molecular biology methods including Sequence Specific Priming; Sequence Specific Oligonucleotide Probe hybridization; and Sanger-Sequence Based Typing. The laboratory is now in the process of introducing human leukocyte antigens (HLA) typing by Next Generation Sequencing as well. One of the major culprits in orchestrating rejection episodes in solid organ transplantation are antibodies that are directed specifically against histocompatibility antigens presented on donor cells. Such antibodies can be present in the patient’s circulation prior to transplantation due to historic sensitizing events, or develop de-novo following the organ transplant. The presence of these donor-specific HLA antibodies will likely lead to diminished allograft function or allograft loss. To monitor for the potential presence of donor-specific antibodies the laboratory uses highly specific and sensitive solid-phase single-antigen micro-array platforms including a flow cytomter and luminex instruments. The monitoring of engraftment in the context of stem-cell and cord-blood transplantation utilizes Short Tandem Repeat analysis.

The Transplant Immunology/Histocompatibility core is currently supporting all transplant programs at Northwestern Memorial Hospital including Kidney, Pancreas, Liver and Islet-cells as well as Heart and Lung stem-cell and cord-blood transplantation. For Ann & Robert H. Lurie Children’s Hospital of Chicago, we support the pediatric kidney and heart transplant programs. The core is instrumental in providing real-time consultation at the time of deceased donor offers. We also support the Kidney Paired Donation program.

Training of young Histocompatibility Laboratory Directors is also part of the mission of the Transplant Immunology/Histocompatibility core. We are one of a handful of labs around the country that have an approved, active, Director-In-Training (DIT) program that graduates at least one DIT fellow annually. Currently the core has 3 DITs.

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