Immune Monitoring Core
Joseph R. Leventhal, MD, PhD & James M Mathew, PhD

New: The Immune Monitoring Core (IMC) of the Northwestern University Comprehensive Transplant Center (NUCTC) is poised to provide its human cell culture and functional testing services to Northwestern and outside groups.

The IMC opened in January 2008 with the original mission to develop ex vivo assays of immune mechanisms in transplant recipients under the leadership of Joshua Miller, MD and James M. Mathew, PhD. Since its inception, the IMC has been involved mainly in three research areas, publishing more than sixty abstracts and papers:

1. Determination of the tolerogenic potential or the lack thereof of commonly used transplant immunosuppressive drugs (IS): The Treg-MLR developed in the laboratory was used to quantify the development of new CD4+CD125-CD25HighFOXP3+ regulatory T cells (Tregs) in mixed lymphocyte reactions (MLR) in the presence of various IS. For examples, using this assay Sirolimus (also known as Rapamycin®), Mycophenolic Acid (in vivo active metabolite of Mycophenolate Mofetil) and Alemtuzumab (also known as Campath-1H) were found to augment Tregs. Conversely, Tacrolimus (also known as Prograf or FK506) (and by extension Cyclosporine-A), Belatacept (Nulojix®) were deemed unfavorable to Tregs.

2. Investigation into biomarkers of clinical transplant tolerance: Two tolerance protocols that are receiving national attention are currently being conducted at the NUCTC. The IMC has developed and is providing biomarker assays to safely and totally withdraw immunosuppressive drugs in these patients.

3. Development of assays for detecting or predicting adverse events (rejection) in transplant recipients in a non-invasive manner. The immune processes of transplant rejection have been detectable only by invasive and sometimes risky biopsies for histopathological examinations. IMC is developing or employing new blood based tests or other physiological indicators of organ dysfunction.

Now, the IMC is developing a broader mission of providing human cell culture as well as functional and associated immune assays to investigators at Northwestern and external research communities. Following are some of the assays that can be made available on the basis of fee for service (others can be custom developed, if needed):

1. Cell Cultures; Biopsy cultures
2. MLR and proliferation assays by 3H-Thymidine incorporation and/or CFSE dilution,
3. Flow sorting of MLR responding and proliferating cells (for subsequent TCR and BCR clonotypic analyses by Adaptive Biotechnologies)
4. Cells Mediated Lympholysis (CML), Micro-CML and cytotoxicity assays using 51Chromium release,
5. Limiting Dilution Analysis (LDA) for CTL and Helper Precursors (CTLp and HTLp),
6. Colony forming assays,
7. 5 & 10 Color Flow for Cell Subsets and Intracellular molecules such as FoxP3
8. Cytokine Assays in Cell Subsets (Flow) and Culture Supernatants (Luminex)
9. ELISPOT Assays for IFN-γ, Granzyme-B and other cytokines
10. Transvivo Delayed Type Hypersensitivity Assay (TV-DTH).
11. Mycoplasma testing
12. Humanized mouse assays for stem cell and immune subset mediated tolerance, including use of NSG mouse human skin graft model (with the Microsurgery Core)

Our mission is to reach the pinnacle of academic excellence such that the Comprehensive Transplant Center at Northwestern University is considered synonymous with best clinical practice, high impact research, and the most desirable training program in transplantation.

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For more information or to utilize the services of the IMC, please contact Dr. Mathew (james-mathew@northwestern.edu).