Advances in Transplantation Immunology
Vancouver, September 1st and 2nd, 2015

Next Generation Sequencing, Epitope Analysis and MHC Antibodies in Organ and Stem Cell Transplantation

Cutting-edge innovations for clinical, laboratory and research teams:
Advances in gene sequencing and proteomics; Role of HLA in human disease: NGS typing of HLA and other MHC genes; Epitope analysis and matching; Measurement and interpretation of complex HLA antibodies; Clinical implication of new methods for transplantation matching and management; Introducing new technologies to the clinical laboratory; and Bioinformatics analysis of NGS and epitope data. Plenary speakers include: Dr. Henry Erlich, Roche Discovery Research and Human Genetics, Dr. Rene Duquesnoy, Professor Emeritus, University of Pittsburgh.

Space for this symposium is strictly limited. To confirm your registration please contact:

www.vchri.ca/ngssymposium

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Next Generation Sequencing (NGS) offers enormous potential to enhance the field of HLA typing, through precise determination of nucleotide sequences across the full length of the human genes, phase resolution to minimize ambiguity, multiplexing for scalable analysis, and high-throughput via laboratory automation. Introduction of NGS to the clinical laboratory brings specific challenges including computing support and data storage, computational analysis and bioinformatics, and the limitations of reference data in current repositories. This symposium will address these issues in preparation for the advent of this new technology.

8.00 am  Breakfast Meet and Mix, Exhibits

Session 1:  9.00 – 10.30 NGS and HLA (part 1). Chairs: K. Tinckam and N. Berka
Plenary: Dr. Henry Ehrlich: Advances and Implications of HLA Gene Sequencing

10:30 am  Coffee break

Session 2:  11.00 – 12.30 NGS and HLA (part 2). Chairs: E. Wagner and J. Li

12:30 pm  Lunch, Discussions, Interactions and Exhibits

Plenary: Martin Maiers, Introduction to Bioinformatics of HLA and the NMDP

15:00 pm  Coffee break

Session 4:  15.30 – 17.00 Directors Meetings and Wet lab demonstrations

HLA epitope based matching offers new opportunities to tackle the problem of antibody-mediated rejection in solid organ transplantation. This conference addresses basic concepts of antibody-defined HLA epitopes including antigenicity and immunogenicity. Epitope-based interpretations of antibody reactivity patterns with HLA panels in different assays permit more precise assessments of HLA mismatch acceptability for sensitized patients. Epitope-based determinations of HLA mismatch permissibility offer new strategies of reducing antibody responses in non-sensitized patients.

8.00 am  Breakfast Discussions, Interaction and Exhibits

Session 5:  9.00-10.30 Introduction to epitope analysis. Chairs: P. Campbell and C. Wiebe
Plenary: Dr. Rene Duquesnoy: Concepts of HLA class I, class II and MICA epitope structure; International Registry of HLA Epitopes and HLAMatchmaker

10:30 am  Coffee break

Session 6:  11.00 – 12.30 Epitope Matching – Acceptable mismatches. C. Daniel and L. Hidalgo
Plenary: Dr. Anat Tambur: Molecular Typing, Epitope Allocation, and Translation to Practice

12:30 pm  Lunch, Discussions, Interactions and Exhibits

Session 7:  13.30 – 15.00 Antibody definition and Interpretation. Chairs: R. Liwski and L. Allan

15:00 pm  Coffee break

Henry A. Erlich PhD. Director, Children’s Hospital and Res. Ctr. At Oakland Director, Roche Molecular Systems In 1985, Dr Erlich pioneered the development of polymerase chain reaction (PCR) and its application to genetic analysis, starting with the diagnosis of sickle cell anemia and, in 1986, the first forensics application of DNA testing in the United States. Dr Erlich pioneered the development of DNA-based HLA typing and has more recently been instrumental in developing and applying the 454 Life Sciences Genome Sequencer next-generation sequencing system for high-throughput, high resolution clonal HLA genotyping. This high-resolution HLA typing system has allowed the detection and quantification of maternal cells in a SCIDS patient. In particular, Dr Erlich’s group studies human leukocyte antigen (HLA) and mitochondrial DNA (mtDNA) variation and the mechanisms that generate this variation; these genetic systems are well known for their applications in the histocompatibility and forensics fields, but are also pertinent to studies of human disease, history, and evolution. Dr. Erlich’s immunogenetics research has long focused on genetic associations with complex diseases, and on autoimmunity and on type 1 diabetes in particular. These studies have demonstrated that multiple HLA class I and class II alleles and haplotypes contribute to susceptibility and resistance to type 1 diabetes, as well as to other autoimmune diseases. The prediction and, ultimately, the prevention of type 1 diabetes is a major research goal. Dr. Erlich is also Director of Human Genetics and Vice-President of Discovery Research at Roche Molecular Systems in Pleasanton, California.

Rene J. Duquesnoy, Ph.D. University of Pittsburgh Medical Center Rene Duquesnoy was born in the Netherlands where he obtained a M.Sc. degree in chemical engineering from the Technological University of Delft. He received a Ph.D. in pathology from the University of Tennessee in Memphis and did a post-doctoral fellowship with Robert A. Good at the University of Minnesota. After his affiliation with the Medical College of Wisconsin and The Blood Center of Wisconsin, in 1984 he became a tenured professor of pathology, with joint appointments in immunology and surgery at the University of Pittsburgh Medical Center. Until 2006 he was a director of UPMC tissue typing laboratory where he currently serves as a clinical consultant. Rene’s research deals with HLA and transplantation immunology. His curriculum vitae lists 350 publications and more than 450 scientific presentations at national and international meetings. Milestones include cross-reactive HLA matching in platelet transfusions, the discovery of the MB system (now called HLA-DQ), alloreactivity of graft-infiltrating T-cells, the dualistic role of HLA in liver transplantation, role of stress proteins in transplant immunity, and the antibody analysis of highly-sensitized patients. Most recently, his NIH grant-supported studies deal with a structurally-based histocompatibility algorithm called HLAMatchmaker. Downloadable programs and detailed information are available on the Web site http://tpis.upmc.edu. Rene was president of ASHI in 1986-87 and he conducted the HLA proficiency testing surveys for ASHI from 1981-2007. He serves on the editorial boards of Human Immunology, Tissue Antigens, Transplant Immunology and Transplantation.

Martin Maiers is the Director of the Bioinformatics Department at the National Marrow Donor Program, based in Minnesota in the United States, a position he has held since January 2007. He is responsible for numerous applications within the field of allogeneic transplantation, managing large databases of genetic data relating to the genes of the immune system for application to clinical practice in (unrelated hematopoietic stem cell transplantation) and clinical research. Prior to joining his current role, Martin Maiers served as the Manager for Bioinformatics at NMDP for nine years and as Manager of the CCN Tools Group with Cray Research for 4 years. His research covers a broad range of genomics and proteomics in the MHC and related diseases, with particular recent focus on
the application of next generation sequencing to the genes in the HLA, KIR and related regions, and the bioinformation management of information for translation to clinical practice.

Dr. Tambur is the Director of the Transplant Immunology Laboratory and a Research Professor at the Comprehensive Transplant Center, Northwestern University, Chicago, Illinois. Dr. Tambur obtained her doctoral degree from the Hebrew University in Jerusalem Israel and her PhD degree in Immunogenetics with Prof Chaim Brautbar at the Hadassah School of Medicine, Hebrew University, Jerusalem, Israel. She joined Prof Howard Gebel at Rush University where she obtained her ABHI diplomate and worked as the director of the HLA laboratory. Dr. Tambur’s research focuses on understanding the role of donor-specific HLA antibodies in the context of solid organ transplantation with specific emphasis on the significance of antibody affinity and strength. This information is then transplanted into risk stratification of patients. Recently her work was dedicated to understanding HLA-DQ antigen antibody interactions and specifically understanding of the newly emerging concept of HLA epitopes. Anat had served on several ABHI and ASHI committees, was an ASHI board member and the president of ABHI. Her society work focused mainly on quality and educational roles. Clinically she is involved with kidney, pancreas, liver, heart and stem cell transplant programs and has contributed mainly to the desensitization program for both the kidney and heart transplant recipients as well as the Kidney Paired Exchange program.