Teaching/Discussion Points

a. Thymic development and T cell signaling
b. Why are there alloreactive T cells in the first place?
c. Major T cell types and their roles: CD8, CD4, Tregs, central/effector memory, tissue resident vs. lymphoid
d. Cytokines and their associated helper T cell subsets and their roles: Th1, Th2, Th17
e. T cell Metabolome

9:30 AM ***B cells: You too Can be a B-liever***
Simon Urschel, MD, PhD, University of Alberta, Edmonton, Canada

Teaching/Discussion Points

a. How does antibody-mediated rejection happen?
b. From co-stimulation to complement and antibody-dependent cellular cytotoxicity, with attention to therapeutic targets
c. B cells in antigen presentation
d. Immune protection from B cells (suppression, cytoprotection, immune regulation)

9:45 AM ***Q&A with Panel***

10:00 AM – 10:30 AM
COFFEE BREAK

10:30 AM – 11:45 AM
SESSION 3 – INNATE IMMUNITY IN THORACIC TRANSPLANTATION
Chair: John Greenland, MD, PhD, University of California San Francisco, San Francisco, CA, USA

10:30 AM ***Overview of Innate Immunity in Transplantation: Every Body Needs a Hero***
Glen Westall, MD, PhD, Alfred Hospital, Melbourne, Australia

Teaching/Discussion Points

a. The various barriers of innate immunity (physical, chemical and cellular)
b. Signaling pathways (TLR, PRR, DAMPs, PAMPs)
c. Interaction of complement and innate immune cells with adaptive immunity
d. The role of innate immunity in ischemia-reperfusion injury
e. Contrast lung versus heart-specific concepts.

10:45 AM ***Neutrophils: The First Responders***
Andrew Gelman, PhD, Washington University, St. Louis, MO, USA

Teaching/Discussion Points

a. Characteristics of neutrophils and role in inflammation
b. Neutrophil extracellular traps (NETs)
c. The role of neutrophils in transplantation

11:00 AM ***Macrophages and Dendritic Cells: The Usual Suspects***
Stephen Juvet, MD, PhD, University of Toronto, Toronto, Canada

Teaching/Discussion Points

a. Characteristics of macrophages and DCs
b. Phagocytosis, antigen processing and presentation
c. The role of DCs and macrophages in inflammation and transplantation

11:15 AM ***Innate Lymphoid Cells: The Unusual Suspects***
Christine Falk, PhD, Hannover Medical School, Hannover, Germany

Teaching/Discussion Points

a. Characteristics of ILCs, NK cells and T cells
b. The role of ILCs, NK cells and T cells in inflammation and transplantation
c. Immune memory in innate immunity

11:30 AM ***Q&A with Panel***

11:45 AM - 12:30 PM
SESSION 4 –FIBROSIS AND TOLERANCE IN THORACIC TRANSPLANTATION
Chair: Tereza Martinu, MD, MHS, University of Toronto, Toronto, Canada

11:45 AM ***Transplantation Endgame: Fibrosis Pathways***
Stijn Verleden, PhD, KU Leuven, Leuven, Belgium

Teaching/Discussion Points

a. The roles and manifestations of fibrosis in chronic rejection of the heart and lung
b. Triggers of fibrosis
c. Injury and dysregulated repair
d. Pro-fibrotic factors; Fibroblast phenotypes
e. Extracellular matrix; Origins of fibroblasts (local proliferation and migration, fibrocytes, epithelial-mesenchymal transition)

12:00 PM ***Infinity Wars: Will Tolerance Prevail?***
Joren Madsen, MD, Dphil, Massachusetts General Hospital, Boston, MA, USA

Teaching/Discussion Points

a. Operational definitions of tolerance
b. Types of regulatory cells
c. Current strategies to achieving tolerance in pre-clinical and clinical thoracic transplantation

12:15 PM ***Q&A with Panel***

12:30 AM – 1:45 PM
LUNCH BREAK (a box lunch is included in the registration fee)

1:45 PM – 2:45 PM
SESSION 5 – INFECTION AND IMMUNITY IN THORACIC TRANSPLANTATION
Chair: Esme Dijke, PhD, University of Alberta, Edmonton, Canada

1:45 PM ***Scylla and Charybdis: How Infections Potentiate Rejection***
Andrew Gelman, PhD, Washington University, St. Louis, MO, USA

Teaching/Discussion Points

a. Bacterial activation of pathogen-specific responses (PAMPs, DAMPs)
b. Specific case of pseudomonas
c. Viral effects on antigen presentation and interferon-dependent immunity
d. Heterotopic immune responses.

2:00 PM ***Streetlight Effect: How to Monitor Post-Transplant Immune Responses***
John Greenland, MD, PhD, University of California San Francisco, San Francisco, CA, USA

Teaching/Discussion Points

a. Strategies to assess immunosuppression level and infection vs. rejection risk
b. Elispots (CMV, EBV, TB, allo-reactive etc.)
c. Immunoknow; Cell-free DNA
d. Microvesicles/cross-dressing
e. BAL immunophenotyping/cytokines.

2:15 PM ***They Came from the Swamp: Microbiome***
Tereza Martinu, MD, MHS, University of Toronto, Toronto, Canada

Teaching/Discussion Points

a. Gut and lung microbiome
b. Effects of microbiota on immune responses
c. Role of microbiome in transplantation
d. Microbiome-derived metabolite effects on the immune system.

2:30 PM ***Q&A with Panel***

2:45 PM - 3:45 PM
SESSION 6 – THERAPEUTICS IN THORACIC TRANSPLANTATION
Chair: Tereza Martinu, MD, MHS, University of Toronto, Toronto, Canada

2:45 PM ***Mechanisms of Immunosuppression: The Empire Strikes Back***
Erik Epailly, MD, Centre Hospitalier de l'Université de Strasbourg, Strasbourg, France

Teaching/Discussion Points

a. Molecular pathways and specific cell types targeted by current immunosuppressants
b. How these mechanisms play into the effects of immunosuppression

3:00 PM ***Novel Agents in the Pipeline: A New Hope***
Glen Westall, MD, PhD, Alfred Hospital, Melbourne, Australia

Teaching/Discussion Points

a. New agents being developed for immunosuppression or immunomodulation and their mechanisms of action

3:15 PM ***Cell Therapy in Transplantation: The Force Awakens***
Sonja Shrepfer, MD, PhD, University of California San Francisco, San Francisco, CA, USA

Teaching/Discussion Points

b. Current state on cell therapy in transplantation
c. Different types of cell therapy; Future directions
d. Can cell therapy make use of ex-vivo organ perfusion?

3:30 PM ***Q&A with Panel***

3:45 PM - 4:15 PM
COFFEE BREAK

4:15 PM - 5:45 PM
SESSION 7 – TRANSPLANTATION TOOLS OF THE TRADE
Chair: John Greenland, MD, PhD, University of California San Francisco, San Francisco, CA, USA

4:15 PM ***OMICS: Ralph Breaks the Internet***
Edward Cantu III, MD, MSCE, University of Pennsylvania, Philadelphia, PA, USA

Teaching/Discussion Points

a. Genomics, Transcriptomics, Proteomics, Metabolomics
b. Considerations for Big Data analysis
c. Focus on the use of these tools for the study of ischemia-reperfusion injury

4:30 PM ***Cellular Assays: The Sixth Sense***
Carla Baan, PhD, University Hospital Rotterdam, Rotterdam, The Netherlands

Teaching/Discussion Points

a. Describe the concepts behind high parameter flow cytometry and mass cytometry, Seahorse assay, confocal and intravital microscopy
b. Focus on the use of these tools for the study of acute cellular rejection

4:45 PM ***Design and Analysis of Cohorts for Translational Research: Full House***
Edward Cantu III, MD, MSCE, University of Pennsylvania, Philadelphia, PA, USA

Teaching/Discussion Points

a. Describe approaches to designing cohorts for translational studies in thoracic transplantation
b. What controls should be considered
c. Sources of bias
d. Statistical Power
e. Survival Analysis (censoring and competing risks)
f. Focus on the use of these tools for the study of antibody-mediated rejection

5:00 PM ***Mouse Modeling in Thoracic Transplantation: Secrets of NIMH***
Stephen Juvet, MD, PhD, University of Toronto, Toronto, Canada

Teaching/Discussion Points

a. Describe approaches to designing mouse model-based studies
b. What controls need to be considered
c. Genetically-engineered mice
d. Focus on the use of these tools for the study of chronic rejection.

5:15 PM ***CRISPR CAS/9 System: Jurassic World III***
Sonja Shrepfer, MD, PhD, University of California San Francisco, San Francisco, CA, USA

Teaching/Discussion Points

a. Explain the basis of the CRISPR CAS/9 system and how it can be used in genetic manipulation
b. How can CRISPR CAS/9 be used in thoracic transplantation
c. Focus on the use of these tools for xenotransplantation

5:30 PM ***Q&A with Panel***

5:45 PM SUMMARY / EVALUATION
Tereza Martinu, MD, MHS, University of Toronto, Toronto, Canada
Esme Dijke, PhD, University of Alberta, Edmonton, Canada
John Greenland, MD, PhD, University of California San Francisco, San Francisco, CA, USA

6:00 PM
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