

Submission No.: PG12-5413

Session : Postgraduate Course 12 (Basic)

Date & Time, Place : November 17 (Thu), 15:00-16:30, Room 6F-1

Session Title : Immunology of xenotransplantation

Multomics toolkits for xenotransplantation research

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Scientific findings were led by invention of technologies. To decode the immunologic barriers existed in xenogeneic transplantsations, I suggest to use the recently developed multomics toolkits including scRNAseq, mass cytometry, spatial transcriptomics. Herein, I introduce the commercial platforms that can be easily applied in immunologic research in xenotransplantation.

1. Commercialized platform: 10x Chromium (dropseq)
 2. Targeted single cell proteomics: Helios (CyTOF)
 3. Spatial Transcriptomics: Nanostring GeoMX
 4. Nanostring GeoMX pipeline
 1. Sample preparation
 1. FFPE (Hospital, pathologic diagnosis grade, individual lab based research grade)
 2. Formalin would change the structure of the molecules including transcript
- 10 year-old FFPE available, I confirmed 8-year-old Monkey sample
 1. Desiccator after slide cut is needed
 2. Multiple sections within 35mmx18mm available
 - 1. Hybridization/Visualization
 1. WTA: Five independent target specific probe/given transcript (18K transcript)
 2. Morphology Marker: four independent
 - Morphology marker should be compatible with antigen retrieval method GeoMX applied
 1. cDNA QC/Library prep/Sequencing à fixed pipeline
 2. Align (Cellranger/Reference)
 3. Data QC (Probe QC)

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4. Data Normalization (Q3)
 5. Dimension Reduction: Umap/tSNE/vSNE, PCA → How many AOIs?
 6. Heatmap: which genes needed to be shown?
 7. Pathway analysis: GSVA, GSEA → Genes in the pathway should be carefully investigated
 8. Network analysis: Cellphone DB, Nichnet. Receptor – Ligand expression, busy environment always shows the connectivity
 9. Confirmation of observation
 1. IHC
 2. IF
- ISH
 1. Spatial transcriptomics
 2. In vitro/organoid/in vivo – mice/in vivo-primate/human