Yale Center for
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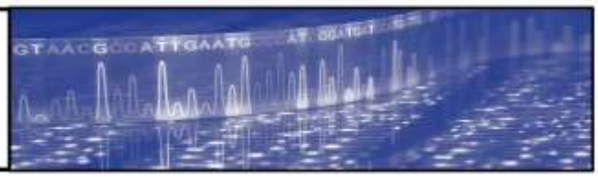

Single Cell Research in Progress Seminar Series

"Pulmonary Immune Profiling of Critically Ill Children with Acute Lung Injury Using Multi-Omic Technology"

By Victoria Habet, DO

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Pierce and Dela Cruz Labs, *Department of Pediatric Critical Care Medicine, Yale School of Medicine*

Host: Dr. Richard Pierce, MD, MS, Assistant Professor of Pediatrics, Department of Pediatric Critical Care Medicine

Zoom: https://yale.zoom.us/j/92908912699

Telephone：203-432-9666 (2-ZOOM if on-campus) or 646 568 7788

Wednesday, September 22nd, 2021

12:00 p.m. to 1:00 p.m. Seminar

Acute lung injury (ALI) is a significant cause or morbidity and mortality in children. It can be triggered by direct (e.g. viral respiratory infection) or indirect (e.g. ischemia-reperfusion injury after cardiopulmonary bypass (CPB)) etiologies. Since high-quality evidence on potential pharmacologic treatments is lacking, management of ALI is aimed toward supportive and protective therapies and treating the underlying cause.

While previous studies have investigated biomarkers and endotypes in ALI, the cellular signaling across multiple cell types is not known. We attempt to comprehensively describe the signaling processes of immune and parenchymal cells in pediatric ALI by using single cell RNA sequencing (scRNAseq), metabolomics, and proteomics to identify key pathways leading to the development and resolution of pediatric ALI. We leverage these multi-omic techniques on serial, deep tracheobronchial lavage samples collected from intubated pediatric patients with ALI secondary to severe viral lower respiratory tract infection or CPB.

Our results demonstrate that children with viral-induced or CPB-induced ALI have distinct cell populations, transcriptional activity, and metabolism that change over the course of disease. Metabolomic and proteomic analyses have revealed significant differences in the molecular composition of tracheobronchial lavage samples between the viral-induced ALI cohort and the CPB-induced ALI cohort. Ultimately, integration of these multi-omic datasets can be used to identify and better describe the major pathways that are augmented in various etiologies of ALI. Common regulatory pathways that are identified through differential gene expression analysis can be used to identify potential therapeutic targets, and biomarkers identified through metabolomic and proteomic analyses of serial samples may be useful in predicting disease trajectory.

Victoria Habet, DO graduated with a Bachelor of Science degree in Biological Sciences and Chemistry from Southern Methodist University in Dallas, Texas and then followed this with a Doctorate degree from the University of North Texas Health Science Center. She completed her pediatric internship and residency at Louisiana State University before joining Yale University as a Pediatric Critical Care Medicine fellow. She is enrolled in the Investigation Scholarly Pathway as part of her fellowship program. She is most passionate about pulmonary-immune cell interactions in pediatric acute lung injury.

CBDS Announcement: The Dean's office is committed to supporting development and implementation of cutting edge technologies. If anyone has ideas for emerging technologies that we should be piloting at Yale, please send them to Katie Zhu (xinxin.zhu@yale.edu), who will relay the suggestions to the Dean's Office.

If you would like to receive email notification of future seminars please email cbds@yale.edu.

Single Cell Research in Progress Trainee Organizing Committee. (Chair: Amy Zhao. Vice Chairs: Linda Chan, Alexandre Jourdon, Mario Skarica, Holly Steach, Victoria Habet)