Introduction

The Center for Pulmonary and Vascular Biology (PVB) provides a programmatic research home for pediatric faculty and trainees pursuing basic research in pulmonary biology and vascular biology. The Center’s mission is to expand the basic understanding of lung and vascular diseases, striving to gain new knowledge that will ultimately lead to new diagnostic, prophylactic, and therapeutic strategies. The science being pursued is focused on lung and vascular development and responses to inflammation, metabolic stress and injury.

The Center provides a valuable resource for investigative endeavors in pulmonary biology and vascular biology across the UT Southwestern campus. This is represented by active collaborations between PVB faculty and other UT Southwestern faculty in the Departments of Internal Medicine, Cell Biology, Population and Data Sciences, and Molecular Genetics, and by participation of PVB faculty in numerous training grants across the campus. PVB researchers also have active collaborations with faculty in the Department of Biomedical Engineering at UTD.

Notably, since 2009 Dr. Shaul in PVB and Dr. Lance Terada in the Division of Pulmonary and Critical Care Medicine in the Department of Internal Medicine have codirected an NIH T32 program to support postdoctoral research training in lung biology and disease at UT Southwestern. The T-32 award was successfully awarded Years 11 to 15 of funding in 2020.

Faculty

The Pediatric PVB faculty are basic scientists and physician-scientists from pediatric divisions working in partnership.

Philip W. Shaul, M.D.
Professor, Vice Chair of Research
Director, Center for Pulmonary and Vascular Biology
Director, Physician-scientist Training Program in Pediatrics
Associates First Capital Corporation
Distinguished Chair in Pediatrics

Chieko Mineo, Ph.D.
Professor, Center for Pulmonary and Vascular Biology

Rashmin C. Savani, M.B.Ch.B.
Professor and Division Chief, Neonatal and Perinatal Medicine
Associate Director, Center for Pulmonary and Vascular Biology
The William Buchanan Chair in Pediatrics

Anastasia Sacharidou, Ph.D.
Instructor, Center for Pulmonary and Vascular Biology

Jessica Moreland, M.D.
Professor of Pediatrics and Microbiology
Division Chief, Pediatric Critical Care Medicine
Thomas Fariss Marsh, Jr. Chair in Pediatrics
Honors / Awards

Best Pediatric Specialists in Dallas, *D Magazine*  
- Jessica Moreland

Texas Super Doctor, *Texas Monthly*  
- Rashmin Savani

Invited Lectures

Chieko Mineo

- NIH Common Fund Glycoscience Program: Investigators Meeting (Virtual), Bethesda, MD, July, 2021  
  - “Role of IgG Hyposialylation in Vascular Endothelial Dysfunction”
- Reproduction, Development & Cancer Seminar Series (Virtual), UTSW, Dallas TX, October, 2021  
  - “Molecular Basis of Preeclampsia Associated with the Antiphospholipid Syndrome”

Jessica Moreland

- Department of Pediatrics Grand Rounds, UT Health San Antonio, San Antonio, TX October 2021  
  - “The inflammatory balance in critical illness: a driver of organ injury”
- Texas Society for Critical Care Medicine Symposium, San Antonio, TX October 2021  
  - “Success in Critical Care Research”
- Advances in Inflammation Research Symposium, Brown University Alpert Medical School, Providence, RI October 2021  
  - “Neutrophils in immune homeostasis: NETs, NADPH oxidase, and toll-like receptor signaling”

Rashmin Savani

- TCHMB Annual Summit, UT Systems, (Virtual) Austin, TX, April 2021  
  - “Implementing newborn admission temperature QI initiative at a local level”
- Duke Research Integrity and Innovation Conference, Duke University Medical Center, (Virtual) Durham, NC, April 2021  
  - “RHAMM as a Target in COVID-19”
- CardioVascular Pulmonary Center of Biomedical Research Excellence, Brown University, (Virtual) Providence, RI, May 2021  
  - “RHAMM as a Target in COVID-19”
- 6th Annual Scientific Congress of the Asian Pediatric Pulmonology Society, (Virtual) Kaohsiung City, Taiwan, September 2021  
  - “Novel Strategies to Prevent Bronchopulmonary Dysplasia”

Philip Shaul

- Annual Scandinavian Atherosclerosis Conference, (Virtual) Humlebaek, Denmark, April, 2021  
  - “LDL Transport in the Artery Wall.”
- Center for Cardiovascular Biology, the Mitochondria and Metabolism Center, the Center for Translational Muscle Research, the Wellstone Muscular Dystrophy Center, and the Division of Cardiology, Department of Medicine, University of Washington School of Medicine, (Virtual) Seattle, WA, March, 2021  
  - “Endothelial Cell Transcytosis in Cardiometabolic Health and Disease.”
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- The Steroid Hormones and Receptors in Health and Disease Conference - Jointly hosted by FASEB and the International Committee on Rapid Responses to Steroid Hormones (RRSH), (Virtual) Dorado, PR, May, 2021
  - “Estrogen Receptor Signaling in Endothelium in Cardiometabolic Health and Disease.”

Conference Presentations

Vascular Discovery: From Genes to Medicine (Virtual), September 2021

Sacharidou A, Chambliss K, Chu H, Lee W-R, Xu L, Shaul PW, Mineo C

Moderated Poster Presentation: “Breakpoint Cluster Region Protein Function as a Kinase Mediates the Atheroprotective Actions of HDL in Vascular Endothelium.”

Sacharidou A, Huang L, Tanigaki K, Mineo C, Shaul PW

Oral Presentation: “Apolipoprotein E Receptor 2 in Endothelium Affords Protection from Both Atherosclerosis and Insulin Resistance.”

Pediatric Academic Societies Meeting (Virtual), April 2021

Price M, Yallapragada S, Kapadia V, Brown L, Savani RC

Poster Presentation: “The Ratio of Respiratory Severity score to the partial pressure of carbon dioxide as an early predictor of moderate to severe bronchopulmonary dysplasia in preterm infants”

Education and Training

The primary teaching activities of the PVB faculty occur at the laboratory bench where residents, clinical pediatric subspecialty fellows, graduate students, and Ph.D. postdoctoral fellows are trained in pulmonary biology research and vascular biology research.

Research Activities

Dr. Jessica Moreland focuses her research on better understanding the cell biology of inflammation with a specific interest in neutrophil biology. Her laboratory studies neutrophil priming by infectious and inflammatory stimuli, with a specific interest in Toll-like receptor signaling, and the role of NADPH oxidase in pro- and anti-inflammatory signaling. The Moreland laboratory studies both primary human neutrophils from healthy donors and from patients, and also utilizes a murine model of the systemic inflammatory response syndrome (SIRS) and multi-organ dysfunction syndrome (MODS).

With an overarching focus on endothelial cell biology, Dr. Sacharidou has made major discoveries regarding a common cause of thrombosis (blood clotting). She has also discovered and continues to characterize a new kinase for Akt kinase which is critical to the cardiovascular protection afforded by HDL cholesterol. Dr. Sacharidou is currently additionally pursuing a number of projects determining how mechanisms in endothelial cells govern the role of the skeletal muscle in normal glucose homeostasis and in type 2 diabetes.
Dr. Rashmin Savani’s laboratory studies the pathogenesis of bronchopulmonary dysplasia and development of novel therapies for this devastating disorder of preterm infants. With over 20 years’ experience in the biology of the glycosaminoglycan hyaluronan and its receptors, they have developed the expertise and tools, including antibodies, peptides, cDNAs, knockout and transgenic mice, that allow examination of this system in angiogenesis, inflammation and lung development, as well as in responses to injury. Specific mechanistic studies of the role of hyaluronan in the activation of nitric oxide production and of the NLRP3 inflammasome are being pursued. This year studies have also focused on the role of hyaluronan and its receptors in the cytokine storm generated by activation of TLR7 responses as a model of SARS-CoV-2 infection, and the use of therapeutic agents to block the activation of this pathway in innate immunity.

The overall goal of the Shaul-Mineo laboratory is to identify mechanisms in endothelial cells that govern cardiovascular and metabolic health and disease. The disorders that they study include thrombosis (blood clotting), atherosclerosis, obstructive vascular disease (stenosis), hypertension and type 2 diabetes. The basic processes they study are focused on how endothelial cells respond to extracellular cues. Their ultimate goal is to identify new targets for therapies to combat cardiovascular and metabolic disorders.

**Current Grant Support**

**Chieko Mineo**

**Grantor:** NIH-National Institutes of Health  
**Title of Project:** Endothelial SR-BI and Metabolic Health  
**Role:** Principal Investigator  
**Dates:** 08/2015 – 06/2021

**Grantor:** NIH-National Institute of DDK Diseases  
**Title of Project:** Endothelial Basis of Obesity-induced Insulin Resistance  
**Role:** Principal Investigator  
**Dates:** 07/2016 – 06/2021

**Grantor:** NIH-National Institute of DDK Diseases  
**Title of Project:** Endothelial Basis of Obesity-induced Insulin Resistance (Supplement)  
**Role:** Principal Investigator  
**Dates:** 07/2019 – 06/2021

**Grantor:** University of Kentucky College of Medicine  
**Title of Project:** Mechanism of Adrenal Insufficiency as a Risk Factor for Sepsis  
**Role:** Co-Investigator  
**Dates:** 09/2016 – 08/2021

**Grantor:** NIH-National Heart, Lung and Blood Institute  
**Title of Project:** Molecular Basis of Pregnancy Complications in the Antiphospholipid Syndrome  
**Role:** Principal Investigator  
**Dates:** 08/2018-05/2023

**Rashmin Savani**

**Grantor:** Mallinckrodt Pharmaceuticals, Inc.  
**Title of Project:** RHAMM-Based Peptides to Block NFkB and NLRP3 Inflammasome Activation  
**Role:** Principal Investigator  
**Dates:** 9/2020 – 8/2022
Philip Shaul

Grantor: NIH-National Heart, Lung and Blood Institute
Title of Project: Dichotomous Role of Endothelial SR-B1 in Atherosclerosis
Role: Principal Investigator
Dates: 12/2016 – 11/2021

Grantor: NIH-National Heart, Lung and Blood Institute
Title of Project: Endothelial Estrogen Receptor Alpha and Cardiometabolic Disease
Role: Principal Investigator
Dates: 06/2019 – 04/2023

Grantor: NIH-National Heart, Lung and Blood Institute
Title of Project: Unraveling ApoE4 Promotion of Cardiometabolic Disease
Role: Principal Investigator
Dates: 07/2020 – 04/2024

Grantor: NIH-National Heart, Lung and Blood Institute
Title of Project: Unraveling ApoE4 Promotion of Cardiometabolic Disease (Supplement)
Role: Principal Investigator
Dates: 05/2021 – 04/2022

Grantor: NIH-National Heart, Lung and Blood Institute
Title of Project: Training Program in Lung Biology and Disease (T32)
Role: Co-Director (with Co-Director L. Terada)
Dates: 04/2020 – 03/2025

Peer-Reviewed Publications


**Book Chapters**