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, Physiology, Pharmacology, Bioinformatics 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 renewed in 2020.

Faculty

The Pediatric PVB faculty are basic scientists and physician-scientists from four 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

Michelle Gill, M.D., Ph.D.
Professor of Pediatric, Immunology and Internal Medicine
Division of Pediatric Infectious Disease

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

Chieko Mineo, Ph.D.
Professor, 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

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

Best Pediatric Specialists in Dallas, D Magazine

- Jessica Moreland

Chieko Mineo

- Promoted to Professor

Michelle Gill

- Promoted to Professor

Texas Super Doctor, Texas Monthly

- Rashmin Savani

Council Member, International Perinatal Collegium

- Rashmin Savani

Invited Lectures

Chieko Mineo

American Heart Association Vascular Discovery Meeting, Chicago, IL, 2020, Virtual Meeting

  - “Endothelial Cell Lipoprotein Transport and Atherosclerosis”

  - UT Southwestern Division of Cardiology Research Seminar Series, Dallas, TX, 2020, Virtual Meeting

    “Molecular Basis of Maternal Hypertension in the Antiphospholipid Syndrome”

Rashmin Savani

- TCHMB Annual Summit, Austin, TX, February 2020

  - “Making Quality Improvement Local”

Philip Shaul

- European Atherosclerosis Society Congress, Geneva, Switzerland, 2020, Virtual Meeting

  - “Endothelial Cell Lipoprotein Transport in Atherosclerosis.”

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. Michelle Gill, whose research centers on evaluating the role of dendritic cells in pediatric respiratory viral infections, partners with Dr. Rebecca Gruchalla and the Division of Pediatric Allergy and Immunology to study asthma pathogenesis. By defining how dendritic cell function is affected in patients with allergic airway diseases and asthma, they hope to better understand how to interrupt, and eventually design strategies to prevent the deleterious immune responses associated with the clinical symptoms of asthma. She also collaborates with Dr. David Farrar in the Department of Immunology in studying the role of Type I interferon and T lymphocyte immune responses in allergic disease pathogenesis. Dr. Gill’s lab also investigates the impact of allergen-specific and targeted biologic immunotherapies on dendritic cell and T follicular helper cell phenotype and function, with the goal of identifying novel mechanisms that contribute to the clinical efficacy of these therapies.

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. 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. Their ultimate goal is to identify new targets for therapies to combat cardiovascular and metabolic disorders.
**Current Grant Support**

**Michelle Gill**

- **Grantor:** NIAID; Inner City Asthma Consortium (ICAC); University of Wisconsin, Madison  
  **Title of Project:** Immunologic Approaches to Reduce Asthma  
  **Role:** Co-Investigator (PI: R Gruchalla)  
  **Dates:** 08/2014 – 07/2021

- **Grantor:** NIAID; Inner City Asthma Consortium3 (ICAC3); University of Wisconsin, Madison  
  **Title of Project:** Mechanistic Study Development for ICAC3 Protocols, Year 7  
  **Role:** Principal Investigator  
  **Dates:** 08/2015 – 07/2021

- **Grantor:** NIAID; Immune Tolerance Network (ITN); Benaroya Research Institute at Virginia Mason  
  **Title of Project:** Dendritic cell and T follicular helper cell pilot studies for the ITN CATNIP study (“Anti-TSLP plus antigen-specific immunotherapy for induction of tolerance in individuals with cat allergy”)  
  **Role:** Principal Investigator  
  **Dates:** 02/2019 – 01/2020

- **Grantor:** NIAID; Immune Tolerance Network (ITN); Benaroya Research Institute at Virginia Mason  
  **Title of Project:** Impact of Anti-TSLP and antigen-specific immunotherapy on Dendritic Cell and T follicular helper cells in individuals with cat allergy  
  **Role:** Principal Investigator  
  **Dates:** 02/2020 – 01/2021

- **Grantor:** NIAID; Immune Tolerance Network (ITN); Benaroya Research Institute at Virginia Mason  
  **Title of Project:** Thymic Stromal Lymphopoietin (TSLP) Bioactivity Pilot Study  
  **Role:** Principal Investigator  
  **Dates:** 02/2020 – 01/2021

**Chieko Mineo**

- **Grantor:** NIH-National Institutes of Health  
  **Title of Project:** Endothelial SR-B1 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: American Heart Associate (Postdoctoral Fellowship Award for Haiyan Chu)  
**Title of Project:** Molecular Basis of Maternal Hypertension in the Antiphospholipid Syndrome  
**Role:** Principal Investigator  
**Dates:** 07/2018 – 06/2020

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

rasmin savani

Grantor: Mallinckrodt Pharmaceuticals, Inc.  
**Title of Project:** RHAMM-Based Peptides to Block NFkB and NLRP3 Inflammasome Activation  
**Role:** Principal Investigator  
**Dates:** 7/2020 – 6/2022

philip shaul

Grantor: NIH-National Institute of Child Health and Human Development  
**Title of Project:** Antecedents and Sequelae of Childhood Onset Disease (K12)  
**Role:** Training Director (PI: J. Perez-Fontan)  
**Dates:** 12/2015 – 11/2020

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: American Heart Association (Postdoctoral Fellowship Award for Jun Peng)  
**Title of Project:** Endothelial Regulation of Insulin Sensitivity  
**Role:** Principal Investigator  
**Dates:** 01/2019 – 12/2020

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:** Training Program in Lung Biology and Disease (T32)  
**Role:** Co-Director (with Co-Director L. Terada)  
**Dates:** 04/2020 – 03/2025
Peer-Reviewed Publications


   Aeroallergen Sensitization, Serum IgE, and Eosinophilia as Predictors of Response to Omalizumab Therapy During the Fall Season Among Children with Persistent Asthma.  

   Intrauterine Transmission of SARS-COV-2 Infection in a Preterm Infant.  
   Pediatr Infect Dis J. 2020 Sep;39(9):e265-e267. PMID:32658097

   Utility of echocardiography in predicting mortality in infants with severe bronchopulmonary dysplasia.  

**Book Chapters**