Introduction

In 2005, a Division of Pediatric Pulmonary and Vascular Biology (PVB) was established to provide a programmatic research home for pediatric faculty and trainees pursuing basic research in pulmonary biology and vascular biology. It is an exclusively research-driven division in the Department of Pediatrics, one of but a handful of research divisions in pediatrics departments nationwide, thereby representing a novel concept that amplifies the efforts and effectiveness of pediatric faculty and trainees alike.

In March 2014, the Division of Pediatric Pulmonary and Vascular Biology became the Center for Pulmonary 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. Within the context of lung and vascular diseases, the Center focuses on lung and vascular development and responses to inflammation and injury.

Under the direction of Philip Shaul, M.D., Professor and Vice Chair for Research, the Center provides a valuable resource for campus-wide investigative endeavors. This is represented by active collaborations between PVB faculty and other UT Southwestern faculty in the departments of Internal Medicine, Cell Biology, Physiology, Pharmacology and Molecular Genetics, and by participation of PVB faculty in numerous training and center grants across the campus.

Notably, in 2009 a shared effort by PVB and the Division of Pulmonary and Critical Care Medicine in the Department of Internal Medicine resulted in procurement of a coveted T-32 training grant from the National Institutes of Health to support postdoctoral research training in lung biology and disease at UT Southwestern. The T-32 award was successfully renewed in 2014.

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.
Associate 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.
Associate 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

Renee Potera, M.D.
Assistant Professor, Pediatric Critical Care Medicine
Honors / Awards

Renee Potera
- Promotion to Assistant Professor

Rashmin Savani
- Texas Super Doctor, Texas Monthly Magazine

Invited Lectures

Philip Shaul
- 6th HDL Workshop, Arteriosclerosis, Thrombosis and Vascular Biology (ATVB), Nashville, TN, May 2016
  - “Endothelial Cell Biology of HDL and SR-BI”

Michelle Gill
- NIAID/NIH, IgE Regulation in Allergic Disease Workshop, Rockville, MD, April 2016
  - “IgE-Mediated Regulation of Plasmacytoid Dendritic Cell Antiviral Responses”
  - “Understanding the Role of Dendritic Cells in Anti-viral Immunity”
- American Academy of Pediatrics, PREP Board Review Course, Invited Speaker for Infectious Disease, Kansas City, MO, February 27-March 2; Philadelphia, PA, September 2016
  - “Viral Infections in Pediatrics: RNA Viruses”
  - “Viral Infections in Pediatrics: DNA Viruses”
  - “Infectious Disease Workshop: Case studies of Meningitis and Brain Abscess-Intracranial Infections”

Jessica Moreland
- Society of Leukocyte Biology, Verona, Italy, September 2016
  - “Toll-like Receptor Trafficking and Cellular Responses are Determined by Common SNPs”

Rashmin Savani
- AAP Western Conference on Perinatal Research, Indian Wells, CA, January 2016
  - “The NLRP3 Inflammasome and BPD: Development of a Preventative Strategy”
- Proteoglycans Gordon Conference, Andover, NH, July 2016
  - “The Hyaluronan Receptor CD44 is Necessary for TLR4 Activation of the NLRP3 Inflammasome and the Development of Bronchopulmonary Dysplasia”
- American Society for Matrix Biology, St. Petersburg, FL, November 2016
  - “The Hyaluronan Receptor RHAMM is Indispensable for VEGF-stimulated Activation of Src and eNOS to Produce Nitric Oxide”
- Third Annual Telemedicine Congress for Hospitals, Orlando, FL, November 2016
  - “Examining Neonatal Telemedicine: a Brief History of Telemedicine and Establishment of TeleNICU”
Conference Presentations

Savani R, Cheong N, Liao J, Longoria C, Wu Q, Yuhanna I, Ullrich V, Shaul P

Platform, Pediatric Academic Society/Society of Pediatric Research, Baltimore, MD, May 2016
“The Hyaluronan Receptor RHAMM is Necessary for the Activation of Src Kinase and the Signaling Pathway for Endothelial Nitric Oxide Production”

Sacharidou A, Shaul PW, Mineo C.

Poster, ATVB-PVD Scientific Sessions Meeting, Nashville, TN, May 2016
“Antiphospholipid Antibodies Induce Thrombosis by Activating Endothelial PP2A via ApoER2-Dab2-PSD95 Complex Formation”

Sacharidou A, Lee W-R, Shaul PW, Mineo C.

“Bcr Kinase is a Novel Akt Kinase that Modulates Scavenger Receptor BI- and PDZK1-dependent Actions of HDL in Endothelium”

Huang L, Chambliss K, Ahmed M, Mineo C, Shaul PW.

Poster, ATVB-PVD Scientific Sessions Meeting, Nashville, TN, May 2016
“Endothelial Scavenger Receptor Class B, Type I (SR-BI) Mediates LDL Uptake by the Artery Wall and Promotes Atherosclerosis in Hypercholesterolemic Mice”

Tanigaki K, Chambliss KL, Yuhanna IS, Sacharidou A, Ahmed M, Atochin DN, Huang PL, Shaul PW, Mineo C.

Poster, ATVB-PVD Scientific Sessions Meeting, Nashville, TN, May 2016
“Endothelial Fcy Receptor IIB Activation Blunts Insulin Delivery to Skeletal Muscle to Cause Insulin Resistance in Mice”


Poster, NICHD’s Child Health Research Centers (CHRC) Annual Retreat, Bethesda, MD, September 2016
“Alveolar Macrophage NOX2 Protects against Lung Injury in a Murine Model of Systemic Inflammation”

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

The overall goal of the Shaul-Mineo laboratory is to identify the molecular components, the protein-protein interactions, and the regulatory events occurring within signaling modules on the plasma membrane which dictate endothelial cell phenotype and the propensity for vascular or metabolic disease. Investigations are performed in cell culture models and in both in vitro and in vivo reconstitution systems, with the ultimate goal of identifying new targets for therapies to combat cardiometabolic disorders.
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 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.

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 and the role of NADPH oxidase in pro- and anti-inflammatory signaling. In addition, the laboratory utilizes a murine model of the systemic inflammatory response syndrome (SIRS) and multi-organ dysfunction syndrome (MODS). Dr. Renee Potera’s current research focuses on the role of alveolar macrophage signaling during acute inflammatory lung injury using a murine model of SIRS.

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.

Current Grant Support

Michelle Gill

Grantor: NIH / University of Wisconsin
Title of Project: Mechanistic Study Development for ICAC3 MUPPITS and CoNAC Protocols
Role: Co-Investigator

Chieko Mineo

Grantor: NIH 1R01HL126795
Title of Project: Endothelial SR-BI and Metabolic Health
Role: Principle Investigator
Dates: 08/2015 – 06/2019

Grantor: NIH 1R01DK110127
Title of Project: Endothelial Basis of Obesity-induced Insulin Resistance
Role: Principle Investigator
Dates: 07/2016 – 06/2021
Jessica Moreland

Grantor: NIH 1R21AI109127
Title of Project: A Novel Anti-inflammatory Role for the Neutrophil NADPH Oxidase
Role: Principal Investigator
Dates: 08/2014 – 07/2017

Renee Potera

Grantor: NIH K12HD68363
Title of Project: Child Health Research Career Development Award
Role: Trainee
Dates: 10/2015 – 09/2016

Rashmin Savani

Grantor: Novare Pharmaceutical, Inc.
Title of Project: Hyaluronan Binding Peptides to Block Inflammation after Lung Injury
Role: Principle Investigator
Dates: 03/2016 – 07/2017

Philip Shaul

Grantor: NIH 2R01HL087564
Title of Project: Oxysterols, Estrogen Receptor Modulation and Vascular Disease
Role: Principle Investigator
Dates: 06/2010 – 05/2016

Grantor: NIH 5K12HD68363
Title of Project: Antecedents and Sequelae of Childhood Onset Disease
Role: Training Director (PI: Pérez Fontán)

Grantor: The Hartwell Foundation
Title of Project: Novel Strategies for Fetal Protection during the Antiphospholipid Syndrome
Role: Principle Investigator
Dates: 04/2013 – 03/2016

Grantor: NIH 5R01-HL115122
Title of Project: FcgammaRIIB and Inflammation-Related Vascular Disease
Role: Principle Investigator
Dates: 08/2013 – 06/2017

Grantor: NIH 5NIH R01-DK015556
Title of Project: Novel Ligands and Mechanisms to Achieve Selective Nuclear Receptor Activity
Role: Co-Investigator (PI: Katzenellenbogen)
Dates: 09/2013 – 08/2017

Grantor: NIH 2R01-HL118001
Title of Project: Role of Endothelial and Macrophage ApoER2 in Atherosclerosis Modulation
Role: Principle Investigator (Multi-PI with David Hui, Univ. of Cincinnati)
Dates: 02/2014 – 01/2018
Grantor: NIH 2T32HL098040
Title of Project: Training Program in Lung Biology and Disease
Role: Project Director/Principle Investigator (Co-PD/PI with Lance Terada)
Dates: 07/2014 – 06/2019

Grantor: Pfizer, Inc. Investigator Initiated Research Program
Title of Project: Bazedoxifene and Estrogen Receptor-negative Breast Cancer
Role: Principle Investigator

Grantor: The Hartwell Foundation
Title of Project: Preventing Obesity-induced Diabetes
Role: Principle Investigator
Dates: 09/2016 – 08/2019

Peer-Reviewed Publications


