Introduction

In 2005, the 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 was 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 designed to amplify 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. In December 2017, Anastasia Sacharidou joined the faculty.

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
Honors / Awards

Rashmin Savani

- Texas Super Doctor, *Texas Monthly Magazine*
- Albert Nelson Marquis Lifetime Achievement Award, *Who’s Who Publication Board*

Invited Lectures

Michelle Gill

- American Academy of Allergy, Asthma & Immunology Annual Meeting, Orlando, FL, March 2017
  - Invited Speaker, “The Role of Glycolysis in Antiviral Responses” presented in Symposium on Immunometabolism

- American Academy of Pediatrics PREP The Course (pediatric board review courses), St. Petersburg, FL, March 2017 and Portland, OR, August 2017
  - Invited Lecturer:
    - “Infectious Diseases Workshop: Interactive Cases”
    - “RNA Viruses and Pediatrics”
    - “DNA Viruses and Pediatrics”

- Grand Rounds, Children’s Medical Center, Dallas, TX, May 2017
  - Invited Speaker, “Decreased Efficacy of the Live Attenuated Influenza Vaccine (LAIV): Challenges in the Mist”

Chieko Mineo

- Life Sciences Center, Tsukuba Advanced Research Alliance, University of Tsukuba, Ibaraki, Japan, August 2017
  - “Role of Endothelial FcRIIB and Hyposialylated IgG in Obesity-induced Insulin Resistance”
Rashmin Savani

- 6th Federation of European Biochemical Societies 6th Advanced Lecture Course, Spetses, Greece, May 2017
  - “Matrix Pathobiology, Signaling & Molecular Targets”

- 11th International Conference on Hyaluronan, Cleveland, OH, June 2017
  - Session Chair, “HA in Immunity and Inflammation”
  - “Hyaluronan and immune responses: A complex balancing act of structure, function, location and context”

- International Perinatal Collegium Meeting, Edinburgh, Scotland, July 2017
  - “Regulation of Inflammation by the Hyaluronan Receptor RHAMM: Studies in Knockout and Transgenic Mice”

- 7 Lakes Proteoglycans Conference, Varese, Italy, September 2017
  - “Receptor for Hyaluronan Mediated Motility (RHAMM) is Indispensable for VEGF-stimulated Src and eNOS Activation and Angiogenesis”

- Visiting Professor, The University of Siena, Siena, Italy, September 2017
  - “BPD in the 21st Century”

- The No Name Conference on Perinatal Vascular Biology, Tampa, FL, October 2017
  - “The Receptor for Hyaluronan Mediated Motility (RHAMM) is Indispensable for VEGF-stimulated Src and eNOS Activation and Angiogenesis”

Philip Shaul

- Cardiovascular Research Institute, University of California, San Francisco, August 2017
  - “Endothelial Cell Transcytosis and Cardiometabolic Disease”

- Department of Pediatrics, University of California, San Francisco School of Medicine, San Francisco, CA, August 2017
  - “Molecular Basis for the Antiphospholipid Syndrome and its Maternal and Fetal Complications”

- Cardiovascular Center Seminar Series, Medical College of Wisconsin, Milwaukee, WI, September 2017
  - “Extrahepatic Biology of the Scavenger Receptor SR-B1”

- The Hartwell Foundation, Tenth Annual Biomedical Research Meeting, Durham, NC, September 2017
  - “Preventing Obesity-induced Diabetes”

Conference Presentations

Rowe R, Pyle DM, Gill M.

Poster, Pediatric Academic Societies Meeting, San Francisco, CA, May 2017
“Rhinovirus Synergizes with Allergic Stimulation to Promote Th2 T cell Priming by Monocytes”
2017 Annual Report

Kumar D, Thomas S, Raetz M, Hooper LV, Savani R, Mirpuri J

- Poster, “Empiric Antibiotic Exposure in Neonatal Mice Results in Translocation of Proteobacteria across the Intestinal Barrier, Increased Expression of Antimicrobial Proteins, and an Increase in Paneth Cells in the Lamina Propria”


- Poster, “The Impact of Pulmonary Hypertension in Preterm Infants with Severe BPD: A Multi-center Comparison of NICU and Readmission Outcomes”

Naeun Cheong, Jie Liao, Christopher Longoria, Qian Wu, Ivan Yuhanna, Philip Shaul, Rashmin C. Savani

- Poster, “Low Molecular Weight Hyaluronan (LMW HA) Uses the HA receptor RHAMM to Phosphorylate and Activate Akt and eNOS to Stimulate Endothelial Cell Migration”

Thomas S, Raetz M, Savani RS, Mirpuri J

- Oral, “Maternal High Fat Diet Results in Microbiota-Dependent Expansion of Type 3 Innate Lymphoid Cells (ILC3s) and Susceptibility to Inflammation in Neonatal Mice”


- Poster, 11th International Conference on Hyaluronan, Cleveland, OH, June 2017 “LMW Hyaluronan Uses RHAMM to Phosphorylate and Activate AKT and eNOS to Stimulate Endothelial Cell Migration”

Liao J, Lal CV, Cheong N, Longoria C, Pure E, Savani RC.

- Poster, 11th International Conference on Hyaluronan, Cleveland, OH, June 2017 “Endothelial CD44 Mediates Neonatal Hyperoxia-induced Lung Injury”

Potera R, Cao M, Jordan LF, Hook JS, Moreland JG.

- Poster, Phagocytes Gordon Research Conference, Waterville Valley, NH, June 2017 “Pulmonary chemokine secretion mediates neutrophilic lung injury in Nox2 deficient mice”

Turley EA, Luyt LG, Savani RC, McCarthy JB, Cowman MK.

- Poster, 11th International Conference on Hyaluronan, Cleveland, OH, June 2017 “Hyaluronan Receptor and Hyaluronan Fragment Peptide Mimetics as Therapeutic Approaches for Reducing Tissue Inflammation and Fibrosis”


- Poster, 11th International Conference on Hyaluronan, Cleveland, OH, June 2017 “Regulation of Inflammation by RHAMM: Studies in Knockout and Transgenic Mice”
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- Poster, 11th International Conference on Hyaluronan, Cleveland, OH, June 2017
  “LMW Hyaluronan Uses RHAMM to Phosphorylate and Activate AKT and eNOS to Stimulate Endothelial Cell Migration”

Shaul PW, Huang L, Chambliss K, Tanigaki K, Mineo C.

- Oral, 2017 Smith-Lemli-Opitz Scientific Symposium, Cincinnati, OH, June 2017
  “The Multiple Lives of SR-BI”

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 mechanisms in endothelial cells that govern cardiovascular and metabolic health and disease. The disorders that they study in genetically-engineered mice include thrombosis (blood clotting), atherosclerosis, obstructive vascular disease, hypertension and type 2 diabetes. Their ultimate goal is to identify new targets for therapies to combat cardiovascular and metabolic 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.

Drs. Philip Shaul and Chieko Mineo led a team that discovered a major mechanism by which obesity causes type 2 diabetes.
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  
**Dates:** 2015 – 2019

**Grantor:** NIH NIAID Inner City Asthma Consortium 3 (ICAC3, UM1AI 114271)  
**Role:** Co-investigator (PI: R Gruchalla)  
**Title of Project:** Immunologic Approaches to Reduce Asthma  
**Dates:** 2014 – 2021

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 – 06/2020

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

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 5K12HD68363  
**Title of Project:** Antecedents and Sequelae of Childhood Onset Disease  
**Role:** Training Director (PI: Pérez Fontán)  
**Dates:** 12/2010 – 11/2020

**Grantor:** NIH 5R01-HL115122  
**Title of Project:** FcgammaRIIB and Inflammation-Related Vascular Disease  
**Role:** Principle Investigator  
**Dates:** 08/2013 – 06/2018
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: The Hartwell Foundation  
**Title of Project:** Preventing Obesity-induced Diabetes  
**Role:** Principle Investigator  
**Dates:** 09/2016 – 08/2019

Grantor: NIH 1R01-HL131597  
**Title of Project:** Dichotomous Role of Endothelial SR-B1 in Atherosclerosis  
**Role:** Principle Investigator  
**Dates:** 12/2016 – 11/2020

**Peer-Reviewed Publications**

PMID: 28784925


**Book Sections**