Division Details

Division Data Summary

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<th>RESEARCH AND TRAINING DETAILS</th>
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Significant Accomplishments

March of Dimes Prematurity Research Center Ohio Collaboration

The March of Dimes Prematurity Research Center Ohio Collaborative comprises a new transdisciplinary group of investigators aimed at discovering the fundamental causes of preterm birth. It brings together investigators from 20 different disciplines to work together for healthier newborns. We believe this collaborative will become a world leader in research to discover the unknown causes of preterm birth and develop precise ways to prevent it. The March of Dimes has pledged $10 million over five years to fund this initiative. The project brings together Ohio’s leading health research institutions – Cincinnati Children’s Hospital Medical Center (the coordinating site; Dr. Louis Muglia, MD, PhD; Drs. James Greenberg, Jeffrey Whitsett, and SK Dey, Co-Directors) and the University of Cincinnati; the Ohio State University and Nationwide Children’s Hospital; and Case Western Reserve University and University Hospitals / MetroHealth.

National Institutes of Health

New awards were obtained from the NHLBI, including the T32 training grant entitled “Pulmonary and Cardiac Development and Disease” Drs. Jeffrey Whitsett, Bruce Trapnell and Frank McCormack (Co-PIs), a new K12 “Omnics of Lung Diseases” Dr. Jeffrey Whitsett (PI), a collaborative project with the Divisions of Biomedical Informatics and the College of Engineering at the University of Cincinnati College of Medicine; and the NHLBI
R01 “Transcriptional Programming of Asthma Related Pathology in Respiratory Epithelia” Dr. Jeffrey Whitsett (PI).

Collaborative for Infant Mortality Reduction

The Perinatal Institute facilitated the creation of a regional public/private/governmental collaborative to reduce the infant mortality rate. The collaborative brings together leaders from Hamilton County, the City of Cincinnati, the University of Cincinnati Colleges of Medicine and Nursing, Cincinnati Children’s, all regional hospital maternity providers, and local nonprofit agencies as a collective impact collaborative. The collaborative has a five year, $1.25 million funding commitment based upon an agreement between the Board of Hamilton County Commissioners, UC Health and Drake Center, LLC. Collaborative operations are based at CCHMC. Drs. James M. Greenberg and Elizabeth Kelly provide operational leadership of the Collaborative, along with a newly appointed Director, Mr. Ryan Adcock. County Commissioner Todd Portune and City of Cincinnati Councilmember Wendell Young Co-Chair the Advisory Board created through a memorandum of understanding signed by all parties on June 13, 2013.

Research Highlights

Suhas Kallapur and Alan Jobe

Suhas Kallapur and Alan Jobe in the Perinatal Institute, together with Claire Chougnet in the Division of Cellular and Molecular Immunology, have developed a novel non-human primate model for investigating the effects of intra-uterine inflammation on the developing fetus. Administration of the cytokine interleukin-1 beta to pregnant rhesus macaques resulted in chorioamnionitis and induction of robust lung inflammation in the fetus and preterm newborn. Their findings suggest that boosting regulatory T cells and/or controlling IL-17 may provide a means to prevent or limit the complications for preterm infants exposed to infection or inflammation prior to birth.

Louis Muglia

Louis Muglia and colleagues have identified genes in families with recurrent preterm birth as contributors to the risk of preterm birth in the general population. Whole-exome sequencing was performed on two mother-daughter pairs, and genes harboring rare variants were tested for association with preterm birth in the general population. The complement and coagulation cascade was one of the most enriched pathways in our two mother-daughter pairs, and was confirmed by analysis in six other mothers’ exomes and association analysis in over 500 nuclear families. These results demonstrated the importance of the complement and coagulation cascades in the pathophysiology of preterm birth, and suggest potential screening and intervention approaches to prevent prematurity that target this pathway.

Scott Wexelblatt, Laura Ward, Eric Hall, and James Greenberg

Scott Wexelblatt, Laura Ward, Eric Hall and James Greenberg in the Perinatal Institute, evaluated the value of a universal testing strategy in a community hospital setting to improve diagnostic accuracy and treatment for neonatal abstinence syndrome. They found that universal testing is feasible, cost effective, and does not generate an excessive burden upon social service providers or local government agencies. This strategy identifies newborns, exposed to in-utero narcotics, not identified through standard risk-based screening approaches, who would otherwise be at high risk to develop untreated neonatal abstinence syndrome.
Significant Publications


This work was part of Dr. Balli’s Ph.D. graduate thesis in the Molecular and Developmental Biology program. The work demonstrates a critical role of the Foxm1 transcription factor in the pathogenesis of pulmonary fibrosis. Epithelial-to-mesenchymal transition (EMT) was demonstrated during radiation-induced pulmonary fibrosis and the molecular targets of Foxm1 were identified. Inhibition of this pathway provides a novel, potential, therapeutic target for pulmonary fibrosis, a enigmatic disease that remains without effective therapy.


This work demonstrates increased morbidity and mortality in preterm birth, showing risks even at older gestational ages when many clinicians consider that the infants are mature enough to adapt normally after birth. The work emphasizes the risk of “late preterm” birth, and the need to minimize the “iatrogenic” prematurity. This paper examined the differences in post-neonatal death risk among the three most common clinical subtypes of preterm birth: preterm premature rupture of membranes (PROM), indicated preterm birth, and spontaneous preterm labor. The authors found that preterm PROM was associated with significantly higher risk of post-neonatal death compared with spontaneous preterm labor in infants born at 27 weeks gestation or later. Similarly, indicated preterm birth was associated with a significantly higher risk of post-neonatal death than spontaneous preterm labor in infants born at 25 weeks gestation or later. Thus, different etiologies for preterm birth carry different risks of post-neonatal mortality and suggest preventative measures may be different amongst these groups.


This work utilizes Xenopus (the frog) to identify the genes and processes involved in the induction of foregut from which critical organs, including thyroid, liver, lung, stomach, and pancreas are formed. The work identifies a new role for Sizzled and Tolloid in the formation of foregut organs relevant to common birth defects affecting newborn infants.


This work identifies a critical role of the transcription factor SPDEF in mucous metaplasia and host defense in the airway. SPDEF is induced in asthma, cystic fibrosis, and chronic obstructive lung diseases where it is required for mucus hyperproduction. SPDEF was shown to inhibit cellular responses to infection, providing a molecular mechanism by which patients with these disorders are susceptible to viral and bacterial infections. The work provides a potential therapeutic target for treatment of these diseases.


This work demonstrates a novel role for Foxm1 in the pathogenesis of inflammation and mucus hyperproduction related to asthma. Foxm1 was shown to be induced during allergy and to enhance goblet cell differentiation by regulating a number of genes controlling mucus production. Inhibition of the Foxm1 pathway provides a potential therapeutic strategy for asthma and other common lung diseases complicated by mucus hyperproduction and
Division Publications


Boneca IG, Sebbane F. Inheritance of the lysozyme inhibitor Ivy was an important evolutionary step by Yersinia pestis to avoid the host innate immune response. J Infect Dis. 2013; 207:1535-43.


46. Hillman NH, Moss TJ, Nitsos I, Jobe AH. Moderate tidal volumes and oxygen exposure during


93. Sengupta A, Kalinichenko VV, Yutzey KE. FoxO1 and FoxM1 transcription factors have antagonistic functions in neonatal cardiomyocyte cell-cycle withdrawal and IGF1 gene regulation. Circ Res.


Faculty, Staff, and Trainees

Faculty Members

**Jeffrey A. Whitsett, MD**, Professor  
**Leadership** Co-Director, Perinatal Institute; Chief, Section of Neonatology, Perinatal and Pulmonary Biology  
**Research Interests** Lung Development; Surfactant

**Henry T. Akinbi, MD**, Associate Professor  
**Research Interests** Neonatal Infections and Blood Transfusions

**Sandip Bhattacharyya, MSc, PhD**, Assistant Professor  
**Research Interests** Inflammation Immunology, Signal Transduction

**Laurel B. Bookman, MD**, Assistant Professor  
**Research Interests** Implementation Science, International Health

**James P. Bridges, PhD**, Instructor  
**Research Interests** Hypoxia Inducible Factors and Downstream Target Genes in Chronic Lung Disease

**Tanya E. Cahill, MD**, Assistant Professor  
**Leadership** Director, High Risk Infant Follow-Up Program  
**Research Interests** Neonatal Abstinence Syndrome and High Risk Infant Follow-Up

**Michael W. Crossman, MD, PhD**, Assistant Professor  
**Research Interests** Bioethics

**Jay H. Dritz, MD**, Assistant Professor  
**Research Interests** Neonatal resuscitation, quality improvement

**Stephan W. Glasser, PhD**, Associate Professor  
**Research Interests** Gene Regulation in the Lung

**Neera K. Goyal, MD, MSHP**, Assistant Professor

**James M. Greenberg, MD**, Professor  
**Leadership** Co-Director, Perinatal Institute; Director, Division of Neonatology  
**Research Interests** Preterm Birth, Community Health, Pulmonary Vascular Development
Beth E. Haberman, MD, Associate Professor  
**Leadership** Medical Director, Cincinnati Children's NICU & Co-Medical Director, Mercy Anderson Hospital Nurseries

**Research Interests** Infant Follow-up

Eric S. Hall, PhD, Assistant Professor  
**Research Interests** Biomedical Informatics

Crystal D. Hill, MD, Assistant Professor  
**Research Interests** Simulation and motility

Steven B. Hoath, MD, Professor Emeritus  
**Research Interests** Skin Development & Environmental Interactions

Alan H. Jobe, MD, PhD, Professor  
**Leadership** Director, Division of Perinatal Biology

**Research Interests** Injury and Repair of the Preterm Lung

Beth Ann Johnson, MD, Assistant Professor

Tanya V. Kalin, MD, PhD, Assistant Professor  
**Research Interests** Transcriptional Regulation of Carcinogenesis and Radiation-Induced Lung Fibrosis

Vladimir V. Kalinichenko, MD, PhD, Associate Professor  
**Research Interests** Fox Proteins in Lung Development

Suhas G. Kallapur, MD, Professor  
**Leadership** Director, Neonatology CME

**Research Interests** Fetal Inflammation/Physiology, Lung Development/Inflammation, BPD, Developmental Immunology

Beena D. Kamath-Rayne, MD, MPH, Assistant Professor  
**Research Interests** Neonatal Outcomes and Public Health; Fetal Lung Maturity; Global Health

Heather C. Kaplan, MD, MSCE, Assistant Professor  
**Research Interests** Health Services Research; Improvement Science

Alan P. Kenny, MD, PhD, Instructor  
**Research Interests** Molecular Development of the Foregut Organs

Paul S. Kingma, MD, PhD, Associate Professor  
**Research Interests** Innate Immune Systems; Cystic Fibrosis; Neonatal Infection

Thomas R. Korfhagen, MD, PhD, Professor  
**Research Interests** Lung Defense

Timothy D. Le Cras, PhD, Associate Professor  
**Leadership** Director of Admissions, Molecular & Developmental Biology Graduate Program

**Research Interests** Chronic Lung Diseases; Lung Development, Pulmonary Hypertension

Yutaka Maeda, DVM, PhD, Assistant Professor  
**Research Interests** Lung cancer, Asthma

Kristin R. Melton, MD, Associate Professor  
**Leadership** Associate Director, Neonatal-Perinatal Medicine Fellowship Training Program
Research Interests Developmental Biology, Neural Crest Biology

Stephanie L. Merhar, MD, MS, Assistant Professor
Research Interests Neonatal neuroimaging, infant follow up

Nagendra K. Monangi, MD, Assistant Professor
Research Interests Maternal/Infant nutrition and vitamin D in preterm infants

Ardythe L. Morrow, PhD, Professor
Leadership Director, Center for Interdisciplinary Research in Human Milk and Lactation
Research Interests Molecular Epidemiology of Human Milk, Epidemiologic Methods, Prevention of Infectious Disease, Predictive Biomarkers of Neonatal Outcomes

Louis J. Muglia, MD, PhD, Professor
Leadership Co-Director, Perinatal Institute; Division of Neonatology; Director, Center for Prevention of Preterm Birth
Research Interests Genetics of Birth Timing; Neurobiology of the Stress Response

Vivek Narendran, MD, MBA, Professor
Leadership Medical Director, Univ. Hosp. NICU & Newborn Nursery; Medical Director, The Christ Hospital Nursery; Chair, Department of Pediatrics, the University Hospital
Research Interests C-PAP; Business Case for Quality Improvements; Preterm Infant Skin

Amy T. Nathan, MD, Assistant Professor
Leadership Medical Director, TriHealth Nurseries
Research Interests Immunobiology

Laurie A. Nommsen-Rivers, PhD, RD, IBCLC, Assistant Professor
Leadership Co-Chair, Seminar Series in Human Milk and Lactation
Research Interests Human Lactation and Breastfeeding

Anne-Karina T. Perl, PhD, Assistant Professor
Research Interests Alveolar Regeneration and Bronchiolar Injury/Repair

John H. Reuter, MD, PhD, Associate Professor
Leadership Chair, Department of Pediatrics at Bethesda North Hospital Nurseries

Ward R. Rice, MD, PhD, Professor
Leadership Director, Neonatal Fellowship Training Program; Director, Newborn Services, St. Elizabeth Medical Center
Research Interests Lung Development, Surfactant Biology

Jerod M. Rone, MD, Associate Professor
Leadership Medical Director, Kettering Medical Center NICU

Kurt R. Schibler, MD, Associate Professor
Leadership Director, Neonatology Clinical Research Program
Research Interests Neonatal Immunology, Necrotizing Enterocolitis

John M. Shannon, PhD, Professor
Leadership Director of Graduate Studies, Program in Molecular and Developmental Biology
Debora I. Sinner, PhD, Instructor
  Research Interests Wnt Signaling and Sox Transcription Factors in Lung Development and Disease

Andrew P. South, MD, MPH, Assistant Professor
  Research Interests Outcomes and Etiology of Gastroschisis, Epidemiology of Late-Preterm Birth

Jean J. Steichen, MD, Professor Emeritus
  Research Interests Infant Follow-up

Takuji Suzuki, MD, PhD., Instructor
  Research Interests Lung Immunology

Bruce C. Trapnell, MD, MS, Professor
  Leadership Director, Rare Lung Diseases Network; Scientific Director, PAP Foundation; Co-Director, Cystic Fibrosis TDN Center
  Research Interests Rare Lung Diseases; GM-CSF, Gene Therapy

Christina J. Valentine, MD, Assistant Professor
  Research Interests Maternal and Infant Nutrition to improve perinatal health

Laura Ward, MD, Assistant Professor
  Leadership Co-Medical Director, Mercy Anderson Hospital Nurseries
  Research Interests Use of Human Milk in the NICU

Timothy E. Weaver, MS, PhD, Professor
  Leadership Associate Director, Division of Pulmonary Biology; Co-Director, Molecular and Developmental Biology Program
  Research Interests Pathogenesis of Interstitial Lung Diseases

Kathryn E. Wedig, MD, Associate Professor
  Leadership Director, High Risk Clinic @ GSH; Medical Director, Mercy Hospital Fairfield
  Research Interests Infant Follow-up, Neonatal Abstinence Syndrome

Scott L. Wexelblatt, MD, Assistant Professor
  Leadership Medical Director, Regional Newborn Services; Co-Medical Director Bethesda North Hospital Nurseries
  Research Interests Late Preterm Infant, Quality Improvement

Jonathan R. Wispé, MD, Professor
  Research Interests Perinatal Ethics, Theological Studies

Yan Xu, PhD, Associate Professor
  Leadership Director, Bioinformatics Microarray Core, Division of Pulmonary Biology
  Research Interests Bioinformatics, Systems Biology, Transcriptional Network
Joint Appointment Faculty Members

**Kathryn A. Wikenheiser-Brokamp, MD, PhD, Associate Professor (Pathology)**

**Research Interests** Pulmonary Pathology, Pediatric and Adult Lung Diseases

Clinical Staff Members

- Beth A. Baisden, MD
- Stephen Bird, MD
- Mary Burwinkel, MD
- Thomas Catalanotto, MD
- Diane Donley, MD
- Dena Elkeeb, MD
- Horacio Falciglia, MD
- Michelle French, MD
- Angelique Gloster, MD
- Girish Gowda, MD
- Pamela Holmes, MD
- Jill Klein, MD
- Katie Loudermilk, MD
- Alisa McGill, MD
- John Morrison, MD
- Miriam Peri, MD
- Ajay Ponkshe, MD
- Danna Premer, MD
- John Robinson, MD
- Deborah Rufner, MD
- Kelley Shultz, MD
- Jean Steichen, MD
- Nicole Tocco, MD
- Wambui Waruingi, MD
- Kira Zimmerly, MD

Trainees

- **Thomas Acciani, BS**, University of Illinois, Urbana, IL
- **Melinda Arnett, PhD**, University of Kansas Medical Center, Kansas City, KS
- **Aria Attia, MS**, Georgetown University, Washington, DC
- **Olivia Ballard, BA**, Miami University, Oxford, OH
- **David Balli, BA**, DePauw University, Greencastle, IN
- **Katie Bezold, BS**, Xavier University, Cincinnati, OH
- **Craig Bolte, PhD**, University of Cincinnati, Cincinnati, OH
- **Yuqi Cai, PhD**, Zhejiang University School of Medicine, Hangzhou, China
- **Gang Chen, MS, PhD**, Yangzhou University, Jiangsu, China
- **Xin-Hua Cheng, PhD**, Miami University, Oxford, OH
- **Rebecca Currier, BS**, Louisiana Tech University, Ruston, LA
- **David Dewar, MD**, PL6, Michigan State University, East Lansing, MI
- **Jill Fritz, BS**, Miami University, Oxford, OH
Division Collaboration

Reproductive Sciences; Developmental Biology; Pulmonary Medicine; Biomedical Informatics; Safety - The James A. Anderson Center; Infectious Disease; Human Genetics; Biostatistics and Epidemiology; Cellular and Molecular Immunology; General Pediatrics; Gastroenterology; Radiology; Fetal Care Center; Rheumatology/CAGE; Cancer and Blood Disease Institute » SK Dey, Takiko Daikoku, Christopher Wylie, James Wells, Noah Schroyer, Aaron Zorn, Richard Lang, William Hardie, Imre Solti, Steven Muething, Margaret Hostetter, Ge Zhang, and Maurizio Macaluso

The causes of preterm birth, complications of prematurity and birth defects span the spectrum of divisional interests and approaches at Cincinnati Children’s. To make substantial progress in reducing infant mortality from these causes requires collaborative efforts across many programs. The Perinatal Institute at Cincinnati Children’s provides an organizing center, and driver, for efforts to improve outcomes for infants born prematurely, prevent prematurity, and reduce the incidence of birth defects to synergistically reduce infant mortality in our region. As such, our Institute’s faculty have close collaborations with investigators in multiple divisions within Cincinnati Children’s, the University of Cincinnati, the other leading research institutions in Ohio, and globally in Japan, Germany, Mexico, Argentina, Finland, China, and Australia. For the past three years, the Division has offered a day-long educational seminar series addressing new approaches to patient care and clinical research for visiting faculty neonatologists from China Taiwan, and Southeast Asia.
## Grants, Contracts, and Industry Agreements

### Grant and Contract Awards

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<td>Genetic Analysis of Human Preterm Birth</td>
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<td>Cincinnati Center for Clinical and Translational Sciences and Training (Pilot/Collaborative Studies)</td>
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<th><strong>WHITSETT, J</strong></th>
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<td><strong>Airway Progenitor Cell Proliferation and Differentiation During Lung Repair</strong></td>
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<td>U01 HL 110964</td>
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<td><strong>Role of SREBP Network in Surfactant Lipid Homeostasis and Lung Maturation</strong></td>
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**Current Year Direct** | $8,157,006 |

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<td><strong>Total</strong></td>
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