**Division Data Summary**

**Research and Training Details**

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**Clinical Activities and Training**

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**Significant Publications**


This work utilizes regional data from the greater Cincinnati area to demonstrate the importance of referral of “high risk” mothers to tertiary obstetrical centers for the care and delivery of their preterm infants. Maternal, rather than infant transfer, reduces perinatal morbidity and mortality related to preterm birth. This publication highlights the benefits of our regionalized clinical program.


This is a landmark publication, demonstrating the first effective treatment for the life-threatening pulmonary complications of lymphangioleiomyomatosis (LAM). It is a carefully controlled, double blind, multicenter study, led by Dr. McCormack (UC) and Dr. Trapnell (CCHMC-UC), began as a part of the “Rare Lung Disease Consortium” here at CCHMC.


It is increasingly clear that late preterm delivery poses significant risks to the newborn. This work demonstrates increased pulmonary morbidity, admission to special care units for multiple complications of prematurity, in spite of documented pulmonary maturation, a finding of national significance in reducing the
rate of preterm birth and associated complications that occur even in late “preterms.” This work demonstrates that pulmonary maturity is not sufficient to ensure neonatal outcomes comparable to infants born at term.


Cooperation among Ohio delivery hospitals and the use of centralized databases, provide the infrastructure to document and reduce late onset sepsis in very preterm infants. This work demonstrates the value of a multi-center improvement collaborative to improve neonatal outcomes and reduce health care costs.


This work identifies secretor and nonsecretor status of the mother/infant dyad as an important risk factor for the necrotizing enterocolitis (NEC) and death of low birth weight/preterm infants. It is the first genetic test that indicates the risk for severe outcomes for preterm infants, and provides support for the importance of the innate immune system and its likely interaction with the microbiome in the pathogenesis of NEC and neonatal sepsis.

**Division Highlights**

**Beena Kamath, MD, MPH**

Dr. Kamath, along with colleagues Emily DeFranco, DO, (Dept. of OB/GYN University of Cincinnati) and Michael Marcotte, MD (Dept. of OB/GYN Good Samaritan Hospital), reported important findings regarding previously unappreciated limitations of fetal lung maturity testing to predict readiness for postnatal life.

**Noah Hillman, MD, Alan Jobe, MD, PhD, Machiko Ikegami, PhD, and Suhas Kallapur, MD**

**Neonatal MRI Imaging**

These investigators led a pre-clinical study of MRI imaging using a novel prototype MRI developed by Dr. Chuck Dumoulin and his colleagues in the CCHMC Imaging Research Center. Preterm lambs were delivered by Cesarean section, treated with pulmonary surfactant, stabilized on mechanical ventilation and subjected to sequential MRI imaging. Successful studies of brain, lung, and gastrointestinal structures were conducted. Findings are being applied toward development of a clinical MRI device scheduled for installation in the CCHMC NICU by January 2012.

**James Greenberg, MD, Eric Hall, PhD, and Jareen Meinzen-Derr, PhD**

**Infant Mortality Reduction**

This group is working with the Anderson Center to support the CCHMC Community Health Strategic goal to reduce infant mortality in Hamilton County to the national average of 6.9/1000 live birth by 2015. They continue work on geographic analytic method to identify key “hot spots” for targeted interventions to reduce preterm birth through coordination of care.

**Heather Kaplan, MD, Edward Donovan, MD, and Carole Lannon, PhD**

**Multi-Institutional Quality Improvement to Reduce Late-Onset Sepsis**

These investigators demonstrated the efficacy of a state-wide quality collaborative (Ohio Perinatal Quality Collaborative) to reduce infections in the NICU.
Division Collaboration

Divisional faculty have close collaborations with faculty in multiple divisions within CCHMC, the University of Cincinnati, and with investigators throughout the world.

Faculty Members

Jeffrey A. Whitsett, MD, Professor
  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

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

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

Tanya E. Cahill, MD, Assistant Professor
  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

Horacio Falciglia, MD, Professor Emeritus
  Research Interests Selenium Status and Neonatal Sepsis; Neonatal Mortality

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

James M. Greenberg, MD, Professor
  Co-Director, Perinatal Institute; Director, Division of Neonatology
  Research Interests Preterm Birth, Community Health, Pulmonary Vascular Development

Beth E. Haberman, MD, Assistant Professor
  Medical Director, Cincinnati Children's NICU & Co-Medical Director, Mercy Anderson Hospital Nurseries
  Research Interests Infant Follow-up

Eric Hall, PhD, Assistant Professor
  Research Interests Biomedical Informatics

Noah H. Hillman, MD, Assistant Professor
  Research Interests Pulmonary Physiology, Neonatal Resuscitation, Lung Injury/Repair

Steven B. Hoath, MD, Professor
  Medical Director, Skin Sciences Program
  Research Interests Skin Development & Environmental Interactions

Machiko Ikegami, MD, PhD, Professor
  Director, Surfactant and Metabolic Function Core
  Research Interests Surfactant Metabolism; Lung Injury

Alan H. Jobe, MD, PhD, Professor
  Director, Division of Perinatal Biology
Research Interests  Injury and Repair of the Preterm Lung

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, Associate Professor
  Director, Neonatology CME
Research Interests  Fetal Inflammation/Physiology, Lung Development/Inflammation, BPD, Developmental Immunology

Beena Kamath, MD, MPH, Assistant Professor
Research Interests  Neonatal Outcomes and Public Health; Fetal Lung Maturity; Global Health

Heather 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, Assistant Professor
Research Interests  Innate Immune Systems; Cystic Fibrosis; Neonatal Infection

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

Timothy Le Cras, PhD, Associate Professor
  Director of Admissions, Molecular & Developmental Biology Graduate Program
Research Interests  Chronic Lung Diseases; Lung Development, Pulmonary Hypertension

Kristin R. Melton, MD, Associate Professor
  Associate Director, Neonatal Fellowship Training Program
Research Interests  Developmental Biology, Neural Crest Biology

Ardythe L. Morrow, PhD, Professor
  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

Vivek Narendran, MD, MBA, Associate Professor
  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
  Medical Director, TriHealth Nurseries
Research Interests  Immunobiology

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

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

John H. Reuter, MD, PhD, Associate Professor
  Co-Medical Director, Bethesda North Hospital Nurseries
Research Interests

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

Kurt R. Schibler, MD, Associate Professor
  Principal Investigator, NICHD Neonatal Research Network
  Research Interests Neonatal Immunology, Necrotizing Enterocolitis

John M. Shannon, PhD, Professor
  Director of Graduate Studies, Program in Molecular and Developmental Biology
  Research Interests Lung Development, Foregut Embryology

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
  Director, Rare Lung Diseases Network; Scientific Director, PAP Foundation; Co-Director, Cystic Fibrosis TDN Center
  Research Interests Rare Lung Diseases; GM-CSF, Gene Therapy

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

Timothy E. Weaver, MS, PhD, Professor
  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
  Director, High Risk Clinic @ GSH; Medical Director, Mercy Hospital Fairfield
  Research Interests Infant Follow-up, Neonatal Abstinence Syndrome

Susan E. Wert, PhD, Associate Professor
  Director, Molecular Morphology Core, Division of Pulmonary Biology
  Research Interests Lung Development, Molecular Morphology of the Lung, Ultrastructural Analysis of the Lung, Genetic Surfactant Disorders

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

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

Kathryn Wikenheiser-Brokamp, MD/PhD, Associate Professor
Pathology

Research Interests Pulmonary Pathology, Pediatric and Adult Lung Diseases

Clinical Staff Members

- Stephen Bird, MD
- Mary Burwinkel, MD
- Thomas Catalanotto, MD
- Christine Chappell, MD
- Diane Donley, MD
- Michelle French, MD
- Pamela Holmes, MD
- Katie Loudermilk, MD
- Alisa McGill, MD
- Miriam Peri, MD
- Ajay Ponkshe, MD
- Danna Premer, MD
- John Robinson, MD
- Deborah Rufner, MD
- Kira Zimmerly, MD

Trainees

- Thomas Acciani, BS, University of Illinois Urbana
- Ceyda Acun, MD, PL6, George Washington University Hospital, Washington, DC
- David Balli, BA, DePauw University, Greencastle, IN
- Clare Berry, PhD, University of Western Australia
- Valerie Besnard, PhD, Universite Rene Descartes - Paris V
- Craig Bolte, PhD, University of Cincinnati
- Gang Chen, MS, PhD, Yangzhou University, China
- Elizabeth Davies, BSc, University of Southampton, UK
- David Dewar, MD, PL4, Michigan State University, East Lansing, MI
- Jill Fritz, BS, Miami University, Oxford, OH
- Tate Gisslen, MD, PL4, University of Minnesota Medical School, Minneapolis, MN
- Corryn Greenwood, MD, PL5, Mayo Clinic School of Graduate Medical Education, Rochester, NY
- David Hahn, BS, Northern Kentucky University
- Hans Michael Haitchi, MD, PhD, University of Southampton, UK
- Jamie Havrilak, BS, Susquehanna University, Selinsgrove, PA
- Prakruti Jambula, MD, PL6, Univ. of Oklahoma HSC, Oklahoma City, OK
- Venkata Kuppala, MD, PL6, The Cleveland Clinic, Cleveland, OH
- Ryosuke Kusano, MD, Kyoto Prefectural University of Medicine, Japan
- Audrone LaForgia, MD, PL5, EVMS/Children's Hospital of the King's Daughters, Norfolk, VA
- Alexander Lange, PhD, University of Cincinnati
- Karunyakanth Mandapaka, MS, University of Cincinnati
Significant Accomplishments

**Diagnosis and Treatment of Pulmonary Alveolar Proteinosis**

National Institutes of Health funding was approved for Bruce Trapnell, MD, MS, and coworkers who have developed lung markers for the diagnosis of hereditary and acquired disorders of surfactant metabolism. They have found that pulmonary alveolar proteinosis (PAP) is a heterogeneous disorder caused, in part, by autoimmunity against GM-CSF and by mutations in GM-CSF receptors, enabling correct diagnosis and treatment of these life-threatening disorders. New treatment modalities, including gene therapy, are being tested in the clinics.

**Pathogenesis of Interstitial Lung Disease and Emphysema**

New NIH funding was approved for studies, led by Timothy Weaver, PhD, to identify the mechanisms causing lung remodeling in idiopathic pulmonary fibrosis associated with mutations in the surfactant protein-C gene, a cause of life-threatening pulmonary disease in children and adults. Anne Karina Perl, PhD, leads the work identifying the role of growth factors to enhance lung growth in children and adults with emphysema.

**Genetic Networks Linking Mucus Metaplasia and Inflammation**

NIH funding was approved for the study of a new genetic network regulating airway epithelial cell differentiation and mucus production related to cystic fibrosis, asthma and COPD in work led by Thomas Korfhagen, MD, PhD, and Jeffrey Whitsett, MD. A master regulator of mucus production and its impact on lung structure and inflammation are being studied as a target for therapy for chronic lung diseases in children and adults.

**Division Publications**


33. Hillman NH, Kallapur SG, Pillow JJ, Nitsos I, Polglase GR, Ikegami M, Jobe AH. Inhibitors of inflammation and endogenous surfactant pool size as modulators of lung injury with initiation of ventilation in...


66. Oh W, Fanaroff AA, Carlo WA, Donovan EF, McDonald SA, Poole WK. Effects of delayed cord clamping


81. Shah TA, Hillman NH, Nitsos I, Polglase GR, Pillow JJ, Newnham JP, Jobs AH, Kallapur SG. Pulmonary


95. Wu H, Suzuki T, Carey B, Trapnell BC, McCormack FX. Keratinocyte growth factor augments pulmonary innate immunity through epithelium-driven, GM-CSF-dependent paracrine activation of alveolar


Grants, Contracts, and Industry Agreements

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<td>Efficacy of SP-D Containing Surfactant for Treatment of Premature Newborns</td>
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**Role of Foxm1 in the Pathogenesis of Prostate Cancer**  
Department of Defense Army  
W81XWH0910389  
07/01/09-06/30/12  
$207,500

KALINICHENKO, V  
Foxf1 Transcription Factor in Development of Pulmonary Capillaries  
National Institutes of Health  
R01 HL 084151  
05/01/11-04/30/15  
$250,000

KALLAPUR, S  
Mechanisms of Fetal Inflammatory Response Syndrome Induced by Chorioamnionitis  
National Institutes of Health  
R01 HD 057869  
02/03/09-01/31/14  
$241,397

KENNY, A  
Secreted BMP Antagonists in Foregut Organ Development  
National Institutes of Health  
K08 HL 105661  
12/08/10-11/30/15  
$121,300

KINGMA, P  
Surfactant Protein D in Pulmonary and Systemic Host Defense  
National Institutes of Health  
K08 HL 089505  
07/01/08-06/30/13  
$120,850

KORFHAGEN, T  
REL M Peptides Alter Lung Defense  
National Institutes of Health  
R21 HL 083599  
09/01/09-08/31/11  
$150,000

LECRAS, T.  
Impact of Early Life Diesel Exposure on Immune Patterning and Lung Structure/Function (LeCras/Hershey)  
National Institutes of Health  
R01 HL 097135  
09/01/09-07/31/14  
$347,205  
LeCras, T  
$127,047  
Hershey, G  
$220,158

MORROW, A  
Novel Genetic and Salivary Glycan Biomarkers for Risk of NEC in ELBW Infants  
National Institutes of Health  
R01 HD 059140  
01/15/09-12/31/13  
$513,785

**The Role of Human Milk in Infant Nutrition and Health**  
National Institutes of Health  
P01 HD 013021  
08/01/09-07/31/14  
$972,187  
Jiang, Xi  
Core D  
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Project 2  
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NOMMSEN-RIVERS, L  
Antidepressant Therapy in Breastfeeding Mothers  
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| **FGF and PDGF Regulate Myofibroblast Differentiation in Alveolar Regeneration** | National Institutes of Health | 07/01/10-06/30/14 | **$250,000** |
| **Role of EGF Receptor Regenerating Airway Epithelium and Airway Wall Thickening** | American Lung Association | 07/01/09-06/30/11 | **$40,000** |

SCHIBLER, K

| **NICHD Cooperative Multicenter Neonatal Research Network** | National Institutes of Health | 04/01/11-03/31/16 | **$200,000** |
| **NICHHD Cooperative Multicenter Neonatal Research Network Capitation** | Research Triangle International (National Institutes of Health) | 04/01/11-03/31/16 | **$57,870** |

SHANNON, J

| **LPCAT1 is Essential for Perinatal Lung Function and Survival** | National Institutes of Health | 07/01/10-06/30/14 | **$317,457** |
| **Role of HIF-1alpha in Fetal Lung Epithelial Differentiation** | National Institutes of Health | 02/01/07-01/31/12 | **$358,040** |

TRAPNELL, B

| **Macrophage-based Human Gene Therapy for Hereditary PAP** | National Institutes of Health | 12/15/10-11/30/12 | **$125,000** |
| **QUANTitative Chest Computed Tomography Unmasking Emphysema Progression in Alpha-1 Antitrypsin Deficiency (QUANTUM-1)** | Alpha One Foundation | 07/01/10-06/30/11 | **$14,577** |
| **Role of Anti-GM-CSF Antibodies in Myeloid Cell Function and Innate Immunity** | National Institutes of Health | 04/01/11-03/31/16 | **$250,000** |

WEAVER, T

| **Role of SFTPC in Pathogenesis of Interstitial Lung Disease** | National Institutes of Health | 12/01/08-11/30/13 | **$290,155** |

WHITSETT, J

<p>| <strong>Pulmonary and Cardiovascular Development Training Grant</strong> | National Institutes of Health | 07/01/09-06/30/14 | <strong>$250,879</strong> |
| <strong>Reagents for Detection and Isolation of Pulmonary Progenitor Cell Populations</strong> | National Institutes of Health (Oregon Health Sciences University) | 09/30/09-08/31/11 | <strong>$107,229</strong> |</p>
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<td>Current Year Direct Receipts</td>
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<td>$187,905</td>
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