

Section of Neonatology, Perinatal and Pulmonary Biology

Division Photo



First Row: Yan Xu, Tanya Kalin, James Greenberg, Jeffrey Whitsett, Alan Jobe, Amy Nathan, Kathryn Wedig; Second Row: Ann Akeson, Laurel Bookman, Beena Kamath, Kurt Schibler, Karen Sparling, Kathryn Wikenheiser-Brokamp, Dana Premer, Heather Kaplan, Kristin Melton; Third Row: Debora Sinner, Thomas Korfhagen, Madhavi Koneru, Anne-Karina Perl, Stephan Glasser, Noah Hillman, Eric Hall, Tanya Cahill, Steven Hoath, Bruce Trapnell, Vladimir Kalinichenko, Laura Ward, John Reuter, Alan Kenny, Jean Steichen, Timothy Weaver

Division Data Summary

Research and Training Details

Number of Faculty	49
Number of Research Fellows	9
Number of Research Students	10
Number of Support Personnel	100
Direct Annual Grant Support	\$6,663,150
Direct Annual Industry Support	\$548,330
Peer Reviewed Publications	61

Clinical Activities and Training

Number of Clinical Staff	22
Number of Clinical Fellows	12
Number of Other Students	5
Inpatient Encounters	83612
Outpatient Encounters	3307

Significant Publications

Kalin, T.V., Wang, I-C., Meliton, L., Zhang, Y., Wert, S.E., Ren, X., Snyder, J., Bell, S.M., Graf, L., Whitsett, J.A. and Kalinichenko, V.V.: Forkhead box m1 transcription factor is required for perinatal lung function. *Proc. Natl. Acad. Sci.* 105:19329-19334, 2008. (PMID:19033457)

This paper used conditional deletion of Forkhead box m1, a transcription factor previously known for its critical role in cell proliferation and tumorigenesis, in the maturation of the lung prior to birth. Deletion of Forkhead box m1 in the developing mouse lung did not alter cell proliferation, but was required for lung function. Foxm1 regulated the biosynthesis of surfactant associated genes critical for lung function at the time of birth. This work provides new

insight both into the functions of Forkhead box m1, as well as genes required for lung maturation and respiration.

Kallapur, S.G., Nitsos, I., Moss, T.J., Polglase, G.R., Pillow, J.J., Cheah, F.C., Kramer, B.W., Newnham, J.P., Ikegami, M., and Jobe, A.H.: IL-1 mediates pulmonary and systemic inflammatory responses to chorioamnionitis induced by lipopolysaccharide. Am. J. Respir. Crit. Care Med. 179:955-961, 2009. (PMID: 19234101)

This paper demonstrates the critical role of IL-1 β in the modulation of lung inflammation and the fetal inflammatory syndrome associated with intrauterine infection. Approximately 60% of very low birth weight preterm infants have evidence of intrauterine infection that initiates both systemic and lung inflammation in the fetus. This paper demonstrates the important role of IL-1 β in this process. Fetal inflammation can affect both neurodevelopmental outcomes and pulmonary inflammation associated with bronchopulmonary dysplasia, a severe respiratory disorder that accompanies preterm birth and intrauterine infection. Understanding the pathogenesis of intrauterine infection will aid in the diagnosis and therapy of lung disease and other prematurity associated disorders in newborn infants.

Nathan, A.T., Peterson, E.A., Chakir, J., and Wills-Karp M.: Innate immune responses of airway epithelium to house dust mite are mediated through beta-glucan-dependent pathways. J. Allergy Clin. Immunol. 123:612-618, 2009. (PMID: 19178937)

This work shows a novel role for beta-glucan mediated lung inflammation in response to house dust mice, a common asthma inducing allergen. Components of the dust mice bind to and activate receptors for sugars on resident pulmonary cells, in turn stimulating lung inflammation that leads to lung remodeling associated with asthma. This new pathway has implications for prevention and therapy of pulmonary allergy and asthma.

Suzuki, T., Sakagami, T., Rubin, B.K., Nogee, L.M., Wood, R.E., Zimmerman, S.L., Smolarek, T., Dishop, M.K., Wert, S.E., Whitsett, J.A., Grabowski, G., Carey, B.C., Stevens, C., van der Loo, J.C.M. and Trapnell, B.C.: Familial pulmonary alveolar proteinosis caused by mutations in CSF2RA. J. Exp. Med. 205:2703-2710, 2008. (PMID: 18955570)

In this multi-divisional collaborative work led by Dr. Bruce Trapnell, the underlying genetic cause of idiopathic pulmonary fibrosis was identified for the first time. Two siblings with severe and early Pulmonary Alveolar Proteinosis (PAP), a disease in which surfactant accumulates in the lungs, were studied. Mutations in the CSF2R, the receptor for GM-CSF (cytokine) required for surfactant removal from the airway caused PAP. The dysfunction of this receptor leads to the marked accumulation of surfactant material in the lung, impairing breathing and growth of these children. Since high doses of GM-CSF can stimulate the abnormal receptor, new therapies for this severe and life-threatening disease are likely to be developed for children who have this genetic defect. The paper provides a genetic basis for the diagnosis of familial pulmonary alveolar proteinosis, and a basis for future therapies.

Wan, H., Luo, F., Wert, S.E., Zhang, L., Xu, Y., Ikegami, M., Maeda, Y., Bell, S.M. and Whitsett, J.A.: Kruppel-like factor 5 is required for perinatal lung morphogenesis and function. Development 135:2563-2572, 2008. (PMID: 18599506)

In this work, Kruppel-like factor 5, a gene identified as an important mediator of "stem cells" was identified. Deletion of KLF-5 markedly inhibited perinatal lung function at birth, regulating the expression of surfactant proteins as well as the morphological maturation of the alveolar region of the lung required for gas exchange at birth. This work demonstrates a novel role for KLF-5 and its gene targets, furthering understanding the pathogenesis of respiratory disease in preterm infants, and repair of the lung after injury.

Division Highlights

Drs. Ardythe Morrow and Kurt Schibler

Clinical and translational research on novel predictive biomarkers for necrotizing enterocolitis and other outcomes of prematurity was launched this year with a 5-year R01 grant from the National Institute of Child Health and Human Development (NICHD). awarded to Drs. Ardythe Morrow and Kurt Schibler as co-PIs. These investigators have exciting preliminary data indicating that specific histo-blood group antigens measured in saliva provide powerful predictors of risk of necrotizing enterocolitis and death in premature infants. This grant supports the conduct of a cohort study of 600 premature infants through a collaboration in Cincinnati Children's and the University of Alabama at Birmingham. The predictive value of salivary and genetic biomarkers will be tested, and the role of microbial colonization in risk of necrotizing enterocolitis and death will be examined using state of the art genomic and informatics methods.

Division Collaboration

Collaboration with

Collaborating Faculty:

Divisional faculty have close collaborations with faculty in multiple divisions within CCHMC and with investigators throughout the world

Faculty Members

Jeffrey A. Whitsett, MD, Professor ; *Chief, Section of Neonatology, Perinatal and Pulmonary Biology*

Research Interests: Lung Development; Surfactant

Ann L. Akeson, PhD, Research Associate Professor

Research Interests: Pulmonary Vascular and Lymphatic Development

Henry T. Akinbi, MD, Associate Professor Clinical

Research Interests: Neonatal Infections and Blood Transfusions

Cindy J. Bachurski, PhD, Research Associate Professor ; *Director, Research in Pulmonary Biology and Neonatology Elective, University of Cincinnati College of Medicine; Director, Summer Internship Program for High School Students, CCHMC*

Research Interests: Gene Regulation in the Lung

Thomas Bartman, MD, PhD, Assistant Professor

Research Interests: Cardiovascular Development

Tanya E. Cahill, MD, Assistant Professor Clinical

Research Interests: Neonatal Abstinence Syndrome and High Risk Infant Follow-Up

Michael W. Crossman, MD, PhD, Assistant Professor Clinical

Research Interests: Intestinal Function and Host-Microbial Interactions; Bioethics

Vrushank G. Dave', PhD, Research Assistant Professor

Research Interests: Transcription, Lung Development and Cancer

Edward F. Donovan, MD, Professor Emeritus

Research Interests: Prematurity Prevention; Infant Mortality; Evidence-based Decision Making; and Clinical Research

Horacio Falciglia, MD, Professor Clinical ; *Director, Mother/Baby Unit Good Samaritan Hospital*

Research Interests: Seleniun Status and Neonatal Sepsis; Timing of Cord Clamping and Outcome; Vermont Oxford Data Base

Stephan W. Glasser, PhD, Associate Professor

Research Interests: Gene Regulation in the Lung

Lloyd Graf, Jr., PhD, Research Assistant Professor

Research Interests: Dysregulated Gene Expression in Inflammatory Lung Diseases

James M. Greenberg, MD, Associate Professor ; *Director, Division of Neonatology; Medical Director, Regional Newborn Services*

Research Interests: Pulmonary Vascular Development

Beth E. Haberman, MD, Assistant Professor Clinical ; *Medical Director, RCNIC & Mercy Anderson Hospital Nurseries; Director, High Risk Infant Follow-Up Clinic*

Research Interests: Infant Follow-up

Eric Hall, PhD, Research Instructor

Research Interests: Biomedical Informatics

Noah H. Hillman, MD, Assistant Professor

Steven B. Hoath, MD, Professor ; *Director, Skin Sciences Institute*

Research Interests: Skin Development

Machiko Ikegami, MD, PhD, Professor ; *Director, Surfactant and Metabolic Function Core*

Research Interests: Surfactant Metabolism

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

Research Interests: Surfactant Physiology

Tanya V. Kalin, MD, PhD, Research Assistant Professor

Research Interests: Fox Transcription Factors in Lung Cancer 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 Clinical ; *Director, Neonatology CME*
Research Interests: Lung Development/Inflammation, BPD, Developmental Immunology

Heather Kaplan, MD, MSCE, Research Assistant Professor
Research Interests: Health Services Research; Implementation Science

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

Paul S. Kingma, MD, PhD, Assistant Professor Clinical
Research Interests: Innate Immune Systems; Surfactant Protein D; Neutrophil function in Cystic Fibrosis

Madhavi Koneru, MD, Assistant Professor Clinical
Research Interests: Urine biomarkers in prenatal renal anomalies

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

Timothy Le Cras, PhD, Associate Professor ; *Director of Graduate Student Recruiting, Molecular & Developmental Biology Graduate Program*
Research Interests: Chronic Lung Disease; Lung Development

Kristin R. Melton, MD, Associate Professor Clinical
Research Interests: Developmental Biology

Vivek Narendran, MD, Associate Professor Clinical ; *Director, Univ. Hosp. NICU & Newborn Nursery; Medical Director, The Christ Hospital Nursery*
Research Interests: C-PAP; Business Case for Quality Improvements

Amy T. Nathan, MD, Research Assistant Professor
Research Interests: Immunobiology

Laurie A. Nommsen-Rivers, PhD, RD, IBCLC, Research Assistant Professor
Research Interests: Human Milk and Lactation; Perinatal Epidemiology

Anne-Karina Perl, PhD, Research Assistant Professor
Research Interests: FGF/PDGF Signaling in Alveolar Regeneration and EGFR Signaling in Bronchiolar Injury and Repair

Danna M. Premer, MD, Assistant Professor Clinical

John H. Reuter, MD, PhD, Associate Professor Clinical ; *Chair, Dept. Pediatrics, Bethesda North Hospital Nurseries*

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

Laurie Nommsen-Rivers, PhD, RD, IBCLC, Research Assistant Professor ; *Co-Chair, Interdisciplinary Seminar Series in Human Milk and Lactation*
Research Interests: Perinatal and pediatric epidemiology; human lactation with a focus on the term newborn

Kurt R. Schibler, MD, Associate Professor ; *Principal Investigator, NICHD Neonatal Research Network*
Research Interests: Neonatal Immunology

John M. Shannon, PhD, Professor
Research Interests: Lung Development

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

Jean J. Steichen, MD, Professor ; *Chair, Department of Pediatrics, The Christ Hospital*
Research Interests: Infant Follow-up

Bruce C. Trapnell, MD, MS, Professor ; *Director, Rare Lung Diseases Clinical Research Consortium; Scientific Director, PAP Foundation; Director, Translational Pulmonary Research; Co-Director, Cystic Fibrosis TDN Center*
Research Interests: Pulmonary Gene Delivery

Laura Ward, MD, Adjunct Assistant Professor
Research Interests: Use of Human Milk in the NICU

Timothy E. Weaver, PhD, Professor ; *Co-Director, Division of Pulmonary Biology*
Research Interests: Protein Processing in the Lung

Kathryn E. Wedig, MD, Associate Professor Clinical ; *Director, High Risk Clinic @ GSH; Medical Director, Mercy Hospital Fairfield*
Research Interests: Infant Follow-up

Susan E. Wert, PhD, Research 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 Clinical ; *Associate Medical Director Regional Newborn Services; Co-medical Director Bethesda North Hospital*

Kathryn Wikenheiser-Brokamp, MD, PhD, Assistant Professor

Research Interests: Pulmonary Pathology; Pediatric and Adult Lung Diseases

Yan Xu, PhD, Research Associate Professor ; *Director, Microarray-Bioinformatics Core, Division of Pulmonary Biology*

Research Interests: Bioinformatics, Systems Biology, Transcriptional Network

Clinical Staff Members

- **Samina Ahmed, MD**
- **Shana Alexander, MD**
- **Stephen Bird, MD**
- **Mary Burwinkel, MD**
- **Thomas Catalanotto, MD**
- **Diane Donley, MD**
- **Michelle French, MD**
- **Lisa Green, MD**
- **Jennifer Hardie, MD**
- **Evelyn Jones, MD**
- **Jillian Klein, MD**
- **Carrie Kluger, MD**
- **Katie Loudermilk, MD**
- **Alisa McGill, MD**
- **Kenton Pate, MD**
- **Miriam Peri, MD**
- **Ajay Ponkshe, MD**
- **John Robinson, MD**
- **Deborah Rufner, MD**
- **Kathy Sorger, MD**
- **Kara Tencza, MD**
- **Kira Zimmerly, MD**

Trainees

- **Valerie Besnard, PhD**, Universite Rene Descartes - Paris V
- **Stephanie Binder, MD**, PL6, John H. Stronger Hospital Cook County, Chicago, IL
- **Jim Bridges, PhD**, University of Cincinnati
- **Brenna Carey, PhD**, University of Cincinnati
- **Gang Chen, MS**, Yangzhou University, China
- **Fusheng Chou, MD**, National Taiwan University
- **Nikki Glenn, BS**, Miami University
- **David Hahn, BS**, Northern Kentucky University
- **Prakruti Jambula, MD**, PL4, Univ. of Oklahoma HSC, Oklahoma City, OK
- **Amer Jameel, BS**, Ohio State University
- **Brooke King, MD**, PL5, Cincinnati Children's Hospital Medical Center - UCMC, Cincinnati, OH
- **Elizabeth Kramer, BA, BS**, Miami University
- **Rishikesh Kulkarni, BPharmSc**, University of Mumbai, India
- **Venkata Kuppala, MD**, PL5, The Cleveland Clinic, Cleveland, OH
- **Tara Lang, MD**, PL5, Mayo School GME, Rochester, MN
- **Alexander Lange, PhD**, University of Cincinnati

- **Yutaka Maeda, PhD**, University of California
- **Karunyakanth Mandapaka, MS**, University of Cincinnati
- **Rafael Mena, MD, PL4**, Cincinnati Children's Hospital Medical Center - UCMC, Cincinnati, OH
- **Stephanie Merhar, MD, PL4**, Cincinnati Children's Hospital Medical Center - UCMC, Cincinnati, OH
- **Bhuvana Murali, BTech**, Vellore Institute of Technology, India
- **Elizabeth Mushaben, BS**, College of Mount St. Joseph
- **Ross Ridsdale, PhD**, University of Toronto
- **Chika Saegusa, PhD**, RIKEN, Japan
- **Takuro Sakagami, MD, PhD**, Niigata University, Japan
- **Christine Sarlone, MD, PL4**, Univ. of Tennessee HSC, Memphis, TN
- **Tushar Shah, MD, MPH, PL5**, Case Western Reserve Univ., Cleveland, OH
- **Jonathan Slaughter, MD, MSc., PL5**, Medical Univ. of South Carolina, Charleston, SC
- **Gareth Stewart, MB BCH BAO, MRCP, PhD**, Royal Infirmary of Edinburgh
- **Holly Strike, MD, PL6**, Indiana Univ SOM, Indianapolis, IN
- **Takuji Suzuki, MD, PhD**, Tohoku University, Japan
- **David Tompkins, MS**, University of Texas
- **Huajing Wan, PhD**, University of Cincinnati
- **Elizabeth Wetzel, MD, MSc, PL4**, Indiana Univ. SOM, Indianapolis, IN

Significant Accomplishments

A Master Gene Controlling Mucus Production

Scientists in the laboratory of Dr. Jeffrey Whitsett, Executive Director of the Perinatal Institute, and collaborators have identified a single gene required for mucus production in the airways of both mice and men called SPDEF (Sam-pointed domain/Ets-like factor). SPDEF regulates a group of genes synthesizing, packaging, and secreting mucus. SPDEF is induced in cystic fibrosis, asthma, and chronic obstructive pulmonary disease (COPD) in the lungs of children and adults, where it contributes to lung infections and other respiratory problems. Understanding the genes and processes influencing mucus secretion will lead to improved diagnosis and treatment of common, severe childhood lung diseases.

Novel Genetic Mutations Cause Severe Lung Disease, Pulmonary Alveolar Proteinosis (PAP) in Children

Dr. Bruce Trapnell and collaborators identified a novel cause of severe lung disease, PAP, in children. Children with mutations in receptor for Granulocyte Macrophage Colony Stimulating Factor (GM-CSF Receptor) develop severe lung disease in which pulmonary surfactant accumulated, causing growth failure and respiratory distress. The receptor fails to signal macrophages in the lung to clear surfactant from the airways. The studies identified a new cause of this pulmonary disease, and provides the knowledge that will lead to improved diagnosis and therapy for this life-threatening pulmonary disorder, PAP.

A New Gene, Foxm1, is Required for Lung Function and Survival at Birth, and Plays a Role in Lung Tumorigenesis

Drs. Vladimir Kalinichenko and Tanya Kalin have discovered that Foxm1, a gene critical for cell proliferation in many organs, plays a critical role in the maturation of the lung prior to birth. Deletion of Foxm1 in the lung caused lung failure at birth but, surprisingly, did not influence cell proliferation. Lung failure was related in part to the lack of pulmonary surfactant. When Foxm1 was deleted after birth, mice failed to develop lung tumors in response to carcinogens and genes associated with lung cancer. The studies identified a new pathway critical for perinatal lung maturation, a factor important for the survival of preterm infants after birth. The study also provides new therapeutic targets for future therapies of lung tumors.

Division Publications

1. Lange AW, Keiser AR, Wells JM, Zorn AM, Whitsett JA. [Sox17 promotes cell cycle progression and inhibits TGF-beta/Smad3 signaling to initiate progenitor cell behavior in the respiratory epithelium](#). *PLoS One*. 2009; 4: e5711.
2. Ambalavanan N, Carlo WA, D'Angio CT, McDonald SA, Das A, Schendel D, Thorsen P, Higgins RD. [Cytokines associated with bronchopulmonary dysplasia or death in extremely low birth weight infants](#). *Pediatrics*. 2009; 123: 1132-41.
3. Bigham MT, Amato R, Bondurant P, Fridriksson J, Krawczeski CD, Raake J, Ryckman S, Schwartz S, Shaw J, Wells D, Brill R. [Ventilator-associated pneumonia in the pediatric intensive care unit: characterizing the problem](#)

- [and implementing a sustainable solution](#). *J Pediatr*. 2009; 154: 582-587 e2.
4. Han X, Uchida K, Jurickova I, Koch D, Willson T, Samson C, Bonkowski E, Trauernicht A, Kim MO, Tomer G, Dubinsky M, Plevy S, Kugathasan S, Trapnell BC, Denson LA. [Granulocyte-macrophage colony-stimulating factor autoantibodies in murine ileitis and progressive ileal Crohn's disease](#). *Gastroenterology*. 2009; 136: 1261-71, e1-3.
 5. Kramer BW, Kallapur SG, Moss TJ, Nitsos I, Newnham JP, Jobe AH. [Intra-amniotic LPS modulation of TLR signaling in lung and blood monocytes of fetal sheep](#). *Innate Immun*. 2009; 15: 101-7.
 6. Olsen IE, Lawson ML, Meinen-Derr J, Sapsford AL, Schibler KR, Donovan EF, Morrow AL. [Use of a body proportionality index for growth assessment of preterm infants](#). *J Pediatr*. 2009; 154: 486-91.
 7. Kramer BW, Kallapur S, Newnham J, Jobe AH. [Prenatal inflammation and lung development](#). *Semin Fetal Neonatal Med*. 2009; 14: 2-7.
 8. Hoskins EE, Morris TA, Higginbotham JM, Spardy N, Cha E, Kelly P, Williams DA, Wikenheiser-Brokamp KA, Duensing S, Wells SI. [Fanconi anemia deficiency stimulates HPV-associated hyperplastic growth in organotypic epithelial raft culture](#). *Oncogene*. 2009; 28: 674-85.
 9. Besnard V, Wert SE, Stahlman MT, Postle AD, Xu Y, Ikegami M, Whitsett JA. [Deletion of Scap in alveolar type II cells influences lung lipid homeostasis and identifies a compensatory role for pulmonary lipofibroblasts](#). *J Biol Chem*. 2009; 284: 4018-30.
 10. Abman S, Jobe A, Chernick V, Blaisdell C, Castro M, Ramirez MI, Gern JE, Cutting G, Redding G, Hagood JS, Whitsett J, Abman S, Raj JU, Barst R, Kato GJ, Gozal D, Haddad GG, Prabhakar NR, Gauda E, Martinez FD, Tepper R, Wood RE, Accurso F, Teague WG, Venegas J, Cole FS, Wright RJ, Gail D, Hamvas A, Kercsmar C, Kiley J, Weinmann G. [Strategic plan for pediatric respiratory diseases research: an NHLBI working group report](#). *Pediatr Pulmonol*. 2009; 44: 2-13.
 11. Ball MK, Jobe AH, Polglase GR, Kallapur SG, Cheah FC, Hillman NH, Pillow JJ. [High and low body temperature during the initiation of ventilation for near-term lambs](#). *Resuscitation*. 2009; 80: 133-7.
 12. Cotten CM, Taylor S, Stoll B, Goldberg RN, Hansen NI, Sanchez PJ, Ambalavanan N, Benjamin DK, Jr.. [Prolonged duration of initial empirical antibiotic treatment is associated with increased rates of necrotizing enterocolitis and death for extremely low birth weight infants](#). *Pediatrics*. 2009; 123: 58-66.
 13. Griggs RC, Batshaw M, Dunkle M, Gopal-Srivastava R, Kaye E, Krischer J, Nguyen T, Paulus K, Merkel PA. [Clinical research for rare disease: opportunities, challenges, and solutions](#). *Mol Genet Metab*. 2009; 96: 20-6.
 14. Moss TJ, Nitsos I, Knox CL, Polglase GR, Kallapur SG, Ikegami M, Jobe AH, Newnham JP. [Ureaplasma colonization of amniotic fluid and efficacy of antenatal corticosteroids for preterm lung maturation in sheep](#). *Am J Obstet Gynecol*. 2009; 200: 96 e1-6.
 15. Perl AK, Zhang L, Whitsett JA. [Conditional expression of genes in the respiratory epithelium in transgenic mice: cautionary notes and toward building a better mouse trap](#). *Am J Respir Cell Mol Biol*. 2009; 40: 1-3.
 16. Wise-Draper TM, Morreale RJ, Morris TA, Mintz-Cole RA, Hoskins EE, Balsitis SJ, Hussein-zadeh N, Witte DP, Wikenheiser-Brokamp KA, Lambert PF, Wells SI. [DEK proto-oncogene expression interferes with the normal epithelial differentiation program](#). *Am J Pathol*. 2009; 174: 71-81.
 17. Newnham JP, Jobe AH. [Should we be prescribing repeated courses of antenatal corticosteroids?](#). *Semin Fetal Neonatal Med*. 2009; 14: 157-63.
 18. Ahmad A, Ahmad S, Glover L, Miller SM, Shannon JM, Guo X, Franklin WA, Bridges JP, Schaack JB, Colgan SP, White CW. [Adenosine A2A receptor is a unique angiogenic target of HIF-2alpha in pulmonary endothelial cells](#). *Proc Natl Acad Sci U S A*. 2009; 106: 10684-9.
 19. Cheah FC, Pillow JJ, Kramer BW, Polglase GR, Nitsos I, Newnham JP, Jobe AH, Kallapur SG. [Airway inflammatory cell responses to intra-amniotic lipopolysaccharide in a sheep model of chorioamnionitis](#). *Am J Physiol Lung Cell Mol Physiol*. 2009; 296: L384-93.
 20. Jobe AH. [Postnatal corticosteroids for bronchopulmonary dysplasia](#). *Clin Perinatol*. 2009; 36: 177-88.
 21. Nathan AT, Peterson EA, Chakir J, Wills-Karp M. [Innate immune responses of airway epithelium to house dust mite are mediated through beta-glucan-dependent pathways](#). *J Allergy Clin Immunol*. 2009; 123: 612-8.
 22. Robinson TE, Trapnell BC, Goris ML, Quittell LM, Cornfield DN. [Quantitative analysis of longitudinal response to aerosolized granulocyte-macrophage colony-stimulating factor in two adolescents with autoimmune pulmonary alveolar proteinosis](#). *Chest*. 2009; 135: 842-8.
 23. Wilson-Costello D, Walsh MC, Langer JC, Guillet R, Laptook AR, Stoll BJ, Shankaran S, Finer NN, Van Meurs KP, Engle WA, Das A. [Impact of postnatal corticosteroid use on neurodevelopment at 18 to 22 months' adjusted age: effects of dose, timing, and risk of bronchopulmonary dysplasia in extremely low birth weight infants](#). *Pediatrics*. 2009; 123: e430-7.

24. Wise-Draper TM, Mintz-Cole RA, Morris TA, Simpson DS, Wikenheiser-Brokamp KA, Currier MA, Cripe TP, Grosveld GC, Wells SI. [Overexpression of the cellular DEK protein promotes epithelial transformation in vitro and in vivo](#). *Cancer Res.* 2009; 69: 1792-9.
25. Uchida K, Nakata K, Suzuki T, Luisetti M, Watanabe M, Koch DE, Stevens CA, Beck DC, Denson LA, Carey BC, Keicho N, Krischer JP, Yamada Y, Trapnell BC. [Granulocyte/macrophage-colony-stimulating factor autoantibodies and myeloid cell immune functions in healthy subjects](#). *Blood.* 2009; 113: 2547-56.
26. Nommsen-Rivers LA, Mastergeorge AM, Hansen RL, Cullum AS, Dewey KG. [Doula care, early breastfeeding outcomes, and breastfeeding status at 6 weeks postpartum among low-income primiparae](#). *J Obstet Gynecol Neonatal Nurs.* 2009; 38: 157-73.
27. Ikegami M, Grant S, Korfhagen T, Scheule RK, Whitsett JA. [Surfactant protein-D regulates the postnatal maturation of pulmonary surfactant lipid pool sizes](#). *J Appl Physiol.* 2009; 106: 1545-52.
28. Luisetti M, Rodi G, Perotti C, Campo I, Mariani F, Pozzi E, Trapnell BC. [Plasmapheresis for treatment of pulmonary alveolar proteinosis](#). *Eur Respir J.* 2009; 33: 1220-2.
29. Meinzen-Derr J, Morrow AL, Hornung RW, Donovan EF, Dietrich KN, Succop PA. [Epidemiology of necrotizing enterocolitis temporal clustering in two neonatology practices](#). *J Pediatr.* 2009; 154: 656-61.
30. Kallapur SG, Nitsos I, Moss TJ, Polglase GR, Pillow JJ, Cheah FC, Kramer BW, Newnham JP, Ikegami M, Jobe AH. [IL-1 mediates pulmonary and systemic inflammatory responses to chorioamnionitis induced by lipopolysaccharide](#). *Am J Respir Crit Care Med.* 2009; 179: 955-61.
31. Xu Y, Saegusa C, Schehr A, Grant S, Whitsett JA, Ikegami M. [C/EBP{alpha} is Required for Pulmonary Cytoprotection During Hyperoxia](#). *Am J Physiol Lung Cell Mol Physiol.* 2009; 297: L286-L298.
32. Kulkarni RM, Greenberg JM, Akeson AL. [NFATc1 regulates lymphatic endothelial development](#). *Mech Dev.* 2009; 126: 350-65.
33. Jobe AH, Hillman N, Polglase G, Kramer BW, Kallapur S, Pillow J. [Injury and inflammation from resuscitation of the preterm infant](#). *Neonatology.* 2008; 94: 190-6.
34. Nathan AT, Marino BS, Hanna B, Nicolson SC. [Novel use of dexmedetomidine in a patient with pulmonary hypertension](#). *Paediatr Anaesth.* 2008; 18: 782-4.
35. Spitzmiller RE, Phillips T, Meinzen-Derr J, Hoath SB. [Response to Correspondence on "Amplitude-Integrated EEG Is Useful in Predicting Neurodevelopmental Outcome in Full-Term Infants with Hypoxic-Ischemic Encephalopathy: A Meta-Analysis"](#). *J Child Neurol.* 2008; 23: 971-972.
36. Wan H, Luo F, Wert SE, Zhang L, Xu Y, Ikegami M, Maeda Y, Bell SM, Whitsett JA. [Kruppel-like factor 5 is required for perinatal lung morphogenesis and function](#). *Development.* 2008; 135: 2563-72.
37. Metzger DE, Stahlman MT, Shannon JM. [Misexpression of ELF5 disrupts lung branching and inhibits epithelial differentiation](#). *Dev Biol.* 2008; 320: 149-60.
38. Kramer BW, Albertine KH, Moss TJ, Nitsos I, Ladenburger A, Speer CP, Newnham JP, Jobe AH. [All-trans retinoic acid and intra-amniotic endotoxin-mediated effects on fetal sheep lung](#). *Anat Rec (Hoboken).* 2008; 291: 1271-1277.
39. Davis KM, Akinbi HT, Standish AJ, Weiser JN. [Resistance to mucosal lysozyme compensates for the fitness deficit of peptidoglycan modifications by *Streptococcus pneumoniae*](#). *PLoS Pathog.* 2008; 4: e1000241.
40. Ruppert C, Mahavadi P, Wygrecka M, Weaver TE, Magdolen V, Idell S, Preissner KT, Seeger W, Gunther A, Markart P. [Recombinant production of a hybrid plasminogen activator composed of surfactant protein B and low-molecular-weight urokinase](#). *Thromb Haemost.* 2008; 100: 1185-92.
41. White M, Kingma P, Tecle T, Kacak N, Linders B, Heuser J, Crouch E, Hartshorn K. [Multimerization of surfactant protein D, but not its collagen domain, is required for antiviral and opsonic activities related to influenza virus](#). *J Immunol.* 2008; 181: 7936-43.
42. Kalin TV, Wang IC, Meliton L, Zhang Y, Wert SE, Ren X, Snyder J, Bell SM, Graf L, Jr., Whitsett JA, Kalinichenko VV. [Forkhead Box m1 transcription factor is required for perinatal lung function](#). *Proc Natl Acad Sci U S A.* 2008; 105: 19330-5.
43. Chaiworapongsa T, Erez O, Kusanovic JP, Vaisbuch E, Mazaki-Tovi S, Gotsch F, Than NG, Mittal P, Kim YM, Camacho N, Edwin S, Gomez R, Hassan SS, Romero R. [Amniotic fluid heat shock protein 70 concentration in histologic chorioamnionitis, term and preterm parturition](#). *J Matern Fetal Neonatal Med.* 2008; 21: 449-61.
44. Zhang Y, Goss AM, Cohen ED, Kadzik R, Lepore JJ, Muthukumaraswamy K, Yang J, DeMayo FJ, Whitsett JA, Parmacek MS, Morrissey EE. [A Gata6-Wnt pathway required for epithelial stem cell development and airway regeneration](#). *Nat Genet.* 2008; 40: 862-70.
45. Glasser SW, Senft AP, Whitsett JA, Maxfield MD, Ross GF, Richardson TR, Prows DR, Xu Y, Korfhagen TR. [Macrophage dysfunction and susceptibility to pulmonary *Pseudomonas aeruginosa* infection in surfactant](#)

- [protein C-deficient mice](#). *J Immunol*. 2008; 181: 621-8.
46. Wang IC, Meliton L, Tretiakova M, Costa RH, Kalinichenko VV, Kalin TV. [Transgenic expression of the forkhead box M1 transcription factor induces formation of lung tumors](#). *Oncogene*. 2008; 27: 4137-49.
 47. Wang IC, Chen YJ, Hughes DE, Ackerson T, Major ML, Kalinichenko VV, Costa RH, Raychaudhuri P, Tyner AL, Lau LF. [FoxM1 regulates transcription of JNK1 to promote the G1/S transition and tumor cell invasiveness](#). *J Biol Chem*. 2008; 283: 20770-8.
 48. Barai ND, Boyce ST, Hoath SB, Visscher MO, Kasting GB. [Improved barrier function observed in cultured skin substitutes developed under anchored conditions](#). *Skin Res Technol*. 2008; 14: 418-24.
 49. Polglase GR, Hillman NH, Pillow JJ, Cheah FC, Nitsos I, Moss TJ, Kramer BW, Ikegami M, Kallapur SG, Jobe AH. [Positive end-expiratory pressure and tidal volume during initial ventilation of preterm lambs](#). *Pediatr Res*. 2008; 64: 517-22.
 50. Suzuki T, Sakagami T, Rubin BK, Nogee LM, Wood RE, Zimmerman SL, Smolarek T, Dishop MK, Wert SE, Whitsett JA, Grabowski G, Carey BC, Stevens C, van der Loo JC, Trapnell BC. [Familial pulmonary alveolar proteinosis caused by mutations in CSF2RA](#). *J Exp Med*. 2008; 205: 2703-10.
 51. Kessler CA, Bachurski CJ, Schroeder J, Stanek J, Handwerger S. [TEAD1 inhibits prolactin gene expression in cultured human uterine decidual cells](#). *Mol Cell Endocrinol*. 2008; 295: 32-8.
 52. Kalin TV, Meliton L, Meliton AY, Zhu X, Whitsett JA, Kalinichenko VV. [Pulmonary mastocytosis and enhanced lung inflammation in mice heterozygous null for the Foxf1 gene](#). *Am J Respir Cell Mol Biol*. 2008; 39: 390-9.
 53. Lavery AP, Meinzen-Derr JK, Anderson E, Ma Q, Bennett MR, Devarajan P, Schibler KR. [Urinary NGAL in premature infants](#). *Pediatr Res*. 2008; 64: 423-428.
 54. Sandhaus RA, Turino G, Stocks J, Strange C, Trapnell BC, Silverman EK, Everett SE, Stoller JK. [alpha1-Antitrypsin augmentation therapy for Pi*MM heterozygotes: a cautionary note](#). *Chest*. 2008; 134: 831-4.
 55. Korfei M, Ruppert C, Mahavadi P, Henneke I, Markart P, Koch M, Lang G, Fink L, Bohle RM, Seeger W, Weaver TE, Guenther A. [Epithelial endoplasmic reticulum stress and apoptosis in sporadic idiopathic pulmonary fibrosis](#). *Am J Respir Crit Care Med*. 2008; 178: 838-46.
 56. Morris BH, Oh W, Tyson JE, Stevenson DK, Phelps DL, O'Shea TM, McDavid GE, Perritt RL, Van Meurs KP, Vohr BR, Grisby C, Yao Q, Pedroza C, Das A, Poole WK, Carlo WA, Duara S, Laptook AR, Salhab WA, Shankaran S, Poindexter BB, Fanaroff AA, Walsh MC, Rasmussen MR, Stoll BJ, Cotten CM, Donovan EF, Ehrenkranz RA, Guillet R, Higgins RD. [Aggressive vs. conservative phototherapy for infants with extremely low birth weight](#). *N Engl J Med*. 2008; 359: 1885-96.
 57. Cardoso WV, Whitsett JA. [Resident cellular components of the lung: developmental aspects](#). *Proc Am Thorac Soc*. 2008; 5: 767-71.
 58. Chaiworapongsa T, Hong JS, Hull WM, Kim CJ, Gomez R, Mazor M, Romero R, Whitsett JA. [The concentration of surfactant protein-A in amniotic fluid decreases in spontaneous human parturition at term](#). *J Matern Fetal Neonatal Med*. 2008; 21: 652-9.
 59. Laptook A, Tyson J, Shankaran S, McDonald S, Ehrenkranz R, Fanaroff A, Donovan E, Goldberg R, O'Shea TM, Higgins RD, Poole WK. [Elevated temperature after hypoxic-ischemic encephalopathy: risk factor for adverse outcomes](#). *Pediatrics*. 2008; 122: 491-9.
 60. Oh W, Perritt R, Shankaran S, Merritts M, Donovan EF, Ehrenkranz RA, O'Shea TM, Tyson JE, Laptook AR, Das A, Higgins RD. [Association between urinary lactate to creatinine ratio and neurodevelopmental outcome in term infants with hypoxic-ischemic encephalopathy](#). *J Pediatr*. 2008; 153: 375-8.
 61. Franks TJ, Colby TV, Travis WD, Tuder RM, Reynolds HY, Brody AR, Cardoso WV, Crystal RG, Drake CJ, Engelhardt J, Frid M, Herzog E, Mason R, Phan SH, Randell SH, Rose MC, Stevens T, Serge J, Sunday ME, Voynow JA, Weinstein BM, Whitsett J, Williams MC. [Resident cellular components of the human lung: current knowledge and goals for research on cell phenotyping and function](#). *Proc Am Thorac Soc*. 2008; 5: 763-6.

Grants, Contracts, and Industry Agreements

Grant and Contract Awards

Annual Direct / Project Period Direct

AKESON, A

Pulmonary Lymphatic Development and Neonatal Lung Disease

March of Dimes - National

6-FY07-317

06/01/07 - 05/31/10

\$76,779 / \$221,209

AKINBI, H

Role of Lysozyme in Airway Host Defense

National Institutes of Health R56 AI 050797	08/01/08 - 07/31/09	\$250,000 / \$250,000
Role of Goblet Cell Hyperplasia in Innate Defense of the Lung Cystic Fibrosis Foundation R457 CR02	07/01/08 - 06/30/10	\$40,000 / \$80,000
BACHURSKI, C		
Novel Model of Adult Epithelial Stem Cell Expansion National Institutes of Health R21 HL 093706	04/01/09 - 03/31/11	\$125,000 / \$275,000
BARTMAN, T		
Analysis of NFATc1 as the Mechanism by which Early Heart Function Regulates Endocardial Cushion and Valve Morphogenesis American Heart Association - Ohio SDG	01/01/06 - 12/31/09	\$59,091 / \$236,364
BRIDGES, J		
Characterization of LPCAT, a Lung Lysopacyltransferase Parker B Francis Fellowship Program	07/01/07 - 06/30/10	\$48,000 / \$144,000
DAVE, V		
PTEN/PI3K/AKT Pathway in Lung Cancer Ohio Cancer Research Association	07/01/08 - 06/30/09	\$45,454 / \$45,454
Calcineurin Effectors in Pulmonary Homeostasis American Heart Association - National SDG083010N	01/01/08 - 12/31/11	\$70,000 / \$280,000
HILL, K		
ODH Division of Family Services Regional Outreach Education Program Ohio Department of Health 31-3-001-1-BM-08	10/01/08 - 09/30/09	\$110,000 / \$110,000
IKEGAMI, M		
Role of C/EBPalpha in Cytoprotection and Recovery from Lung Injury National Institutes of Health R01 HL 095464	04/01/09 - 03/31/13	\$250,000 / \$1,000,000
Efficacy of Sp-D Containing Surfactant for Treatment of Premature Newborns March of Dimes - National 6-FY09-235	06/01/09 - 05/31/12	\$86,628 / \$271,996
JOBE, A		
Antecedents to Lung Injury in the Preterm National Institutes of Health R01 HD 012714	05/01/06 - 03/31/11	\$181,638 / \$954,405
KALINICHENKO, V		
Fox Transcription Factors in Development of Pulmonary Capillaries National Institutes of Health R01 HL 084151	05/01/08 - 04/30/11	\$242,750 / \$728,250
Foxm1 Transcription Factor in Development of Non-Small Lung Cancer American Cancer Society - National RSG-06-187-01-MGO	07/01/07 - 06/30/10	\$167,256 / \$496,650
KALLAPUR, S		
Mechanisms of Fetal Inflammatory Response Syndrome Induced by Chorioamnionitis National Institutes of Health		

R01 HD 057869	02/03/09 - 01/31/14	\$235,222 / \$1,249,399
KAPLAN, H		
Impact of Context on QI Success: A Novel Framework		
Robert Wood Johnson Foundation		
65149	10/01/08 - 09/30/10	\$74,833 / \$151,097
KING, B		
Surfactant Protein D Decreases Lung Injury and Inflammation		
Ikaria		
	12/01/08 - 05/30/10	\$10,000 / \$10,000
KINGMA, P		
Surfactant Protein D in Pulmonary and Systemic Host Defense		
National Institutes of Health		
K08 HL 089505	07/01/08 - 06/30/13	\$119,350 / \$604,250
Neutrophil Function in Cystic Fibrosis		
Cystic Fibrosis Foundation		
R457 CR02	07/01/08 - 06/30/10	\$50,000 / \$100,000
LECRAS, T		
Pathogenesis of Neonatal Lung Disease		
American Heart Association - National		
EIA0740069N	01/01/07 - 12/31/11	\$90,909 / \$454,545
PERL, A		
Regulation of PDGFR-alpha Expression by FGF during Alveolar Myofibroblast Differentiation		
American Heart Association - Ohio		
GIA075563B	07/01/07 - 06/30/09	\$55,000 / \$110,000
SCHIBLER, K		
NICHD Cooperative Multi-Center Neonatal Research Network		
National Institutes of Health		
U10 HD 027853	04/01/06 - 03/31/11	\$264,124 / \$619,326
SHANNON, J		
Role of HIF-1 in Fetal Lung Epithelial Differentiation		
National Institutes of Health		
R01 HL 084376	02/01/07 - 01/31/12	\$358,951 / \$1,832,879
TRAPNELL, B		
Role of Anti-GM-CSF Antibodies in Myeloid Cell Function		
National Institutes of Health		
R01 HL 085453	04/01/07 - 03/31/11	\$250,000 / \$1,000,000
WAN, H		
Roles of KLF5 in Lung Morphogenesis and Injury		
American Lung Association		
	07/01/08 - 06/30/09	\$28,600 / \$28,600
WANG, I-C		
Role of FoxN1 in K-Ras Induced Lung Tomorigenesis		
National Lung Cancer Partnership		
	01/01/09 - 12/31/09	\$50,000 / \$100,000
WEAVER, T		
Regulation of Respiratory Epithelial Cell Homeostasis		
National Institutes of Health		
P01 HL 061646	08/10/04 - 06/30/09	\$1,329,780 / \$6,892,425
Weaver, T	Project 1	285,627

Prows, D	Project 2	170,531
Ikegami, M	Project 3	293,755
Whitsett, J	Project 4	300,092
Weaver , T	Core A	11,340
Xu, Y	Core B	132,071
Wert, S	Core C	136,364

Structure/Function Analyses of SPB in Transgenic Mice

National Institutes of Health

R37 HL 056285 05/01/06 - 04/30/11 \$376,762 / \$1,885,203

Role of SFTPC in Pathogenesis of Interstitial Lung Disease

National Institutes of Health

R01 HL 086492 12/01/08 - 11/30/13 \$275,068 / \$1,560,058

WHITSETT, J

Pulmonary and Cardiovascular Development Training Grant

National Institutes of Health

T32 HL 007752 07/01/04 - 06/30/09 \$231,415 / \$1,142,435

ABCA3 and Alveolar Homeostasis

National Institutes of Health

R01 HL 085610 07/10/06 - 06/30/11 \$298,226 / \$1,567,158

Transcriptional Control of Respiratory Epithelial Progenitor Cells

National Institutes of Health

R01 HL 090156 09/28/07 - 06/30/11 \$332,146 / \$1,372,968

Transcriptional Control of Respiratory Epithelial Progenitor Cells

National Institutes of Health

R01 HL 090156 (supplement) 08/15/08 - 06/30/09 \$12,000 / \$12,000

Transcriptional Programming of Asthma Related Pathology in Respiratory Epithelial Cells

National Institutes of Health

R01 HL 095580 04/01/09 - 03/31/13 \$340,895 / \$1,417,776

Research Development Program- Transgenic Animal Core

Cystic Fibrosis Foundation

R457 CR02 7/1/08 - 6/30/10 \$50,000 / \$50,000

Kalin, Tatiana

Role of Foxm1 Protein in Macrophages during Lung Tumor Formation

Concern Foundation

84974 07/01/08 - 06/30/10 \$50,000 / \$50,000

Role of Foxm1 Protein in Initiation and Progression of Lung Cancer

American Cancer Society - Ohio

09/01/08 - 08/31/09 \$27,273 / \$27,273

Current Year Direct

\$6,663,150

Industry Contracts

Hoath

KAO Corporation

\$ 396,427

Steichen

Infacare Pharmaceutical Corporation

\$ 10,950

Visscher

Procter and Gamble

\$ 117,853

Current Year Direct Receipts

\$548,330

Total \$7,211,480
