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**JEFFREY A. WHITSETT, M.D.**

TRANSCRIPTIONAL NETWORKS REGULATING LUNG FORMATION  
AND ALVEOLAR HOMEOSTASIS: LESSONS FROM NEWBORN INFANTS

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MARCH 28, 2013  
4:00 P.M.  
208 LIGHT HALL

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Upcoming Discovery Lecture:

**SIR RORY COLLINS**  
*Oxford*

*April 4, 2013*  
*208 Light Hall / 4:00 P.M.*

VANDERBILT  UNIVERSITY  
MEDICAL CENTER

## TRANSCRIPTIONAL NETWORKS REGULATING LUNG FORMATION AND ALVEOLAR HOMEOSTASIS: LESSONS FROM NEWBORN INFANTS

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Major scientific advances in prenatal and neonatal physiology have provided the basis for improved outcomes for preterm and other infants with disorders causing respiratory failure. Critical for the improved diagnosis and treatment of preterm infants, was the recognition of the importance of the pulmonary surfactant system in the pathogenesis of Respiratory Distress Syndrome (RDS) in preterm infants. Dr. Whitsett and colleagues in the Division of Neonatology, Perinatal and Pulmonary Biology, at Cincinnati Children's Hospital Medical Center, with many collaborators worldwide, have focused their attention to the molecular basis of lung formation, maturation, and function for more than three decades. Initial questions regarding the regulation of surfactant synthesis and secretion in newborn infants, led to the identification and study of the structure and function of the Surfactant Proteins (SP-A, SP-B, SP-C, SP-D), the genes encoding them and critical transcriptional regulators of lung formation and homeostasis. The distinct roles of each of the surfactant proteins and GM-CSF in surfactant homeostasis and control of innate immunity in the lung were systematically explored. The important role of SP-B and SP-C in surfactant replacement preparations used to treat newborn infants was elucidated. Reagents, including peptides, antibodies and transgenic mouse models were developed for general use by the field of pulmonary biology for the study of common and idiopathic lung diseases, including lung cancer. Molecular tools to add, mutate or delete genes selectively in the respiratory epithelium of transgenic mice enabled the development of models for the study of transcriptional regulators critical for lung formation, airway epithelial differentiation and function that are relevant to the pathogenesis of common lung diseases, including asthma, chronic obstructive pulmonary disease (COPD), and cystic fibrosis. Basic advances made in understanding the molecular basis of surfactant homeostasis, lung formation and function in newborn infants have provided the tools and strategies useful for the diagnosis and treatment of pulmonary diseases that were previously termed "idiopathic."

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Jeffrey A. Whitsett, MD a Professor of Pediatrics, Chief of the Section of Neonatology, Perinatal and Pulmonary Biology, and Executive Director of the Perinatal Institute at Cincinnati Children's Hospital Medical Center, University of Cincinnati College of Medicine. Dr. Whitsett received his medical degree from Columbia University, in New York, and has been a faculty member since 1977. He is internationally known for his research in pulmonary medicine, as well as for his clinical expertise in neonatology. Dr. Whitsett has made a series of groundbreaking contributions in pulmonary medicine. His major pioneering work has been on surfactant proteins A, B, C, and D, cloning their genes, and clarifying their roles in lung development.

Throughout his career, Dr. Whitsett has had the remarkable ability to move from molecular biology, to animal models, to diagnosis and therapy of human disease. He played a critical role in making surfactant protein replacement a routine tool for treating immature lungs and respiratory distress syndrome in premature infants. His laboratory has contributed to the identification of a number of genes critical for lung formation and function. Mutations in genes regulating surfactant homeostasis were shown to cause acute and chronic lung disease in infants and adults.

Dr. Whitsett is a member of the Institute of Medicine, National Academy of Sciences and is the recipient of the Mead Johnson Award, a National Institutes of Health (NIH) Merit Award, the first Julius Comroe Lectureship in Pulmonary Research from FASEB, the William Cooper Procter Award from Cincinnati Children's, the Amberson Lecture Award of the American Thoracic Society, and the prestigious Daniel Drake Medal for scientific contributions from the University of Cincinnati College of Medicine. Dr. Whitsett is the author of over 400 papers in both the basic science and clinical literature.

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