



Richard Bland

Professor (Research) of Pediatrics (Neonatology), Emeritus
Pediatrics - Neonatology

CONTACT INFORMATION

- **Alternate Contact**

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Bio

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Pediatrics - Neonatology
- Member, Cardiovascular Institute

HONORS AND AWARDS

- Honorary Doctor of Medicine, University of Uppsala, Sweden (2004)
- Distinguished Alumnus Award, Boston University School of Medicine (1996)
- Established Investigator, American Heart Association (1979-1984)
- Ogden C Bruton Award, Uniformed Services (1972, 1973)

PROFESSIONAL EDUCATION

- BA, Yale University , Social Sciences (1962)
- MD, Boston University , Medicine (1966)

LINKS

- Rabinovitch/Bland Lab: <http://med.stanford.edu/labs/rabinovitchbland/>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our research program focuses on lung growth and development, and the adverse impact of prolonged mechanical ventilation on the incompletely formed lung, which in very premature infants often leads to a life-threatening condition that was first described as bronchopulmonary dysplasia (Northway WH Jr et al, Stanford University, New Engl J Med 276: 357-368, 1967). This form of neonatal chronic lung disease is the leading cause of long-term hospitalization and recurrent respiratory disorders seen in tiny infants who have been born at less than 28 weeks of gestation. Failed alveolar formation and excess, disordered lung elastin are prominent histological features of this disease, which in some ways resembles adult emphysema. We study the effects of mechanical ventilation, with either air or 40% O₂, on genes and proteins that regulate lung growth and development in newborn mice, whose

alveoli and pulmonary capillaries form mainly after birth at term gestation. As elastin plays a crucial role in lung growth and development (elastin-null mice die soon after birth from cardiorespiratory failure related to defective alveolar and lung vascular formation), we are especially interested in studying the effects of prolonged mechanical ventilation (cyclic lung stretch) with O₂-rich gas (which is often needed to sustain life of extremely premature infants) on genes that regulate elastin synthesis and assembly, which in turn can affect lung septation and angiogenesis. We currently study the effects of lengthy mechanical ventilation on lungs of mutant newborn mice that have defects in elastin assembly and associated abnormalities of lung structure. Because mechanical ventilation of the developing lung can induce the release of proteolytic enzymes that break down elastin, we recently began to study the effects of mechanical ventilation with O₂-rich gas in a transgenic mouse that over-expresses elafin, a potent inhibitor of serine elastase activity. We think that these studies will pave the way for novel and effective strategies to treat or prevent neonatal chronic lung disease, and perhaps other respiratory disorders that exhibit similar pathological features in older children and adults.

Publications

PUBLICATIONS

- **Targeting IL6-Edn1-FoxO1 axis enables lung growth in mechanically ventilated newborn mice.** *The European respiratory journal*
Hirani, D., Selle, J., Wagde, V., Klymenko, O., Kuiper-Makris, C., Danopoulos, S., Donato, M., Preuss, S., Preuss, M., Mujahid, S., Vohlen, C., Wulf, K., van Koningsbruggen-Rietschel, et al
2025
- **Elafin Treatment Rescues EGFR-Klf4 Signaling and Lung Cell Survival in Ventilated Newborn Mice** *AMERICAN JOURNAL OF RESPIRATORY CELL AND MOLECULAR BIOLOGY*
Alcazar, M., Kaschwich, M., Ertsey, R., Preuss, S., Milla, C., Mujahid, S., Masumi, J., Khan, S., Mokres, L. M., Tian, L., Mohr, J., Hirani, D., Rabinovitch, et al
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- **Elafin Treatment Rescues EGFR-Klf4 Signaling and Lung Cell Survival in Ventilated Newborn Mice.** *American journal of respiratory cell and molecular biology*
Alejandre Alcazar, M. A., Kaschwich, M., Ertsey, R., Preuss, S., Milla, C., Mujahid, S., Masumi, J., Khan, S., Mokres, L. M., Tian, L., Mohr, J., Hirani, D. V., Rabinovitch, et al
2018; 59 (5): 623–34
- **Elafin Reverses Pulmonary Hypertension via Caveolin-1-Dependent Bone Morphogenetic Protein Signaling** *AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE*
Nickel, N. P., Spiekerkoetter, E., Gu, M., Li, C. G., Li, H., Kaschwich, M., Diebold, I., Hennigs, J. K., Kim, K., Miyagawa, K., Wang, L., Cao, A., Sa, et al
2015; 191 (11): 1273-1286
- **Lung matrix and vascular remodeling in mechanically ventilated elastin haploinsufficient newborn mice.** *American journal of physiology. Lung cellular and molecular physiology*
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2015; 308 (5): L464-78
- **Neonatal mice genetically modified to express the elastase inhibitor elafin are protected against the adverse effects of mechanical ventilation on lung growth** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
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2012; 303 (3): L215-L227
- **Inhibiting Lung Elastase Activity Enables Lung Growth in Mechanically Ventilated Newborn Mice** *AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE*
Hilgendorff, A., Parai, K., Ertsey, R., Jain, N., Navarro, E. F., Peterson, J. L., Tamosiuniene, R., Nicolls, M. R., Starcher, B. C., Rabinovitch, M., Bland, R. D.
2011; 184 (5): 537-546
- **Prolonged mechanical ventilation with air induces apoptosis and causes failure of alveolar septation and angiogenesis in lungs of newborn mice** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*

- Mokres, L. M., Parai, K., Hilgendorff, A., Ertsey, R., Alvira, C. M., Rabinovitch, M., Bland, R. D.
2010; 298 (1): L23-L35
- **Mechanical ventilation uncouples synthesis and assembly of elastin and increases apoptosis in lungs of newborn mice** *Am J Physiol Lung Cell Mol Physiol*
Bland, R., Ertsey R, Mokres LM, Xu L, Jacobson BE, Jiang S, Alvira CM, Rabinovitch M, Shinwell ES, Dixit A
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 - **Mechanical ventilation with 40% oxygen reduces pulmonary expression of genes that regulate lung development and impairs alveolar septation in newborn mice** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
Bland, R. D., Mokres, L. M., Ertsey, R., Jacobson, B. E., Jiang, S., Rabinovitch, M., Xu, L., Shinwell, E. S., Zhang, F., Beasley, M. A.
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 - **Dysregulation of pulmonary elastin synthesis and assembly in preterm lambs with chronic lung disease** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
Bland, R. D., Xu, L., Ertsey, R., Rabinovitch, M., Albertine, K. H., Wynn, K. A., Kumar, V. H., Ryan, R. M., Swartz, D. D., Csiszar, K., Fong, K. S.
2007; 292 (6): L1370-L1384
 - **Inhaled nitric oxide effects on lung structure and function in chronically ventilated preterm lambs** *Am J Respir Crit Care Med*
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2005; 172 (7): 899-906
 - **Neonatal chronic lung disease in the post-surfactant era - Lessons learned from authentic animal models** *International Symposium on Recent Advances in Neonatal Medicine*
Bland, R. D.
KARGER.2005: 181-91
 - **Pulmonary vascular dysfunction in preterm lambs with chronic lung disease** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
Bland, R. D., Ling, C. Y., Albertine, K. H., Carlton, D. P., MacRitchie, A. J., Day, R. W., Dahl, M. J.
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 - **Reduced endothelial nitric oxide synthase in lungs of chronically ventilated preterm lambs** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
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 - **Chronic lung injury in preterm lambs: Disordered pulmonary elastin deposition** *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY*
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- **Severe Pulmonary Arterial Hypertension is Characterized by Increased Neutrophil Elastase and Relative Elafin Deficiency.** *Chest*
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- **Lung matrix and vascular remodeling in mechanically ventilated elastin haploinsufficient newborn mice.** *American journal of physiology. Lung cellular and molecular physiology*
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Bland, R. D., Jonzon, A.
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- **Tgf beta Blockade Preserves Vascular Endothelial Growth Factor (VEGF) Signaling And Enables Alveolar Formation In Mechanically Ventilated Newborn Mice**
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- **Molecular determinants of lung development.** *Annals of the American Thoracic Society*
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- **ADVERSE EFFECTS OF MECHANICAL VENTILATION (MV) ARE BLUNTED IN TRANSGENIC NEWBORN MICE THAT OVER-EXPRESS THE SERINE ELASTASE INHIBITOR ELAFIN**
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- **Mechanical Ventilation (MV) for 24 Hours Disrupts VEGF Signaling, Induces Apoptosis and Inhibits Formation of Alveoli and Lung Blood Vessels in Newborn Mice.**

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- **Chronic minocycline-induced autoimmunity in children** *JOURNAL OF PEDIATRICS*
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- **Increased expression of genes associated with elastin synthesis and assembly in lungs of mechanically ventilated preterm lambs compared to term lambs** *Experimental Biology 2005 Meeting/35th International Congress of Physiological Sciences*
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