

Strategic Plan for Lung Vascular Research:

An NHLBI-ORDR Workshop Report

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Summary:

The Division of Lung Diseases of the National Heart Lung Blood Institute (NHLBI), with the Office of Rare Diseases Research (ORDR), held a workshop to identify priority areas and strategic goals to enhance and accelerate research that will result in improved understanding of the lung vasculature, translational research needs, and ultimately the care of patients with pulmonary vascular diseases. Multi-disciplinary experts with diverse experience in laboratory, translational and clinical studies identified seven priority areas and discussed limitations in our current knowledge, technologies and approaches. The focus for future research efforts include: **a)** better characterizing vascular genotype-phenotype relationships and incorporating systems approaches when appropriate; **b)** advancing our understanding of pulmonary vascular metabolic regulatory signaling in health and disease; **c)** expanding our knowledge of the biologic relationships between the lung circulation and circulating elements, systemic vascular function, and right heart function and disease; **d)** improving translational research for identifying disease-modifying therapies for the pulmonary hypertensive diseases; **e)** establishing an appropriate and effective platform for advancing translational findings into clinical studies testing, and **f)** developing the specific technologies and tools that will be enabling for these goals, such as question-guided imaging techniques and lung vascular investigator training programs. Recommendations from this Workshop will be utilized within the Lung Vascular Biology and Disease Extramural Research Program for planning and strategic implementation purposes.

Formal recommendations from the Workshop are summarized as follows:

- Advance basic scientific research in lung vascular biology utilizing emerging technologies.
- Advance and coordinate basic and clinical knowledge of the pulmonary circulation-right heart axis through novel research efforts utilizing multidisciplinary teams.
- Define interactions between lung vascular components and circulating elements and systemic circulations by fostering novel collaborations.
- Encourage systems analysis to understand and define interactions between lung vascular genetics, epigenetics, metabolic pathways, and molecular signaling.
- Develop strategies using appropriate animal models to improve the understanding of the lung vasculature in health and in conditions that reflect human disease.
- Enhance translational research in lung vascular disease by comparing cellular and tissue abnormalities identified in animal models to those in human specimens.
- Improve lung vascular disease molecular and clinical phenotype coupling.
- Develop *in vivo* imaging techniques which assess structural changes in lung vasculature, metabolic shifts, functional cell responses and right ventricular function.
- Develop research consortia that advance basic, translational, and clinical studies, allow for multi-center epidemiological study feasibility, and support junior investigators' training in lung vascular biology and disease.