

## Lung Development and Regeneration.

Donald J Massaro MD, Gloria DeCarlo Massaro MD, and Pierre Chambon MD, editors. (Lung Biology in Health and Disease series, volume 190, Claude Lenfant, executive editor.) New York/Basel: Marcel Dekker. 2004. Hard cover, illustrated, 593 pages, \$195.

Volume 190 of the National Institutes of Health's long-running series, *Lung Biology in Health and Disease*, covers the timely and important topic of lung development and regeneration. This field has seen an explosive growth in research and interest in recent years, in part fueled by developments in understanding of cellular and molecular mechanisms underlying lung development and remodeling, including the role of stem cells. The editors, all respected experts in lung development, bring a wealth of experience and have assembled an impressive list of established investigators to provide current state-of-the-art perspectives on selected aspects of lung development and regeneration. This volume will appeal to all basic scientists and clinicians interested in lung biology, as well as to developmental biologists.

The book consists of 20 chapters organized into 5 sections. In the first section, 2 model lung diseases, bronchopulmonary dysplasia (BPD) and chronic obstructive pulmonary disease (COPD) are utilized as paradigms for disordered development and regeneration, respectively. Dr Jacqueline Coalson, one of the pioneers in the field of prenatal lung diseases and BPD, provides a fascinating history of BPD in the first chapter. This chapter sets the tone of the book with its detailed consideration of the anatomical pathology and pathogenesis underlying BPD. The second chapter discusses modern management approaches to BPD. In addition to the widely accepted practices of maternal administration of prenatal corticosteroids in threatened premature births and use of surfactants in premature infants, this chapter provides a concise review of ventilator approaches to BPD, as well as consideration of other past and potential future approaches, including use of oxygen, fluid,

and salt management, diuretic use, retinoids, and post-natal glucocorticoid use.

The next 5 chapters discuss different aspects of COPD but don't always relate back to the central issue of lung development and regeneration. Chapter 3 is a concise and well-written history of COPD that underscores issues such as what is COPD and who will get it. Diagnostic and treatment issues are examined as well. Chapters 4–6 provide an extensive and detailed discussion of the role of inflammatory cells and pathways involved in the inflammation associated with COPD. Several diagrams and tables, especially in Chapter 4, are particularly valuable for helping to collate a large volume of experimental information. Chapter 6 also provides an excellent overview of the rationale and effects of several treatment approaches for COPD, including use of bronchodilators, oxygen, and corticosteroids. The next chapter, on potential use of retinoids for COPD, is the closest of these chapters to the spirit of the volume. The scientific rationale and in vitro and animal studies evaluating retinoid effects on alveolar growth and repair set the stage for review of current clinical trials evaluating use of retinoids in COPD.

The second section focuses on technical approaches and new theoretical possibilities for evaluating lung development and repair. The first 2 of these chapters discuss general use of differential display techniques such as microarrays. While informative, one would have expected information obtained with these techniques on differential gene and protein expression in developing or remodeling lung. Rather, these 2 chapters were strictly concerned with general methodology, and would have been perhaps better placed in a separate volume on experimental methods. The next chapter, on plasticity of circulating stem cells, was a well-written overview to a very cutting-edge field. The final chapter in this section discussed mechanical and cytoskeletal bases of lung morphogenesis and included some informative model illustrations. This chapter arguably could have been better placed in the next section.

The subsequent section contains 2 chapters devoted, respectively, to mammalian lung morphogenesis and to a survey of non-

mammalian lung structures. These are well written and presented, particularly from a comparative anatomical standpoint. Many photomicrographs and diagrams add to the interest of these 2 chapters. However, cellular and molecular mechanisms underlying lung development are only briefly discussed.

The fourth section contains a single chapter, on branching morphogenesis. This well-written and detailed chapter explores the mechanisms underlying various aspects of lung development, including epithelial, vascular, and alveolar development, in addition to branching morphogenesis.

The final section is more broad-ranging and includes several timely topics. In the first chapter, the role of apoptosis in emphysema is considered. The second reviews animal models of COPD and emphysema. These 2 chapters are interestingly presented and well-punctuated with informative pictures and diagrams. The next 2 chapters provide detailed assessments of factors governing, respectively, alveolar generation and the cellular and molecular responses involved in post-pneumonectomy lung growth. These latter 2 chapters provide excellent overviews of available knowledge in these respective fields. The final 2 chapters focus on effects of aging, COPD, and various other perturbations, including caloric restriction and temperature, on lung physiology. While well written and interesting, the relation to lung development and regeneration is less clear.

In summary, this current volume is an important addition to the *Lung Biology in Health and Disease* series and provides an excellent overview of selected aspects of lung development and regeneration. One looks forward to subsequent similar volumes on this topic, as the field continues to explosively develop. This book will be a valuable resource to anyone studying developmental and regenerative aspects of lung biology.

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