
Preface

The scientific study of the respiratory system has increased enormously during the last decades, principally due to advances in cellular and molecular biology. The progress has allowed respiratory researchers and clinicians to investigate, in much detail, the complex processes underlying the development, function or malfunction, and regulation of respiration. Respiration emerges as the product of the assemblage of neuronal activity, lung ventilation, and respiratory muscle-pump function. The drive to inspire comes ultimately from the oscillating activity of the brain stem neuronal network. This drive, however, is subject to constant incoming modifications from central and peripheral sensory inputs. At the core of these inputs lies molecular signaling, which thus is essential in the pathophysiology of human disease and therapeutic interventions. The intricacies of how molecular signals are translated into respiratory regulation in health and disease have only begun to be unfolded.

Neurobiology of Respiration contains updated material regarding the broad aspects of respiratory regulation. The book explores the mechanisms underlying the pathologies of the respiratory system. Children's respiratory ailments are richly represented as this group is especially vulnerable. The notable topics of interest include molecular aspects related to neuroactive substances, chemokines and proteins released by cells in various pathological conditions, infections exemplified by influenza-like illnesses, inflammatory conditions such as asthma or chronic obstructive pulmonary disease (COPD), respiratory allergy and occupational diseases, immunology, cardiovascular-respiratory disorders, and respiratory oncology. Another group of chapters have to do with the psychosomatic aspects of smoking and with the consequences of smoking for muscle catabolism, underlain by the activation of cytotoxic proteins. Yet, other chapters deal with the cognitive and neural fatigue, which astonishingly may be detected by changes in the exhaled breath content, and with restriction of respiratory muscle work and contractility, particularly when the muscles are under hyperventilatory strain. The book content also includes observational and interventional epidemiological studies. Particularly, the latter form the basis of translational medicine which is considered as an extension of evidence-based medicine. Translational research encompasses the basic and social sciences with the view of optimizing the efficiency of patient care and prophylactic measures to improve the health and quality of life. I trust that the coordinated topics outlined above will allow the readers ample exposure to the latest developments in both scientific and clinical sides of respiratory neurobiology.

The book is a blend of basic and clinical research, and it is thought to promote the translation of science into clinical practice. It combines chapters describing the areas of current research and clinical interest. The chapters present the original findings supported by carefully planned and executed controlled experiments. The book helps the reader keep up with the state-of-the-art knowledge about the active sub-disciplines of respiratory neurobiology and may thus become the comprehensive base of reference in the field of respiration for a long time to come and an enduring source of future research ideas. The progress in respiratory neurobiology is the only way to increase the understanding of the mechanisms of respiratory disorders and therefore to be able to use the evidence-based treatment, which is the desired end of research. The book is a required text for those interested to learn about current respiratory research. It also is an essential text for clinicians searching for 'bench to bedside' treatments of lung diseases.

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