

accurate, and not presented in a verbose manner. Only rarely did the author fail to include what I believe are important cytomorphologic clues. For example, on page 49 she did not mention the nuclear molding (physical compression) in the multinucleated squamous cells of a herpes simplex viral infection. She also does not describe well the classic "ground glass" pattern of the chromatin in herpetically infected cells, although she does mention it in a subsequent table.

On the other hand, some redundancy did creep in. This was most noticeable in her description of the cytologic patterns of presentation of conventional adenocarcinoma (page 92), bronchoalveolar carcinoma (page 95), squamous cell carcinoma (page 84), and carcinoid tumors (page 105), in which it basically states that all of these neoplasm specimens include "single cells, aggregates, and syncytial tissue fragments." In other words most epithelial malignancies occur in smears as relatively cellular samples, with both intact single malignant cells and small to large, flat, and 3-dimensional cohesive masses. Perhaps this is unavoidable, but still, to the knowing reader, it was annoying; why provide data if it is not going to help us distinguish such tumors?

Another example of redundancy can be found on page 167, in the discussion of idiopathic pulmonary hemosiderosis. In one paragraph—and only a few sentences apart—the author tells us twice that patients may suffer "respiratory distress."

I agree with most of Dr Kini's text and find it quite detailed and encompassing. However, there are a few minor areas that I dispute. For example, on page 41 she states that mitotic figures are not seen in acute respiratory distress syndrome. I disagree, because they certainly can be present. I also disagree that carcinoid tumors may closely resemble bronchoalveolar carcinomas and that small cell carcinomas may closely resemble adenocarcinomas (both statements on page 99).

I believe the author attempted to be clinically useful at the onset of Chapter 4, in separating benign noninfectious (basically proliferative) conditions, which overall is excellent, but the splitting from a pathology viewpoint is somewhat artificial. They are all basically conditions in which reparative atypia and degenerative changes can be present within epithelial cells.

A very positive aspect of this book is that scattered throughout the text are a number of well constructed and highly informative tables. These often summarize data presented in the text as well as add new

information. I believe that workers in cytopathology may, with some frequency, pull the book off the shelf and refer to the tables rather than the text. One of my favorites was Table 4–7, in which Dr Kini outlines the differential diagnosis of cytology samples containing foamy histiocytes.

On page 96 there is a reference to Table 7–5 (to distinguish conventional adenocarcinomas from bronchoalveolar carcinomas); the reference should be to Table 7–6.

In my opinion the greatest strength of this book (more valuable than her good text and tables) are the illustrations, which are numerous and lavish. Most are crisply detailed and successfully depict what they set out to demonstrate. Although there are some histologic and ultrastructural pictures, most of the photomicrographs are Papanicolaou-stained cytologic specimens of all types. There is a relative dearth of Romanowsky-stained preparations, which is unfortunate in that many pathologists rely on that stain, at least in part, for fine-needle aspiration biopsies. However, Romanowsky stains are not part of Dr Kini's routine working repertoire.

A major weakness of this book, on the other hand, and no fault of Dr Kini's, is that all of the illustrations are at the end of the text, rather than intermingled with the text, which would have made the book far more pleasing and easy to use. Frankly, it is a pain to flip 50 or more pages back and forth while marching through this tome. For that major distraction I guess we can blame the publisher.

Perhaps the single most important chapter for the readers of *RESPIRATORY CARE* is Chapter 2, "Respiratory Specimen Types for Cytologic Diagnoses Specimen Procurement, Collection Methods, Specimen Submission, Cytopreparation, and Staining," which informs readers of the need for expeditious, gentle handling of specimens and the difficulty in preparing specimens to provide excellent cytomorphologic detail. When such specimens are available for review, good interpretations generally follow, which allows pathologists to render accurate diagnoses simply on routine cytologic material. Thus, as stated by Dr Kini in the Introduction, diagnosticians would rely much less heavily on ancillary diagnostic procedures, which is no small matter in this era of cost containment.

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Disease Markers in Exhaled Breath. Nándor Marczin MD PhD, Sergei A Kharitonov MD PhD, Sir Magdi H Yacoub MB BCH, Peter J Barnes MD DSc, editors. (*Lung Biology in Health and Disease*, volume 170, Claude Lenfant, executive editor.) New York: Marcel Dekker. 2003. Hard cover, illustrated, 534 pages, \$195.

Disease Markers in Exhaled Breath summarizes exciting recent developments that may lead to novel noninvasive methods to monitor disease activity by analysis of exhaled breath. Most of the book is dedicated to nitric oxide (NO) biology and physiology, but carbon monoxide and other volatile organic compounds, such as ethane, are also discussed. The editors bring a wealth of experience in NO research to this volume. I suspect this book is unlikely to be read from cover to cover, but, rather, individuals will choose sections pertinent or interesting to them. The individual chapters are written by researchers in those subjects and, like many multi-author books, the quality of the writing varies.

The book is divided into 3 parts. Part One, "Physiological Aspects of Disease Markers in Exhaled Gases," consists of 7 chapters, which address the measurement, physiology, and molecular and cellular sources of these markers.

Chapter 1 provides an overview of NO as a biological mediator. This chapter would be useful for researchers, but clinicians and respiratory therapists are less likely to be interested in its content. The description of NO synthase and the discussions of inhibitors and the role of arginases are excellent. Chapter 2 is a well-organized discussion of the physiology of NO and should be read by pulmonologists, critical care physicians, asthma specialists, cardiologists, and respiratory therapists. One gets the correct impression that these investigators are the pioneers in NO research. Tables 1 through 3 are excellent summaries of factors that affect exhaled endogenous NO and provide useful information for those who are interested but don't have the time to read the voluminous literature. This chapter also has a great discussion of the effects of stretch, mechanical forces, and ventilation on NO production. Chapter 3 discusses the molecular and cellular sources of exhaled NO and provides an in-depth discussion of NO physiology. Chapter 4 reviews the influence of ventilation and pulmonary blood flow on exhaled NO. This chapter is useful for the

critical care physician, for physiologists involved in research, and for therapists who use the measurement clinically. It delves into the complexity of interpreting exhaled NO levels and explains the contradictory findings of NO measurements using different techniques. It also gives a lucid account of the relationship of ventilation, NO, and CO₂. The text is supported by good graphs, but the distinction between CO₂, NO, and flow lines is sometimes unclear. The section on positive end-expiratory pressure is well organized. This chapter also includes descriptions of some elegant experiments and a discussion that discounts the theories of the fate of NO production and consumption in poorly ventilated areas, as proposed in Chapter 2.

Chapter 5 switches gears to discuss heme oxygenase in lung disease. This chapter seems to be out of place because heme oxygenase is not a gaseous product. Chapter 5's discussion of heme oxygenase and Chapter 6's discussion of carbon monoxide should have been organized slightly differently, so that heme oxygenase was placed in the proper context, as the generator of carbon monoxide. Moreover, the writing in these sections seemed a bit awkward and convoluted. For example, on page 137 it reads, "CO insists on being attended to—and understood and appreciated but that explication requires a context, one that provides the conceptual framework within which the mechanisms of CO's beneficial effects may be most precisely described." The message is unclear. As well, words such as "interesting," "intriguing," and "fascinating" are used many times (eg, page 142, "what was found was intriguing"; page 143, "the observation. . . is interesting"; page 144, ". . . raised an intriguing possibility"; page 145, "a fascinating, if serendipitous. . ."; page 146, "interestingly. . ."; page 147, "ironically. . ."; and page 149, "this most extraordinary molecule"), making the discussion less objective. In addition, the summary and future directions section needs to be more succinct.

Chapter 7 discusses the role of reactive oxygen and nitrogen species in lung injury. The discussion on the good and the "dark" sides of NO is very balanced and should be read by everyone interested in NO physiology and pathology. This chapter would benefit from summary tables and a list of abbreviations.

Part Two discusses the methodological and technical aspects of exhaled breath mea-

surement. The first chapter is a good review and very well written. It would be elementary for researchers but useful for the clinician, respiratory therapist, or nurse. The chapter lacks a discussion of the measurement techniques used with children—a group that presents some difficulty. Chapter 9 discusses analysis of volatile organic compounds and would be useful for respiratory therapists, nurses, and physicians. It is organized very well, in a "how-to-do" manner, with advantages and disadvantages of the techniques outlined. It also poses the appropriate questions of what these analyses mean, why we should do them, and their potential.

Part Three, which is on pathological aspects, is the longest section in the book. If someone has a thorough understanding of the basic physiology of exhaled NO, these chapters can be read without reading Parts One or Two. For someone who has read the initial chapters, there is some repetition in Part Three, the chapters of which are grouped according to pathological mechanisms (hypoxia, ischemia reperfusion, and inflammation) rather than individual diseases. Chapter 10, "Regulation of Nitric Oxide Synthases and Gas-Phase Nitric Oxide by Oxygen," is supported by clearly labeled and useful figures. Chapter 11, "Exhaled Markers in Interstitial Lung Disease and Pulmonary Hypertension," is a summary of information found in other sections of the book. Chapter 12, "Exhaled Nitric Oxide in Human Lung Ischemia-Reperfusion," is very well written and thought provoking. This section would be useful for critical care physicians, cardiothoracic surgeons, and anesthesiologists. It gives a balanced discussion of the role of cardiopulmonary bypass and nitroglycerin-induced NO as a marker of pulmonary microvascular function. Chapter 13 introduces the role of volatile organic compounds in organ reperfusion injury. It introduces ethane and pentane as markers of free radical damage and ethane as a reflection of total body lipid peroxidation. The supporting animal experiments are elegant, as are the clinical studies of transplant patients. This section would be very useful to those who are involved in organ preservation. Most of the data here are not useful to the clinician, because the use of these markers is still experimental.

Chapters 14–20 address inflammatory conditions. Chapter 14 is a very good summary for the respiratory therapist, pulmonologist, and critical care physician. The

roles of steroids, beta-agonists, leukotriene antagonists, and the NO synthase inhibitors in asthma are discussed; chronic obstructive pulmonary disease, bronchiectasis, and pulmonary ciliary dyskinesia are also addressed. The authors stress that breath markers are moving targets and hence need to be followed over time. This is a first attempt to look at carbon monoxide and NO effects in asthma during acute exacerbations and with steroid therapy. Chapter 15 discusses exhaled gas markers in septicemia. The rat experiments are elegant and provide fairly convincing evidence for NO in sepsis, its rate of production, and source and mechanism of origin. The well-done graphs supplement the text admirably. Chapter 16 is a great discussion of the method of gas collection and a summary of exhaled gases in acute respiratory distress syndrome. It also portrays inflammation as a dynamic process and hence different markers may be useful at different stages of the disease. Though its clinical utility is limited, this discussion should be interesting to the respiratory therapist, pulmonologist, critical care physician, and physiologist.

Chapter 17, "Exhaled Nitric Oxide in Lung Transplant Recipients," would be useful for clinicians as well as researchers. It provides a wealth of information but requires persistence and concentration to unravel it. It is confusing that "eNO" is used interchangeably for "epithelial NO" (pages 384 and 385) and "exhaled NO" (page 386). Some sections of this chapter are difficult to read, with many figures and numbers (page 395) that could have been summarized in tables or graphs.

Chapter 18 deals with NO in cystic fibrosis. This would be interesting for researchers, pulmonologists, respiratory therapists, and nurses. It attempts to reconcile the fact that exhaled NO is low in cystic fibrosis patients despite that inflammation is present, and it achieves that objective credibly. Chapter 19 describes exhaled NO in rheumatic diseases. This would be interesting to rheumatologists and allergists, although the information is not yet clinically useful. Some of the material in this chapter also appeared in previous sections. The final chapter (Chapter 20) deals with the disturbances of metabolism of NO in liver disease. This chapter deals with the biology and disposition of NO and its metabolites and with using exhaled NO as a measure of disease severity. The chapter repeats some information from Part One. This chapter

would benefit from a diagram of the Krebs cycle and urea pathway, which would make the discussion easier to follow.

This hard-cover book is sturdy and attractive, and the illustrations are clear. The table of contents is adequate and the author index could be useful for researchers and those interested in obtaining the original manuscripts. Breath analysis is rapidly evolving, but this book's references are accurate and up to date. One of the shortcomings of the book is that it does not address some issues in depth, such as exhaled NO in children; neither does it discuss exhaled NO in sickle cell disease and acute chest syndrome.

One criticism of this book regards the organization at the ends of the chapters, some of which end with summaries, others with conclusions, others with discussions of future research directions, and another with

challenges for the future. It would have been useful for each chapter to include a succinct summary of what we know, what we don't know, and meritorious research endeavors.

Typographical and editing errors are present throughout the text and underscore the fact that more meticulous editing and organization would have also led to less repetition. Some examples include: page 162, "smooth and smooth"; page 168, "microbi-static"; page 265, "artioaral" should be "arterial"; page 300, "laperoscopic" should be "laparoscopic"; page 354, "spectroophotometric"; page 392, "steriod" should be "steroid"; page 406, "three" should be "there"; page 409, "simulation" should be "stimulation"; and page 450, "entero-hapato cycle" should be "enterohepatic cycle."

Without question the strength of this book is the cutting-edge information it provides in a new field of lung biology. Moreover, it

was written by those who are intimately involved in the research and have a thorough grasp of the literature. It should appeal to a wide range of readers, including respiratory physiologists, respiratory therapists, cardiologists, pulmonologists, and critical care physicians, and it should be on the bookshelves of those who are involved or interested in exhaled breath analysis. For researchers in the field it provides a good summary; however, they will need to review the emerging literature on a regular basis.

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