



Pharmacology and Physiology for Anesthesia: Foundations and Clinical Application

Hugh C. Hemmings Jr., Talmage D. Egan. Elsevier Saunders, Philadelphia, PA, USA, 2013, \$138.84 CAD, 690 pages, ISBN 978-1-4377-1679-5

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A thorough understanding of physiology and pharmacology is an absolute requirement for practicing anesthesiologists, intensivists, and pain medicine specialists. Despite this, a dedicated text is perhaps not yet available, which contains a detailed overview of these subject areas relevant for use among both anesthesia residents and practicing anesthesiologists. As such, the stated goal of the newly published textbook, *Pharmacology and Physiology for Anesthesia: Foundations and Clinical Application*, is to bridge the gap “between introductory texts and comprehensive reference books by providing a detailed overview of these fundamental subject areas for anesthesiologists, intensivists, and pain practitioners, both in training and in practice.”

This first edition hardcover text includes contributions from over 60 internationally recognized authors, including those from the United States, United Kingdom, Europe, and Asia. The six-chapter introductory section of the book details pharmacological science and principles, including pharmacodynamics, pharmacokinetics, pharmacogenomics, and development of adverse drug reactions. These chapters are followed by four sections describing the physiology of the 1) central nervous, 2) cardiovascular and pulmonary, and 3) gastrointestinal and endocrine systems, as well as 4) fluid, electrolyte, and hematologic homeostasis. Within these sections, authors describe the scientific principles

necessary for understanding anesthesia interventions or related applications.

As the editors outline in the preface, a number of the text's characteristics enhance its use for translation or acquisition of basic science principles relevant to anesthesia providers. The systems-oriented approach to the text allows for rotating residents or even staff anesthesiologists to use the material to supplement their more clinical or evidence-informed readings. When used in this fashion, it could constitute an excellent reference for locating answers to more fundamental or basic science-driven questions that arise throughout anesthesia training and practice. For the most part, the chapters of the text appear to be comprehensive. They are also presented clearly and are relatively well referenced, which should allow for anesthesia and other care providers to obtain an appropriate grasp of the material as well as to locate key references for supplemental reading where required. The book is printed in color and contains an impressive number of illustrations drawn or redrawn by professional artists (all available online via the Expert Consult platform for download and use), which may assist in providing continuing medical education. These illustrations are of excellent quality and were given substantial consideration during their production.

Despite its numerous advantages, the text does have limitations that can be remedied relatively easily in future editions of the book. Most importantly, some relevant topics were either not discussed or could have been discussed in greater depth. As an example, although the authors chose to exclude mathematical equations in their description of pharmacokinetics, some formulae are likely required in order to understand how drug-drug and drug-disease interactions may alter the bioavailability and/or clearance of drugs. Moreover, little consideration appears to have been

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given to the importance of energy-dependent multidrug transporters, including P-glycoprotein and multidrug resistance proteins. Several of these transporters are highly expressed in the gastrointestinal tract, liver and biliary system, kidney, blood-brain and blood-cerebrospinal fluid barriers, blood-testis barrier, and within the placenta, and can extensively alter the pharmacokinetics and pharmacodynamics of commercially available drugs, including those commonly used in anesthesia practice. As anesthesia residents and practicing anesthesiologists frequently care for critically ill or injured patients, a chapter dedicated to describing the profound alterations that can occur in physiology and pharmacokinetics among these patient populations would also have been helpful. Furthermore, it would have been better if the text had highlighted the potential adverse consequences that large bolus doses of opioids can have on intracranial and cerebral perfusion pressure among those with severe traumatic brain injury as well as the influence of cardiopulmonary bypass, systemic hypothermia, and the systemic inflammatory response on patient physiology and on intravenous and inhalational anesthetic drug pharmacokinetics and pharmacodynamics. Finally, although thromboelastography and rotational thromboelastography were described in the

chapter on blood and coagulation, a more detailed description of how these tests are performed and how their results may be interpreted would have been useful, especially given the increasing use of these tests by trauma and acute care surgeons.

Despite these relatively minor limitations, *Pharmacology and Physiology for Anesthesia: Foundations and Clinical Application* appears to constitute an excellent reference text. The book may ultimately prove to bridge the gap between basic science and evidence-based medicine that can frequently exist within the training and practice of anesthesiologists and perioperative, critical care, and pain medicine specialists. Its content appears to be accurate, its illustrations are informative and supplement the written component of the text, and the book itself appears appropriately priced. As the text is meant to supplement clinical readings and related primary literature, its availability as an online resource through Expert Consult allows for anesthesia and related medical specialists to answer many fundamental questions regarding their practice at the point of care for a relatively reasonable price.

Competing interests None declared.