

# Brody's Human Pharmacology

Molecular to Clinical

FOURTH EDITION



■ Minneman ■ Wecker

Larner and Brody

FOURTH EDITION  
WITH 284 ILLUSTRATIONS

# Brody's Human Pharmacology

## Molecular to Clinical

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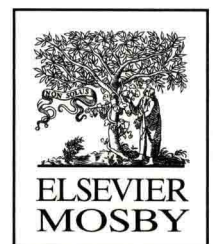
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# Brody's Human Pharmacology

Molecular to Clinical

Dedicated to our families  
Jeff, Rebecca, and Jenny Minneman  
Jonathan Tigue and Sarah Rachel Wecker-Tigue

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# Preface

This fourth edition of *Brody's Human Pharmacology: Molecular to Clinical* has been altered substantially to assist health professional students learn the most up-to-date and relevant pharmacological information. As the number and classes of drugs and sources of information in pharmacology continue to proliferate at an astonishing rate, it has become increasingly difficult for students to identify the concepts required for a basic understanding of pharmacology. An important goal of this book has been to assist the student by presenting the most relevant information in a clear and concise manner, excluding material more suitable for advanced training in particular subspecialties. The text focuses on prototypical drugs to illustrate basic mechanisms and uses boxes and tables to emphasize key points and relevant clinical information. Multicolored illustrations depict key concepts, mechanisms, and important structural formulas. This book is designed for teaching and learning and is not intended to be an all-inclusive reference work.

The information is provided in eight parts, each of which contains an overview of the topics covered within each section. As with previous editions, we have focused on the relationship between the mechanisms of action of drugs at the cellular/molecular level and their effects on the patient. Each chapter dealing with specific drug types has a consistent structure, as in the prior edition, with sections titled:

- Therapeutic Overview
- Mechanisms of Action
- Pharmacokinetics
- Relation of Mechanisms of Action to Clinical Response
- Side Effects, Clinical Problems and Toxicity
- New Horizons

Standard color-coded boxes include Major Drugs, Abbreviations, Therapeutic Overview, Clinical Problems, and Trade Names. In combination with over 300 color figures demonstrating critical concepts, this orderly structure should help students focus on learning the critical information associated with each class of drugs.

The fourth edition includes contributions from 26 new experts and new chapters on Herbals and Natural Products (Chapter 7) and Eating Disorders and Obesity (Chapter 26) because of their emerging importance in modern medicine. To help emphasize key concepts, the overall number of chapters has been reduced by consolidating several chapters in the prior edition and by eliminating material appropriate for more specialized texts. All chapters contain Self-Assessment Questions at the end of the chapter, and the answers are provided in the back of the book. We hope these questions help students evaluate their understanding of the material presented in each chapter and point to sections where further review might be helpful.

Chapters have been authored by experts in a particular area and edited for consistency of coverage and style. Content was selected to emphasize the immediate needs of medical and other health professional students within the framework of a traditional lecture-based course, an innovative organ systems approach, or a problem-based learning curriculum. To increase the consistency in the level of coverage for each chapter, but to avoid as much redundancy as possible, many of the chapters submitted were revised and extensively reformatted by the editors before production.

The multicolor figures that help explain key concepts will be available for download from the Elsevier web site for use in preparing electronic teaching materials. There will also be a Question Bank on the web site containing the questions printed in the chapters as well as others, along with the answers and short explanations of why they are correct. This should be helpful to both teachers and students evaluating their progress in understanding the material covered and in preparing examinations.

We hope that the content revisions, the focus on key concepts, the consistent organization, and the new figures make this new edition even more user-friendly and helpful to students and teachers alike.

KENNETH P. MINNEMAN  
LYNN WECKER



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# General principles

THIS SECTION EXPLAINS THE basic concepts that are critical for learning how drugs are used in prevention and treatment of disease. The principles discussed in this section are essential for understanding the use of all the different drug classes described in the remainder of the book. Chapter 1 provides key definitions of important terms in pharmacology and a basic knowledge of the most important concepts. Chapter 2 describes drug targets, called **receptors**, and how drugs interact with these targets to cause functional responses. The relationship between drug concentration and biological effect can often be inferred from these interactions and is discussed extensively. Chapter 3 explains the dynamics of the absorption of drugs, their distribution to various body sites, their metabolism into active and inactive compounds, and their routes of elimination. These issues are fundamental to an understanding of the biological effects of any drug. Clinical pharmacokinetics and dosing schedules and how they are

impacted at the extremes of age are described in Chapter 4. These include temporal relationships between plasma concentrations of drugs and their pharmacological effects, including the concepts of half-life, steady-state, clearance, and bioavailability. Chapter 5 considers novel molecular therapeutic approaches that are emerging because of the revolution in biology and medicine that has occurred recently. These include gene therapy, other nucleic acid-based therapies, the use of specific antibodies, and strategies for targeted drug delivery. Chapter 6 describes how drugs are developed, regulated, and marketed, and provides a summary of the enormous hurdles involved in the development of novel, therapeutically useful compounds. The principles of prescription writing are also described. Finally, Chapter 7 discusses the increasingly widespread use of dietary and herbal supplements, what we know and do not know about these products, and their potential to impact conventional drug therapy and medical interventions.



