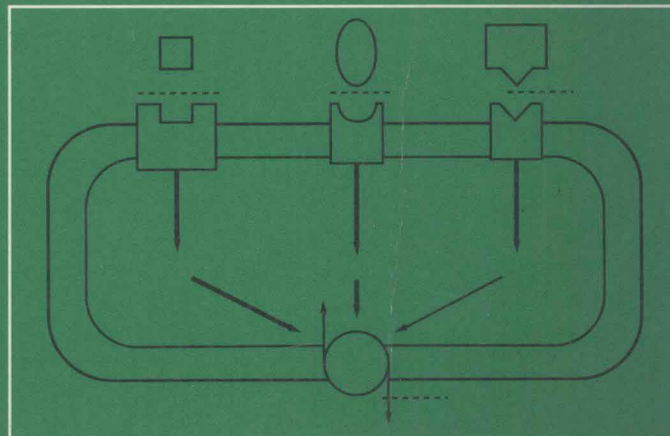
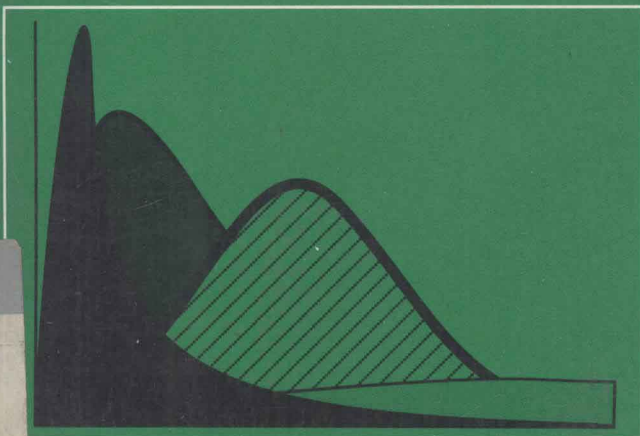
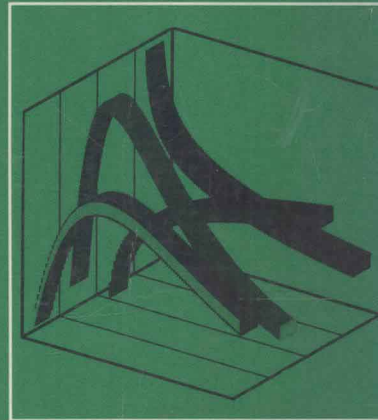
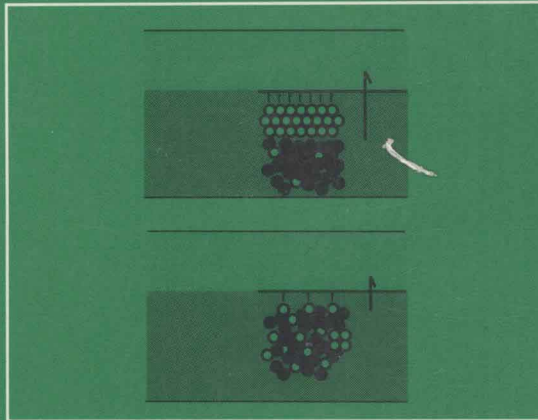
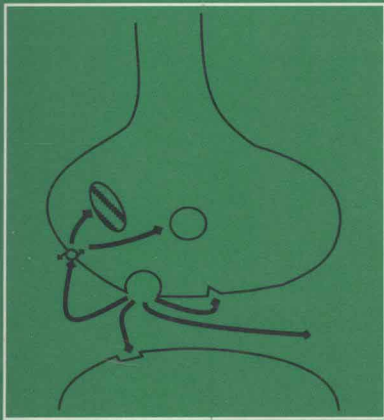


Essentials of Basic Science

PHARMACOLOGY

Edited by
Theoharis C. Theoharides, Ph.D., M.D.



Pharmacology

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Pharmacology

Preface

Pharmacology is the study of the mechanism of action and use of drugs and links biochemistry, morphology, physiology, pathology, and infectious diseases with an understanding of disease at the molecular level. Pharmacology, therefore, bridges the gap between the preclinical and clinical years of medical school, and it is the only discipline among the basic sciences that physicians will actively employ daily throughout their careers. Unfortunately, studying pharmacology in a classroom often seems a dry and overwhelming chore to students who are eager to begin interacting with and treating patients. After 10 years of study and training at Yale University School of Medicine and years of teaching and revising curricula, it became apparent to me that a student-friendly textbook of pharmacology for medical students on the brink of their first clinical experience should present the essentials of pharmacology as a framework within which a vast amount of clinical information can be organized. Such a book may not appear substantial enough to be useful to a practicing physician, but it should be kept in mind that much of the specific drug information physicians use in the clinical setting is obtained by reading package inserts, the *Physicians' Desk Reference*, and specialized articles, not by referring back to information they learned from textbooks during their preclinical years. This book is not, therefore, intended for use by physicians as a comprehensive review of pharmacology.

In order to help the student master the essentials of pharmacology, this book differs from other textbooks in the following ways:

1. It is designed to be manageable in size.
2. All of the tables and figures are original and are classroom-tested for effectiveness.
3. Learning objectives appear at the beginning of each chapter.
4. Chemical structures are included only for purposes of clarification or comparison.

5. Figures and tables were conceived to illustrate didactically important principles rather than just to list characteristics of drugs.
6. Important principles and terms are emphasized in the text and in tables.
7. Summary tables at the end of chapters bring together the mechanism of action, clinical uses, and adverse effects of the drugs discussed in the text.
8. Bibliographies are short and are chosen mostly from recent basic or clinical reviews rather than from primary sources.
9. National Board type questions are provided to test the most important aspects of the material presented.
10. Short explanations of the answers to the National Board type questions are provided.

The presentation of the material makes it easy to absorb and repeatedly emphasizes what is critical for the student to remember. The numerous tables not only organize the material for the student but are excellent review devices.

T. C. T.

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Pharmacology

Notice

The indications and dosages of all drugs in this book have been recommended in the medical literature and conform to the practices of the general medical community. The medications described do not necessarily have specific approval by the Food and Drug Administration for use in the diseases and dosages for which they are recommended. The package insert for each drug should be consulted for use and dosage as approved by the FDA. Because standards for usage change, it is advisable to keep abreast of revised recommendations, particularly those concerning new drugs.

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General Principles and Pharmacokinetics

Theoharis C. Theoharides
Louis Shuster

Objectives

You should understand the following terms and topics:

Terms

Absorption	Half-life	pK _a
Agonist, antagonist	Hepatic blood flow–limited elimination	Plateau, ceiling
Antagonism	Microsomal mixed-function oxidase system	Receptor
Area under the curve (AUC)	Minimum therapeutic concentration	Slow acetylator
Bioavailability	Partial agonist, antagonist	Steady-state concentration
Bolus injection	Peak and trough concentrations	Synergism
Clearance	Pharmacodynamics	Termination of action
Competitive versus noncompetitive antagonists	Pharmacokinetics	Therapeutic index
Distribution	Phase I and phase II biotransformation	Weak acid, weak base
Enzyme induction		Zero-order, first-order elimination
Excretion		
First-pass effect		

Topics

The relationship between physiochemical properties and drug distribution

The concept of volume of distribution

The time required to obtain steady state or drug elimination

The relationship between half-life and elimination rate constant

The units defining important terms

The differences between drug potency, affinity, and efficacy

The definition of therapeutic index as LD₅₀ over ED₅₀

How to calculate plasma concentrations and half-life from a curve showing attainment of steady state or drug elimination

Principal sites of metabolism and different types of biotransformation reactions

Metabolism, p. 31, was written by Roy L. Kisliuk. Pharmacokinetics, p. 12, was written by David J. Greenblatt.