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The Pharmacological
Basis of
THERAPEUTICS

12TH EDITION

LAURENCE BRUNTON

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Goodman & Gilman's
**The Pharmacological Basis of
THERAPEUTICS**

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Goodman & Gilman's
**The Pharmacological Basis of
THERAPEUTICS**

twelfth edition

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In Memoriam
Keith L. Parker
(1954-2008)

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Contents

Contributors	xi
Preface	xvii
Preface to the First Edition	xix
Acknowledgements	xxi

SECTION I

General Principles	1
1. Drug Invention and the Pharmaceutical Industry	3
Suzanne M. Rivera and Alfred Goodman Gilman	
2. Pharmacokinetics: The Dynamics of Drug Absorption, Distribution, Metabolism, and Elimination	17
Iain L. O. Buxton and Leslie Z. Benet	
3. Pharmacodynamics: Molecular Mechanisms of Drug Action	41
Donald K. Blumenthal and James C. Garrison	
4. Drug Toxicity and Poisoning	73
Kevin C. Osterhoudt and Trevor M. Penning	
5. Membrane Transporters and Drug Response	89
Kathleen M. Giacomini and Yuichi Sugiyama	
6. Drug Metabolism	123
Frank J. Gonzalez, Michael Coughtrie, and Robert H. Tukey	
7. Pharmacogenetics	145
Mary V. Relling and Kathleen M. Giacomini	

SECTION II

Neuropharmacology	169
8. Neurotransmission: The Autonomic and Somatic Motor Nervous Systems	171
Thomas C. Westfall and David P. Westfall	

9. Muscarinic Receptor Agonists and Antagonists	219
Joan Heller Brown and Nora Laiken	
10. Anticholinesterase Agents	239
Palmer Taylor	
11. Agents Acting at the Neuromuscular Junction and Autonomic Ganglia	255
Ryan E. Hibbs and Alexander C. Zambon	
12. Adrenergic Agonists and Antagonists	277
Thomas C. Westfall and David P. Westfall	
13. 5-Hydroxytryptamine (Serotonin) and Dopamine	335
Elaine Sanders-Bush and Lisa Hazelwood	
14. Neurotransmission and the Central Nervous System	363
Perry B. Molinoff	
15. Drug Therapy of Depression and Anxiety Disorders	397
James M. O'Donnell and Richard C. Shelton	
16. Pharmacotherapy of Psychosis and Mania	417
Jonathan M. Meyer	
17. Hypnotics and Sedatives	457
S. John Mihic and R. Adron Harris	
18. Opioids, Analgesia, and Pain Management	481
Tony L. Yaksh and Mark S. Wallace	
19. General Anesthetics and Therapeutic Gases	527
Piyush M. Patel, Hemal H. Patel, and David M. Roth	
20. Local Anesthetics	565
William A. Catterall and Kenneth Mackie	
21. Pharmacotherapy of the Epilepsies	583
James O. McNamara	

viii	22. Treatment of Central Nervous System Degenerative Disorders	609
	David G. Standaert and Erik D. Roberson	
	23. Ethanol and Methanol	629
	Marc A. Schuckit	
	24. Drug Addiction.....	649
	Charles P. O'Brien	

SECTION III

Modulation of Cardiovascular Function 669

25. Regulation of Renal Function and Vascular Volume	671
Robert F. Reilly and Edwin K. Jackson	
26. Renin and Angiotensin	721
Randa Hilal-Dandan	
27. Treatment of Myocardial Ischemia and Hypertension	745
Thomas Michel and Brian B. Hoffman	
28. Pharmacotherapy of Congestive Heart Failure.....	789
Bradley A. Maron and Thomas P. Rocco	
29. Anti-Arrhythmic Drugs.....	815
Kevin J. Sampson and Robert S. Kass	
30. Blood Coagulation and Anticoagulant, Fibrinolytic, and Antiplatelet Drugs.....	849
Jeffrey I. Weitz	
31. Drug Therapy for Hypercholesterolemia and Dyslipidemia	877
Thomas P. Bersot	

SECTION IV

Inflammation, Immunomodulation, and Hematopoiesis 909

32. Histamine, Bradykinin, and Their Antagonists.....	911
Randal A. Skidgel, Allen P. Kaplan, and Ervin G. Erdős	
33. Lipid-Derived Autacoids: Eicosanoids and Platelet-Activating Factor.....	937
Emer M. Smyth, Tilo Grosser, and Garret A. FitzGerald	
34. Anti-inflammatory, Antipyretic, and Analgesic Agents; Pharmacotherapy of Gout.....	959
Tilo Grosser, Emer M. Smyth, and Garret A. FitzGerald	
35. Immunosuppressants, Tolerogens, and Immunostimulants.....	1005
Alan M. Krensky, William M. Bennett, and Flavio Vincenti	
36. Pulmonary Pharmacology	1031
Peter J. Barnes	
37. Hematopoietic Agents: Growth Factors, Minerals, and Vitamins.....	1067
Kenneth Kaushansky and Thomas J. Kipps	

SECTION V

Hormones and Hormone Antagonists 1101

38. Introduction To Endocrinology: The Hypothalamic-Pituitary Axis	1103
Keith L. Parker and Bernard P. Schimmer	
39. Thyroid and Anti-Thyroid Drugs	1129
Gregory A. Brent and Ronald J. Koenig	
40. Estrogens and Progestins.....	1163
Ellis R. Levin and Stephen R. Hammes	
41. Androgens	1195
Peter J. Snyder	
42. ACTH, Adrenal Steroids, and Pharmacology of the Adrenal Cortex	1209
Bernard P. Schimmer and John W. Funder	
43. Endocrine Pancreas and Pharmacotherapy of Diabetes Mellitus and Hypoglycemia.....	1237
Alvin C. Powers and David D'Alessio	
44. Agents Affecting Mineral Ion Homeostasis and Bone Turnover.....	1275
Peter A. Friedman	

SECTION VI

Drugs Affecting Gastrointestinal Function 1307

45. Pharmacotherapy of Gastric Acidity, Peptic Ulcers, and Gastroesophageal Reflux Disease....	1309
John L. Wallace and Keith A. Sharkey	
46. Treatment of Disorders of Bowel Motility and Water Flux; Anti-Emetics; Agents Used in Biliary and Pancreatic Disease.....	1323
Keith A. Sharkey and John L. Wallace	
47. Pharmacotherapy of Inflammatory Bowel Disease	1351
John L. Wallace and Keith A. Sharkey	

SECTION VII

Chemotherapy of Microbial Diseases 1363

48. General Principles of Antimicrobial Therapy	1365
Tawanda Gumbo	
49. Chemotherapy of Malaria	1383
Joseph M. Vinetz, Jérôme Clain, Viengneun Bounkeua, Richard T. Eastman, and David Fidock	
50. Chemotherapy of Protozoal Infections: Amebiasis, Giardiasis, Trichomoniasis, Trypanosomiasis, Leishmaniasis, and Other Protozoal Infections	1419
Margaret A. Phillips and Samuel L. Stanley, Jr.	

51. Chemotherapy of Helminth Infections1443
James McCarthy, Alex Loukas, and Peter J. Hotez
52. Sulfonamides, Trimethoprim-Sulfamethoxazole, Quinolones, and Agents for Urinary Tract Infections1463
William A. Petri, Jr.
53. Penicillins, Cephalosporins, and Other β -Lactam Antibiotics1477
William A. Petri, Jr.
54. Aminoglycosides1505
Conan MacDougall and Henry F. Chambers
55. Protein Synthesis Inhibitors and Miscellaneous Antibacterial Agents1521
Conan MacDougall and Henry F. Chambers
56. Chemotherapy of Tuberculosis, *Mycobacterium Avium* Complex Disease, and Leprosy1549
Tawanda Gumbo
57. Antifungal Agents1571
John E. Bennett
58. Antiviral Agents (Nonretroviral)1593
Edward P. Acosta and Charles Flexner
59. Antiretroviral Agents and Treatment of HIV Infection1623
Charles Flexner
62. Targeted Therapies: Tyrosine Kinase Inhibitors, Monoclonal Antibodies, and Cytokines1731
Bruce A. Chabner, Jeffrey Barnes, Joel Neal, Erin Olson, Hamza Mujagic, Lecia Sequist, Wynham Wilson, Dan L. Longo, Constantine Mitsiades, and Paul Richardson
63. Natural Products in Cancer Chemotherapy: Hormones and Related Agents1755
Beverly Moy, Richard J. Lee, and Matthew Smith

SECTION IX

Special Systems Pharmacology 1771

64. Ocular Pharmacology1773
Jeffrey D. Henderer and Christopher J. Rapuano
65. Dermatological Pharmacology1803
Craig Burkhart, Dean Morrell, and Lowell Goldsmith
66. Contraception and Pharmacotherapy of Obstetrical and Gynecological Disorders1833
Bernard P. Schimmer and Keith L. Parker
67. Environmental Toxicology; Carcinogens and Heavy Metals1853
Michael C. Byrns and Trevor M. Penning

APPENDICES

- I. Principles of Prescription Order
Writing and Patient Compliance1879
Iain L. O. Buxton
- II. Design and Optimization of Dosage Regimens: Pharmacokinetic Data1891
Kenneth E. Thummel, Danny D. Shen, and Nina Isoherranen

Index 1991

SECTION VIII

- ### Chemotherapy of Neoplastic Diseases 1665
60. General Principles of Cancer Chemotherapy1667
Bruce A. Chabner
61. Cytotoxic Agents1677
Bruce A. Chabner, Joseph Bertino, James Cleary, Taylor Ortiz, Andrew Lane, Jeffrey G. Supko, and David Ryan

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Preface

The publication of the twelfth edition of this book is a testament to the vision and ideals of the original authors, Alfred Gilman and Louis Goodman, who, in 1941 set forth the principles that have guided the book through eleven editions: to correlate pharmacology with related medical sciences, to reinterpret the actions and uses of drugs in light of advances in medicine and the basic biomedical sciences, to emphasize the applications of pharmacodynamics to therapeutics, and to create a book that will be useful to students of pharmacology and to physicians. These precepts continue to guide the current edition.

As with editions since the second, expert scholars have contributed individual chapters. A multiauthored book of this sort grows by accretion, posing challenges to editors but also offering memorable pearls to the reader. Thus, portions of prior editions persist in the current edition, and I hasten to acknowledge the contributions of previous editors and authors, many of whom will see text that looks familiar. However, this edition differs noticeably from its immediate predecessors. Fifty new scientists, including a number from outside the U.S., have joined as contributors, and all chapters have been extensively updated. The focus on basic principles continues, with new chapters on drug invention, molecular mechanisms of drug action, drug toxicity and poisoning, principles of antimicrobial therapy, and pharmacotherapy of obstetrical and gynecological disorders. Figures are in full color. The editors have continued to standardize the organization of chapters; thus, students should easily find the basic physiology, biochemistry, and pharmacology set forth in regular type; bullet points highlight important lists within the text; the clinician and expert will find details in extract type under clear headings.

Online features now supplement the printed edition. The entire text, updates, reviews of newly approved drugs, animations of drug action, and hyperlinks to relevant text in the prior edition are available on the Goodman & Gilman section of McGraw-Hill's websites, *AccessMedicine.com* and *AccessPharmacy.com*. An Image Bank CD accompanies the book and makes all tables and figures available for use in presentations.

The process of editing brings into view many remarkable facts, theories, and realizations. Three stand out: the invention of new classes of drugs has slowed to a trickle; therapeutics has barely begun to capitalize on the information from the human genome project; and, the development of resistance to antimicrobial agents, mainly through their overuse in medicine and agriculture, threatens to return us to the pre-antibiotic era. We have the capacity and ingenuity to correct these shortcomings.

Many, in addition to the contributors, deserve thanks for their work on this edition; they are acknowledged on an accompanying page. In addition, I am grateful to Professors Bruce Chabner (Harvard Medical School/Massachusetts General Hospital) and Björn Knollmann (Vanderbilt University Medical School) for agreeing to be associate editors of this edition at a late date, necessitated by the death of my colleague and friend Keith Parker in late 2008. Keith and I worked together on the eleventh edition and on planning this edition. In anticipation of the editorial work ahead, Keith submitted his chapters before anyone else and just a few weeks before his death; thus, he is well represented in this volume, which we dedicate to his memory.

Laurence L. Brunton
San Diego, California
December 1, 2010

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Preface to the First Edition

Three objectives have guided the writing of this book—the correlation of pharmacology with related medical sciences, the reinterpretation of the actions and uses of drugs from the viewpoint of important advances in medicine, and the placing of emphasis on the applications of pharmacodynamics to therapeutics.

Although pharmacology is a basic medical science in its own right, it borrows freely from and contributes generously to the subject matter and technics of many medical disciplines, clinical as well as preclinical. Therefore, the correlation of strictly pharmacological information with medicine as a whole is essential for a proper presentation of pharmacology to students and physicians. Further more, the reinterpretation of the actions and uses of well-established therapeutic agents in the light of recent advances in the medical sciences is as important a function of a modern text book of pharmacology as is the description of new drugs. In many instances these new interpretations necessitate radical departures from accepted but outworn concepts of the actions of drugs. Lastly, the emphasis throughout the book, as indicated in its title, has been clinical. This is mandatory because medical students must be taught pharmacology from the standpoint of the actions and uses of drugs in the prevention and treatment of disease. To the student, pharmacological data per se are valueless unless he/she is able to apply this information in

the practice of medicine. This book has also been written for the practicing physician, to whom it offers an opportunity to keep abreast of recent advances in therapeutics and to acquire the basic principles necessary for the rational use of drugs in his/her daily practice.

The criteria for the selection of bibliographic references require comment. It is obviously unwise, if not impossible, to document every fact included in the text. Preference has therefore been given to articles of a review nature, to the literature on new drugs, and to original contributions in controversial fields. In most instances, only the more recent investigations have been cited. In order to encourage free use of the bibliography, references are chiefly to the available literature in the English language.

The authors are greatly indebted to their many colleagues at the Yale University School of Medicine for their generous help and criticism. In particular they are deeply grateful to Professor Henry Gray Barbour, whose constant encouragement and advice have been invaluable.

Louis S. Goodman
Alfred Gilman
New Haven, Connecticut
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Section

General Principles

- Chapter 1.** Drug Invention and the Pharmaceutical Industry / 3
- Chapter 2.** Pharmacokinetics: The Dynamics of Drug Absorption, Distribution, Metabolism, and Elimination / 17
- Chapter 3.** Pharmacodynamics: Molecular Mechanisms of Drug Action / 41
- Chapter 4.** Drug Toxicity and Poisoning / 73
- Chapter 5.** Membrane Transporters and Drug Response / 89
- Chapter 6.** Drug Metabolism / 123
- Chapter 7.** Pharmacogenetics / 145

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