TEXTBOOK OF MEDICAL PHYSIOLOGY

SEVENTH EDITION

Arthur C. Guyton, M.D.

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Arthur C. Guyton, M.D.
Chairman and Professor
Department of Physiology and Biophysics
University of Mississippi School of Medicine

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Preface

When I wrote the first edition of this textbook, I had the naive belief that once the book was completed, subsequent revisions would require only simple changes. However, with each new edition I find that progress in the field of physiology is so rapid that large portions of the text must be completely recast and rewritten, and even the emphasis of the subject matter must often be changed as our knowledge becomes more penetrating. Therefore, the reader will find hardly a chapter in this edition that has not been significantly altered. Also, most of the figures have been either changed in at least some feature or replaced, and new ones have been added. Especially important, many of the figures have been redrawn simply to increase their clarity.

As has been true of most of the past revisions, the major change in this edition reflects a striking trend toward more fundamental physiology. The reason for this is mainly the greater success of the research physiologist in probing deeper into basic mechanisms of function, especially cellular and molecular mechanisms, than was true a few years ago. Yet I have attempted still to present physiology as an integrated study of the body's functional systems, utilizing the new fundamental knowledge to build a better understanding of the mechanisms upon which life depends.

Also a serious attempt has been made to devise and achieve techniques of expression that will help bring the physical and chemical principles of the body's complexities into the medical student's realm of understanding. In pursuit of this goal, I have kept records of those types of material with which the student has difficulty; I have quizzed students in detail to determine their levels of comprehension; and I have attempted to note inconsistencies in logic that might appear in student discussions. All these data have been used to help choose the material and methods of presentation. Thus, it has been my desire to make this book a "teaching" text as well as one that covers essentially all the basic physiology required of a student of medicine.

A special emphasis of the book is a more detailed attention than given in most other textbooks of physiology to the body's many control systems. These are the basis of what physiologists call *homeostasis*. The reason for this special emphasis is that most disease conditions of the body result from abnormal function of one or more of the control systems. Therefore, the student's comprehension of "medical" physiology depends perhaps more on a knowledge of these systems than on any other facet of physiology.

Another goal has been to make the text as accurate as possible. To help attain this, suggestions and critiques from many physiologists, students, and clinicians throughout the United States and other parts of the world have been received and utilized in checking the factual accuracy of the text. Yet, even so, because of the likelihood of error in sorting through many thousands of bits of information, I wish to issue an

invitation—in fact, much more than merely an invitation, actually a request—to all readers to send along notices of error or inaccuracy. Indeed, physiologists understand how important feedback is to proper function of the human body; so, too, is feedback equally important for progressive development of a textbook of medical physiology. I hope also that those many persons who have helped already will accept my sincerest appreciation for their efforts.

A word of explanation is needed about two features of the text—first, the references, and, second, the two print sizes. The references have been chosen primarily for their up-to-dateness and for the quality of their own bibliographies. Use of these references as well as of cross-references from them can give the student almost complete coverage of the entire field of physiology.

The print is set in two sizes. The material presented in small print is of several different kinds; first, anatomical, chemical, and other information that is needed for the immediate discussion but that most students will learn in more detail in other courses; second, information that is of special importance to certain clinical fields of medicine but that is not necessary to fundamental understanding of the body's basic physiologic mechanisms; and, third, information that will be of value to those students who wish to pursue a subject more deeply than the average medical student. In contrast, the material in large print constitutes the major bulk of physiological information that students will require in their medical studies and that they will not obtain in other courses. Those teachers who would like to present a limited course of physiology can direct students' study primarily to the large type.

Again, I wish to express my deepest appreciation to many others who have helped in the preparation of this book. I am particularly grateful to Ivadelle Osberg Heidke, Gwendolyn Robbins, and Elaine Steed-Davis for their excellent secretarial services, to Tomiko Mita for her superb work on new illustrations, and to Dana Dreibelbis, Wynette Kommer, Robert Butler, Margaret Shaw, and the staff of the W. B. Saunders Company for continued editorial and production excellence.

ARTHUR C. GUYTON

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