

Essentials of Anatomy and Physiology

Second Edition



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Essentials of **Anatomy and Physiology** Second Edition

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Preface

All of us associated with the first edition of *Essentials of Anatomy and Physiology*, the author, illustrator, editors, and production staff, extend our thanks to all of you who have adopted our textbook for use in your courses and especially to those who have written to us with suggestions, criticisms, and encouragement. We hope you will find that your concerns have been considered in this second edition, and we thank you for making the second edition possible.

The text has been updated wherever appropriate to include recent research. This will be most apparent in the boxed inserts on clinical applications. Many of the illustrations have been modified or redone entirely, some to add color and others to match more closely the text material. New illustrations also have been added to provide further visual reinforcement of explanations in the text.

Chapter 2 now includes basic material on hydrogen bonds and chemical reactions. Microbiology, which previously was covered in a separate supplement, is now included as Chapter 22: An Introduction to Microbiology and Human Disease. To supplement the glossary we have added Appendix F: Prefixes, Combining Word Roots, and Suffixes Used in Medical Terminology. Appendix G is a list of eponymous terms and their equivalents.

A new ancillary is the computerized test bank, available to adopters of the second edition. This test bank contains more than 1500 questions geared to the review questions in each chapter, and it is fully described, with a demonstration disk, in the *Instructor's Guide*.

As always, your comments and suggestions will be most welcome, and they may be sent to us in care of the publisher: F. A. Davis Company, 1915 Arch Street, Philadelphia, PA 19103.

Valerie C. Scanlon

Dobbs Ferry, New York

Tina Sanders

Castle Creek, New York

To my students, past and present
VCS

To Brooks, for his encouragement
TS

To the Instructor

Teachers of introductory anatomy and physiology courses face a special challenge: we must distill and express the complexities of human structure and function in a simple way, without losing the essence and meaning of the material. That is the goal of this textbook: to make this material readily accessible to students with diverse backgrounds and varying levels of educational preparation.

No prior knowledge of biology or chemistry is assumed, and even the most fundamental terms are defined thoroughly. Essential aspects of anatomy are presented clearly and reinforced with excellent illustrations. Essential aspects of physiology are discussed simply, yet with accuracy and precision. Again, the illustrations complement the text material and foster comprehension on the part of the student. These illustrations were prepared especially for students for whom this is a first course in anatomy and physiology. As you will see, many are full-page images in which detail is readily apparent. All important body parts have been carefully labeled, but the student is not overwhelmed with unnecessary labels. Wherever appropriate, the legends refer students to the text for further description or explanation.

The text has three unifying themes: the relationship between physiology and anatomy, the interrelations among the organ systems, and the relationship of each organ system to homeostasis. Although each type of cell, tissue, organ, or organ system is discussed simply and thoroughly in itself, applicable connections are made to other aspects of the body or to the functioning of the body as a whole. Our goal is to provide your students with the essentials of anatomy and physiology, and in doing so, to help give them an appreciation for the incredible machine that is the human body.

The sequence of chapters is a very traditional one. Cross references are used to remind students of what they have learned from previous chapters. Nevertheless, the textbook is very flexible, and, following the introductory four chapters, the organ systems may be covered in almost any order, depending on the needs of your course.

Each chapter is organized internally from the simple to the more complex, with the anatomy followed by the physiology. The *Instructor's Guide* presents modifications of the topic sequences that may be used, again depending on the needs of your course. Certain more advanced topics may be omitted from each chapter without losing the meaning or flow of the rest of the material, and these are indicated, for each chapter, in the *Instructor's Guide*.

Clinical applications are set apart from the text in boxed inserts. These are often aspects of pathophysiology that are related to the normal anatomy or physiology in the text discussion. Each box presents one particular topic and is referenced at the appropriate point in the text. This material is intended to be an integral part of the chapter but is set apart for ease of reference and to enable you to include or omit as many of these topics as you wish. The use of these boxes also enables students to read the text material without interruption and then to focus on specific aspects of pathophysiology. A comprehensive list of the boxes appears inside the book's front and

back covers, and another list at the beginning of each chapter cites the boxes within that chapter.

Tables are utilized as summaries of structure and function, to concisely present a sequence of events, or to present additional material that you may choose to include. Each table is referenced in the text and is intended to facilitate your teaching and to help your students learn.

New terms appear in bold type within the text, and all such terms are fully defined in an extensive glossary, with phonetic pronunciations. Bold type may also be used for emphasis whenever one of these terms is used again in a later chapter.

Each chapter begins with a chapter outline and student objectives to prepare the student for the chapter itself. New terminology and related clinical terms are also listed, with phonetic pronunciations. Each of these terms is fully defined in the glossary, with cross references back to the chapter in which the term is introduced.

At the end of each chapter are a study outline and review questions. The study outline includes all of the essentials of the chapter in a concise outline form. The review questions may be used by the students as a review or self-test. Following each question is a page reference in parentheses. This reference cites the page(s) in the chapter on which the content needed to answer the question correctly can be found. The answers themselves are included in the *Instructor's Guide*.

An important supplementary learning tool for your students is available in the form of a *Student Workbook* that accompanies this text. For each chapter in the textbook, the workbook offers fill-in and matching-column study questions, figure-labeling and figure-coloring exercises, and crossword puzzles based on the chapter's vocabulary list. Also included are comprehensive, multiple-choice chapter tests to provide a thorough review for students. All answers are provided at the end of the workbook.

The instructor's materials for this text include a complete *Instructor's Guide*, a computerized test bank, and a transparency package. The *Instructor's Guide* contains expanded chapter outlines, notes on each chapter's organization and content (useful for modifying the book to your specific teaching needs), topics for class discussions, and answers to the chapter review questions from the textbook. The computerized test bank contains test questions for every chapter of the book, with a total of more than 1500 questions. It uses F. A. Davis's simple but powerful Make-A-Test test-generation software, which allows you to select the questions you wish, modify them if you choose, and even add your own questions. The transparency package offers many clear, sharp, full-color transparencies taken from the textbook's illustrations and tables.

Suggestions and comments from colleagues are always valuable, and yours would be greatly appreciated. When we took on the task of writing and illustrating this textbook, we wanted to make it the most useful book possible for you and your students. Any suggestions that you can give us to help us achieve that goal are most welcome, and they may be sent to us in care of F. A. Davis Company, 1915 Arch Street, Philadelphia, PA 19103.

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To the Student

This is your textbook for your first course in human anatomy and physiology, a subject that is both fascinating and rewarding. That you are taking such a course says something about you: you may simply be curious as to how the human body functions. Or, you may have a personal goal of making a contribution in one of the health-care professions. Whatever your reason, this textbook will help you to be successful in your anatomy and physiology course.

The material is presented simply and concisely, yet with accuracy and precision. The writing style is informal yet clear and specific; it is intended to promote your comprehension and understanding.

Organization of the Textbook

To use this textbook effectively, you should know the purpose of its various parts. Each chapter is organized in the following way:

Chapter Outline—This presents the main topics in the chapter, which correspond to the major headings in the text.

Student Objectives—These summarize what you should know after reading and studying the chapter. These are not questions to be answered, but are rather, with the chapter outline, a preview of the chapter contents.

New Terminology and Related Clinical Terminology—These are some of the new terms you will come across in the chapter. Read through these terms before you read the chapter, but do not attempt to memorize them just yet. When you have finished the chapter, return to the list and see how many terms you can define. All of these terms are fully defined in the glossary.

Study Outline—This is found at the end of the chapter. It is a concise summary of the essentials in the chapter. You may find this outline very useful as a quick review before an exam.

Review Questions—These are also at the end of the chapter. Your instructor may assign some or all of them as homework. If not, the questions may be used as a self-test to evaluate your comprehension of the chapter's content. The page number(s) in parentheses following each question refers you to the page(s) in the chapter on which the content needed to answer the question correctly can be found.

Other Features within Each Chapter

Illustrations—These are an essential part of this textbook. Use them. Look at them and study them carefully, and they will be of great help to you as you learn. They are intended to help you develop your own mental picture of the body and its parts and processes. Each illustration is referenced in the text, so you will know just when to consult it.

Boxes—Discussions of clinical applications are in separate boxes in the text so that you may find and refer to them easily. Your instructor may include all or some of these as required reading. If you are planning a career in the health professions, these boxes are an introduction to pathophysiology, and you will find them interesting and helpful.

Bold Type—This is used whenever a new term is introduced, or when an old term is especially important. The terms in bold type are fully defined in the glossary, which includes phonetic pronunciations.

Tables—This format is used to present material in a very concise form. Some tables are summaries of text material and are very useful for a quick review. Other tables present additional material that complements the text material.

To make the best use of your study time, a Student Workbook is available that will help you to focus your attention on the essentials in each chapter. Also included are comprehensive chapter tests to help you determine which topics you have learned thoroughly and which you may have to review. If your instructor has not made the workbook a required text, you may wish to ask that it be ordered and made available in your bookstore. You will find it very helpful.

Some Final Words of Encouragement

Your success in this course depends to a great extent on you. Try to set aside study time for yourself every day; a little time each day is usually much more productive than trying to cram at the last minute.

Ask questions of yourself as you are studying. What kinds of questions? The simplest ones. If you are studying a part of the body such as an organ, ask yourself: What is its name? Where is it? What is it made of? What does it do? That is: name, location, structure, and function. These are the essentials. If you are studying a process, ask yourself: What is happening here? What is its purpose? That is: What is going on? and what good is it? Again, these are the essentials.

We hope this textbook will contribute to your success. If you have any suggestions or comments, we would very much like to hear them. After all, this book was written for you, to help you achieve your goals in this course and in your education. Please send your suggestions and comments to us in care of F. A. Davis Company, 1915 Arch Street, Philadelphia, PA 19103.

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