

Preface

Human Biology introduces students to the anatomy and physiology of the human body. All systems of the body are represented, and each system has its own chapter. The text also helps students understand that humans are a part of the biosphere and that human activities can have environmental consequences.

This eighth edition is particularly exciting because two new chapters have been added and the sequence of chapters has been reorganized. Chapter 21, "Parasites and Pathogens," considers selected human diseases. I was prompted to add this chapter now that emerging diseases, antibiotic resistance, and pathogens as weapons have become topics of increasing human concern. Only through knowledge can students know how to protect themselves. Chapter 26, "Population, Resources, and Pollution," emphasizes that human population size and resource consumption go hand and hand with pollution. Students need a global perspective of environmental problems, especially since the countries of the world now convene regularly to try to solve these problems.

The Birth of Human Biology

When I was teaching general biology, it became apparent to me that students were very interested in how their bodies worked, how to keep them healthy, and how they can occasionally malfunction. Students also found environmental concepts intriguing. I decided it would be possible to write a text and develop a course for nonmajors that built on these interests while teaching biological concepts and how scientists think and carry out research.

The application of biological principles to practical human concerns is now widely accepted as a beneficial approach to the study of biology. Students should leave college with a firm grasp of how their bodies normally function and how the human population can become more fully integrated into the biosphere. We are frequently called upon to make health and environmental decisions. Wise decisions require adequate knowledge and can help ensure our continued survival as individuals and as a species.

In this edition, as in previous editions, each chapter presents concepts clearly, simply, and distinctly so that students will feel capable of achieving an adult level of understanding. Detailed, high-level scientific data and terminology are not included because I believe that true knowledge consists of having a working understanding of concepts rather than technical facility.

Pedagogical Features

Human Biology excels in pedagogical features. Each part opens by highlighting the central ideas of the chapters within that part and telling the reader how the topics contribute to biological understanding.

Each chapter begins with an integrated outline that numbers the chapter's sections and, new to this edition, utilizes questions rather than statements to introduce concepts. The questions are meant to stimulate student interest in finding the answers within the chapter. The Online Learning Center supplies the answers if students are having difficulty. Each chapter also features an opening vignette that tells a human interest story designed to intrigue students so that they want to learn more.

The numbering system in the chapter outline is continued in the chapter itself and in the summary so that instructors can assign only certain portions of a chapter if they wish. As you may know, my staff and I page the book before it goes to the publisher. We make sure that each new section starts at the top of a page and that each illustration is on the same page as its reference or on the facing page. Therefore, a student never needs to turn the page to find an illustration!

Questions at the end of the chapters are of both the essay and objective type:

- **Studying the Concepts** reviews the content of the chapter and requires students to write out their answers.
- **Testing Your Knowledge of the Concepts** includes only objective questions, and their number has been substantially increased.
- **Understanding Key Terms** lists the boldfaced terms in the chapter and gives the page number where each term is defined. Following the list is a matching exercise that allows students to test their understanding of the terms.

Illustrations

The illustrations are not only visually motivating but also have many other features that students will find helpful. Students who are visual learners will particularly appreciate the care with which each illustration has been developed and executed. Color coordination includes assigning colors to the various classes of organic molecules and to the different human tissues and organs.

Visual Focus illustrations provide a conceptual overview that relates structure to function. Step-by-step descriptions take a concept that could be difficult to understand and turn it into one that students can readily grasp. For example, in Figure 12.5, boxed statements explain synapse structure and function, from the complete neuron to an enlargement of a receptor for a neurotransmitter. As with many other illustrations, a micrograph is included. In this case, the micrograph illustrates that many axons communicate with a cell body.

This edition increasingly uses icons, small drawings that help students see how a particular structure is part of a bigger one. For example, the icon of an eye reminds students of the overall location of the retina as its structure is discussed in detail.

New Parts and Chapters

As mentioned, the sequence of chapters has been reorganized. Part VII, "Human Disease," is a new part that brings together chapters formerly widely separated and also includes one of the new chapters. This part begins with Chapter 20, "Defenses Against Disease," which now concentrates solely on immunity. The new chapter, entitled "Parasites and Pathogens," occurs next, and is followed by Chapter 22, "Sexually Transmitted Diseases," which now includes the information that was formerly in the AIDS supplement. Concluding Part VII is an updated Chapter 23, "Cancer."

Part VIII, "Human Evolution and Ecology," has been expanded with the addition of Chapter 26, "Population, Resources, and Pollution," a new chapter that considers these topics from a global perspective. This chapter discusses five resources—land, water, food, energy, and minerals—and of utmost interest, includes a forecasting of the hydrogen-solar revolution. Chapter 25, "Global Ecology," explains the fundamentals of ecology with the entire biosphere in mind, while Chapter 27, "Saving the World's Biodiversity," concentrates on how we can preserve other species of the world and why we should.

Bioethical Issues

As in the previous edition, students are asked to apply the biological concepts to the many and varied perplexing bioethical issues facing society every day. A multistep process that involves the Online Learning Center is designed to help them develop a strategy for thinking through issues and coming to a decision after studying conflicting opinions. First, each issue is featured in a Bioethical Focus text box, which presents both sides of an issue and asks a series of thoughtful questions that can serve as the basis for class discussion. Then students are directed to the Online Learning Center where more information is available on

such topics as genetic disease testing, modern reproductive technologies, human cloning, AIDS vaccine trials, animal rights, and fetal research. There, students have the opportunity to carry out the following activities:

Taking Sides. Students answer a series of questions, and their answers are tallied so that their original positions are revealed.

Further Debate. Students are directed to read articles on both sides of the issue.

Explain Your Position. Students are asked to defend their positions in writing. They can e-mail their essays to their professor.

Applications

The human applications featured in *Human Biology* are many and varied. Some topics are integrated into the running text, and others are discussed more fully in boxed readings of two types: Health Focus and Ecology Focus. Throughout the text, the focus readings carry the two themes of preserving our bodies and preserving the biosphere.

Among the applications are such topics as eating disorders, allergies, pulmonary disorders, hepatitis infections, modern reproductive technologies, the Human Genome Project, and gene therapy. Other topics, such as the cloning of humans and xenotransplantation, are also included. Of particular interest to students will be two Health Focus boxes new to this edition: "Living with Klinefelter Syndrome" and "New Cures on the Horizon"; the latter pertains to the benefits of the Human Genome Project.

Homeostasis

This edition of *Human Biology* again places an emphasis on homeostasis. The revised Chapter 4, entitled "Organization and Regulation of Body Systems," discusses the principles of homeostasis and the contributions of the various systems to keeping the internal environment relatively constant. Well-designed illustrations, especially in Chapter 14, "The Endocrine System," show how negative feedback control is essential to homeostasis. In each systems chapter, a Human Systems Work Together feature describes how the particular organ system being discussed works with other systems to achieve homeostasis.

Technology

Many resources are available to help students understand the content of this textbook. In addition to the end-of-chapter questions and a printed study guide, the Online

Learning Center at www.mhhe.com/maderhuman8 contains readings, quizzes, animations, and other activities to help students master the concepts. As with the previous edition, text material and technology complement one another.

For example, Bioethical Focus and Human Systems Work Together features have an associated online exercise that helps students make better use of these stimulating features.

Overview of Changes to *Human Biology Eighth Edition*

New Parts and Chapters

The sequence of chapters has been reorganized, and a new part and two new chapters have been added. Part VII "Human Disease" is a new part and includes a new chapter, "Parasites and Pathogens." Part VIII "Human Evolution and Ecology" includes the new chapter "Population, Resources, and Pollution."

Chapter Opening Page

The chapter outline now contains questions listed according to the major sections instead of statements. The questions are designed to start students thinking about and learning concepts.

Illustrations

Many new illustrations have been added. Visual Focus pieces that cover a process from start to finish with boxed explanations have been revised.

Bioethical Focus

As before, most chapters include a bioethical issue, which is also discussed in the Online Learning Center. New to this edition are issues entitled Cloning of Humans, Stopping the Spread of Emerging Diseases, and Oil Drilling in the Arctic Wildlife Refuge.

e-Learning Connection

Online study aids are organized in a new format according to major sections of a chapter on the Online Learning Center. Students can easily determine what resources are available for help with difficult concepts. Visit www.mhhe.com/maderhuman8

Testing Your Knowledge of the Concepts

Each chapter now contains 25–40 mainly multiple choice questions to better prepare students for exams.