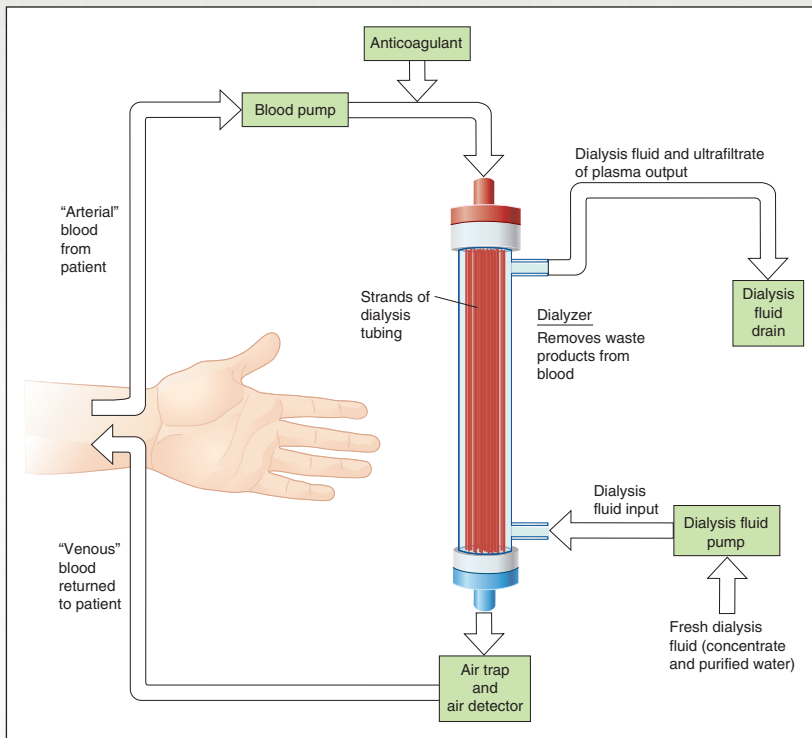


Textbook Tour

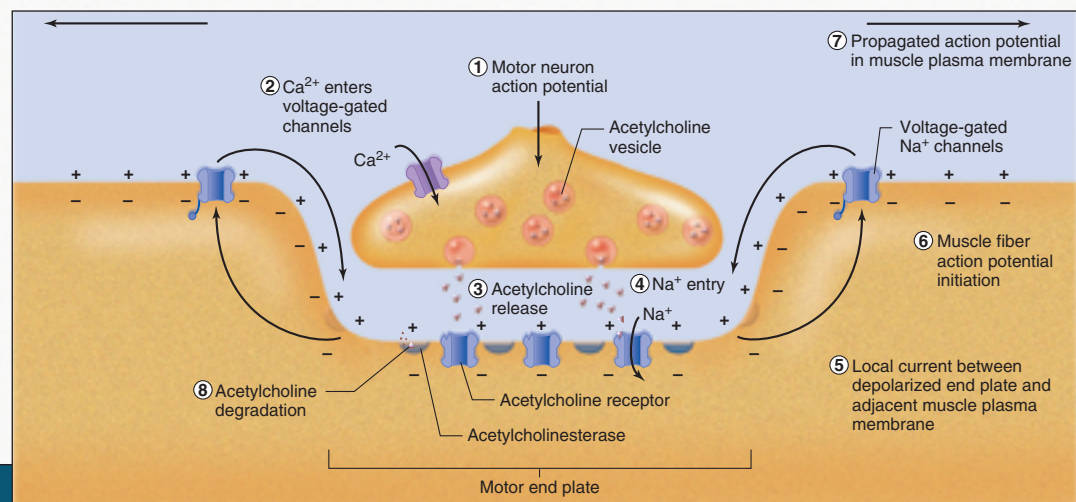


"Illustrations are one of the strong points in previous editions and this continues to be the case with the 9th edition."

Daniel Richardson
University of Kentucky

Beautifully Rendered Full-Color Art

Almost all of the figures have been redone in this edition, ranging from a complete redrawing of the figure to simple labeling changes. A realistic three-dimensional perspective has been added to many of the figures for greater clarity and understanding of the concept.

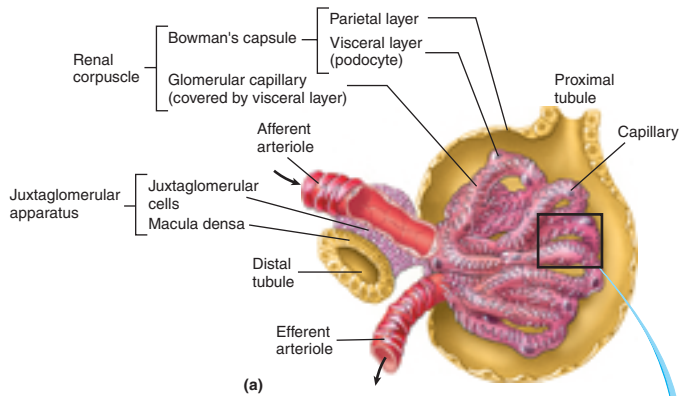


Flow Diagrams

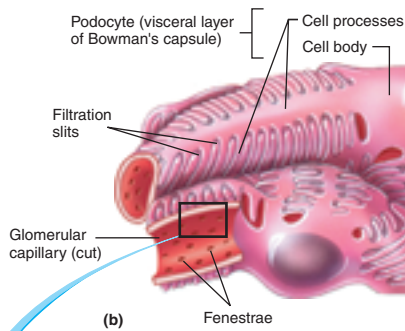
Long a hallmark of this book, extensive use of flow diagrams has been continued in this edition. A bookmark has been included with your book to give a further explanation.

Color-Coded Illustrations

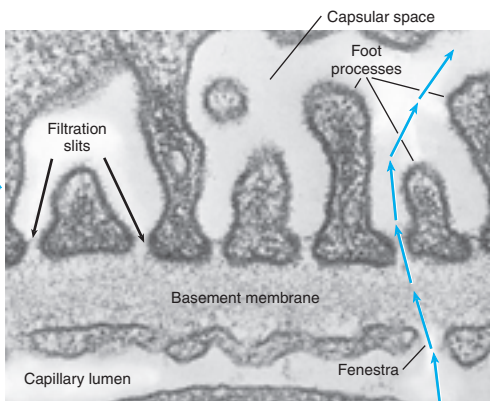
Color-coding is effectively used to promote learning. For example, there are specific colors for the extracellular fluid, the intracellular fluid, muscle, and the lumen of the renal tubules and GI tract.



(a)



(b)



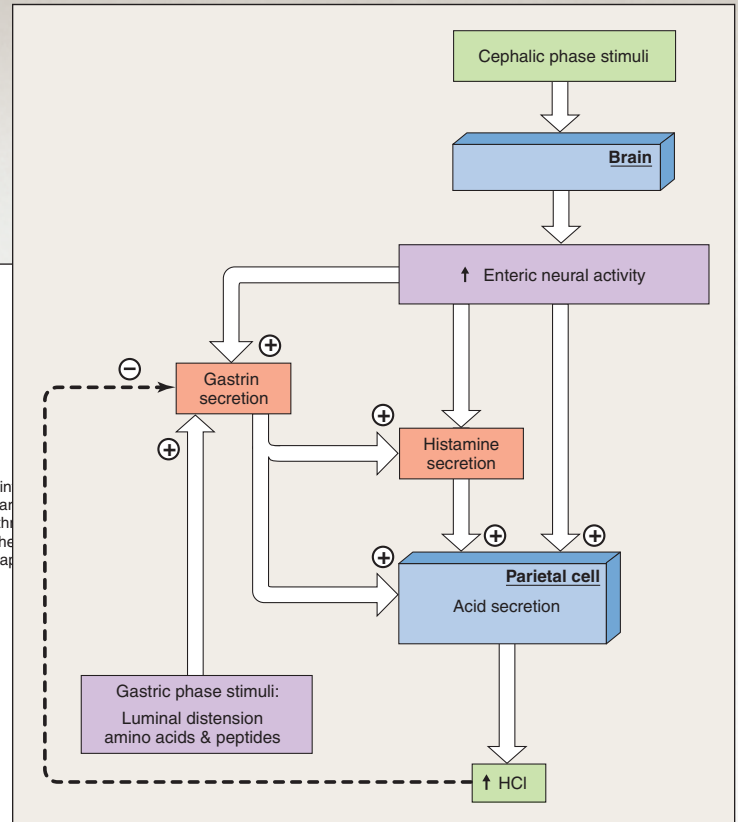
(c)

Movement of filtrate

a. Blood flows in the afferent arteriole to the glomerulus. The Bowman's capsule surrounds the glomerulus.

b. Podocytes of Bowman's capsule surround the capillaries. Filtration slits between the podocytes allow fluid to pass into Bowman's capsule. The glomerulus is composed of capillary endothelium that is fenestrated. Surrounding the endothelial cells is a basement membrane.

c. Substances in the blood are filtered through capillary fenestrae. The filtrate then passes across the basement membrane and through slit pores between the foot processes (also called pedicels) and enters the capsular space. From here, the filtrate is transported to the lumen of the proximal convoluted tubule.



a. Blood flows in the afferent arteriole to the glomerulus. The Bowman's capsule surrounds the glomerulus.

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Clinical Examples

New discussions of clinical applications have been added at the ends of appropriate sections. The authors have drawn from their teaching and clinical experiences to provide students with real-life applications.



ADDITIONAL CLINICAL EXAMPLES

ACROMEGALY AND GIGANTISM

Acromegaly and *gigantism* arise when there exists a situation in which chronic, excess amounts of growth hormone are secreted into the blood. In almost all cases, acromegaly and gigantism are caused by tumors of the anterior pituitary gland that secrete growth hormone at very high rates. These tumors are typically very slow growing, and, if occurring after puberty, it may be decades before a person realizes that there is something seriously wrong with him or her.

If the tumor arises before puberty, when the epiphyseal growth plates are still open, then the individual will develop gigantism ("pituitary giant") and grow to extraordinary heights (Figure 11–28). Some pituitary giants have reached heights over eight feet! If the tumor arises after puberty, when linear growth is no longer possible, the condition is known as acromegaly. Such people will be of

normal height but will manifest many other symptoms that also occur in pituitary giants.

Even when linear growth is no longer possible (after puberty), very high plasma levels of GH result in the thickening of many bones in the body, most noticeably in the hands, feet, and head. The jaw, particularly, enlarges to give the characteristic facial appearance ("*prognathism*") associated with acromegaly. In addition, many internal organs also become enlarged, and this can interfere with their ability to function normally.

All adults continue to make and secrete GH even after growth has stopped. That is because GH has metabolic



(a)



(b)



(c)

FIGURE 11–28

Gigantism and acromegaly in one individual of a pair of identical twins. Note the increased height and facial bone thickening (a), as well as the bone thickening of hands (b) and feet (c).

"Additional clinical examples are excellent. This is definitely an improvement."

Jeffrey Walker
University of Wisconsin



TABLE 6–8 Summary of Functions of the Major Parts of the Brain

I. Forebrain

A. Cerebral hemispheres

1. Contain the cerebral cortex, which participates in perception (Chapter 7), the generation of skilled movements (Chapter 10), reasoning, learning, and memory (Chapter 8)
2. Contain subcortical nuclei, including those that participate in coordination of skeletal muscle activity (Chapter 10)
3. Contain interconnecting fiber pathways

B. Thalamus

1. Is a synaptic relay station for sensory pathways on their way to the cerebral cortex (Chapter 7)
2. Participates in control of skeletal muscle coordination (Chapter 10)
3. Plays a key role in awareness (Chapter 8)

C. Hypothalamus

1. Regulates anterior pituitary gland function (Chapter 11)
2. Regulates water balance (Chapter 14)
3. Participates in regulation of autonomic nervous system (Chapters 6 and 16)
4. Regulates eating and drinking behavior (Chapter 16)
5. Regulates reproductive system (Chapters 11 and 17)
6. Reinforces certain behaviors (Chapter 8)
7. Generates and regulates circadian rhythms (Chapters 1, 7, 11, and 16)
8. Regulates body temperature (Chapter 16)
9. Participates in generation of emotional behavior (Chapter 8)

D. Limbic system

1. Participates in generation of emotions and emotional behavior (Chapter 8)
2. Plays essential role in most kinds of learning (Chapter 8)

II. Cerebellum

- A. Coordinates movements, including those for posture and balance (Chapter 10)
- B. Participates in some forms of learning (Chapter 8)

III. Brainstem

- A. Contains all the fibers passing between the spinal cord, forebrain, and cerebellum
- B. Contains the reticular formation and its various integrating centers, including those for cardiovascular and respiratory activity (Chapters 12 and 13)
- C. Contains nuclei for cranial nerves III through XII

Summary Tables

Some summary tables summarize small or moderate amounts of information, whereas others bring together large amounts of information that may be scattered throughout the book. The tables complement the accompanying figures to provide a rapid means of reviewing the most important material in a chapter.

“ . . . I would rank the text a 10 in valuable educational features that enhance learning.”

Bruce Bennett
Community College of Rhode Island

THOUGHT QUESTIONS

(Answers are given in Appendix A.)

1. In two cases (A and B), the concentrations of solute X in two 1-L compartments separated by a membrane through which X can diffuse are

Case	CONCENTRATION OF X, mM	
	Compartment 1	Compartment 2
A	3	5
B	32	30

- a. In what direction will the net flux of X take place in case A and in case B?
- b. When diffusion equilibrium is reached, what will be the concentration of solute in each compartment in case A and in case B?
- c. Will A reach diffusion equilibrium faster, slower, or at the same rate as B?

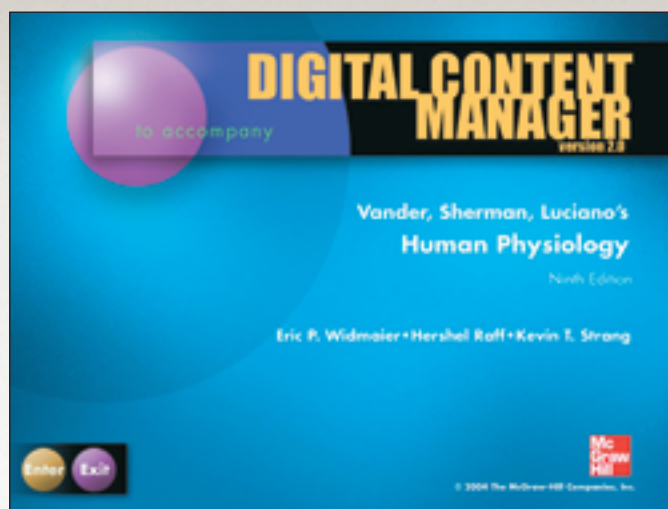
Thought Questions

At the end of each chapter are Thought Questions that challenge you to go beyond the memorization of facts to solve problems and encourage you to stop and think more deeply about the meaning or broader significance of what you have just read.

Supplements Tour

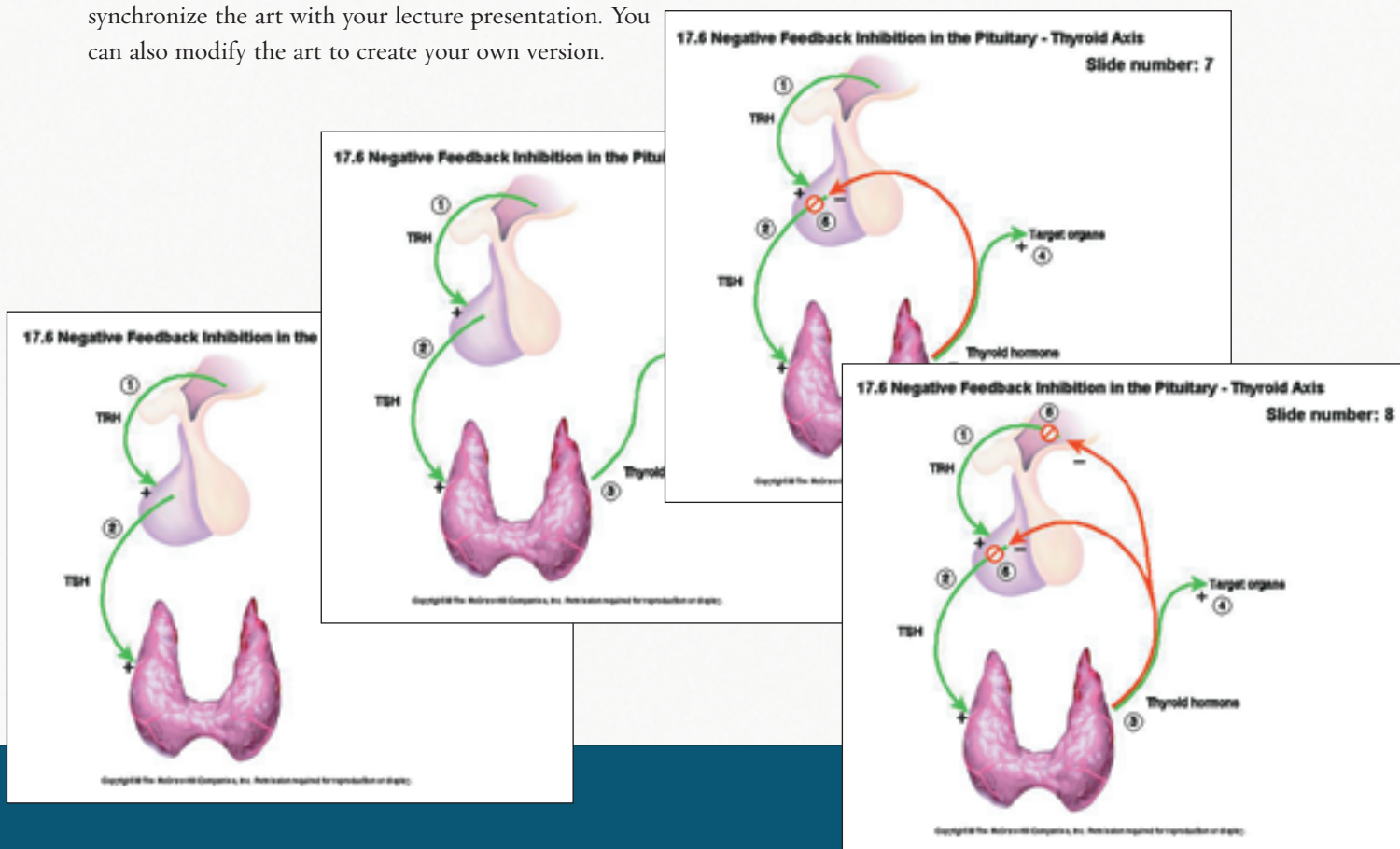
Digital Content Manager CD-ROM

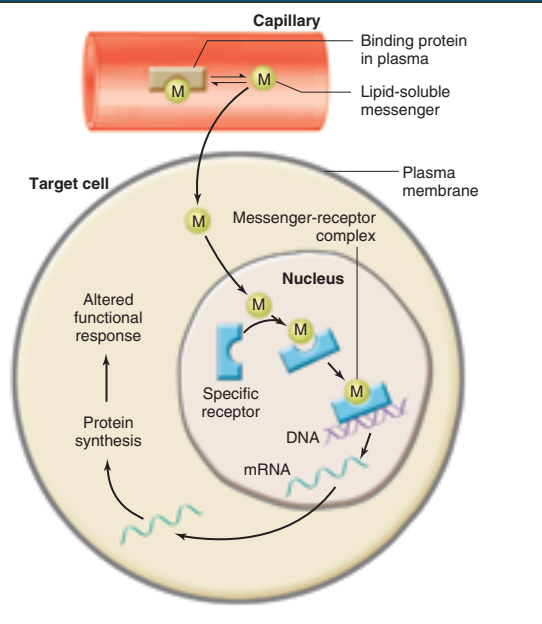
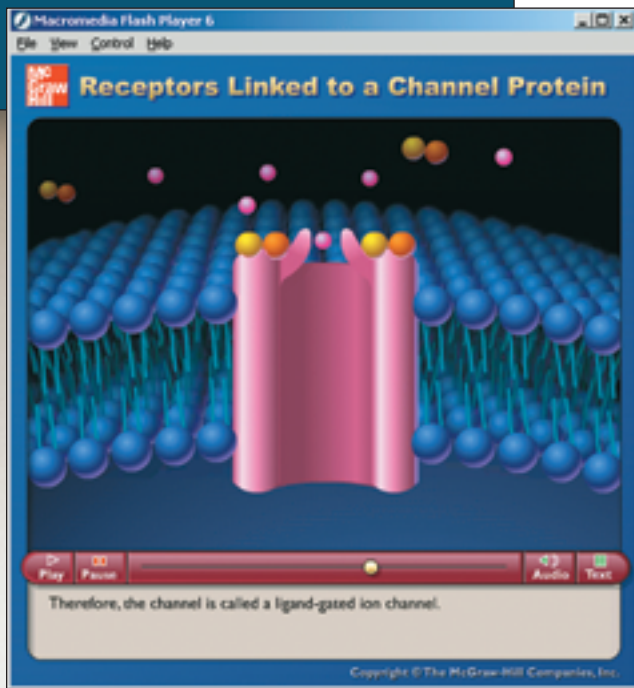
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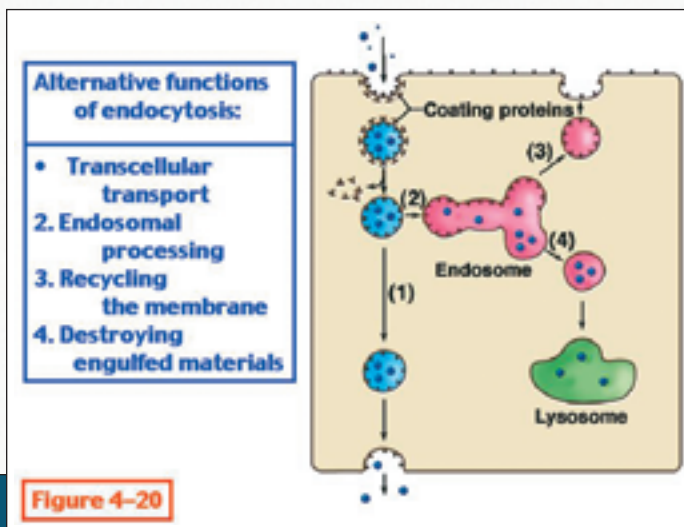


Figure 4-20

Leukocyte Behavior in Inflammation

TABLE 6-12		Locations of Receptors for Acetylcholine, Norepinephrine, and Epinephrine
I. Receptors for acetylcholine		
a. Nicotinic receptors		
On postganglionic neurons in the autonomic ganglia		
At neuromuscular junctions of skeletal muscle		
On some central nervous system neurons		
b. Muscarinic receptors		
On smooth muscle		
On cardiac muscle		
On gland cells		
On some central nervous system neurons		

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