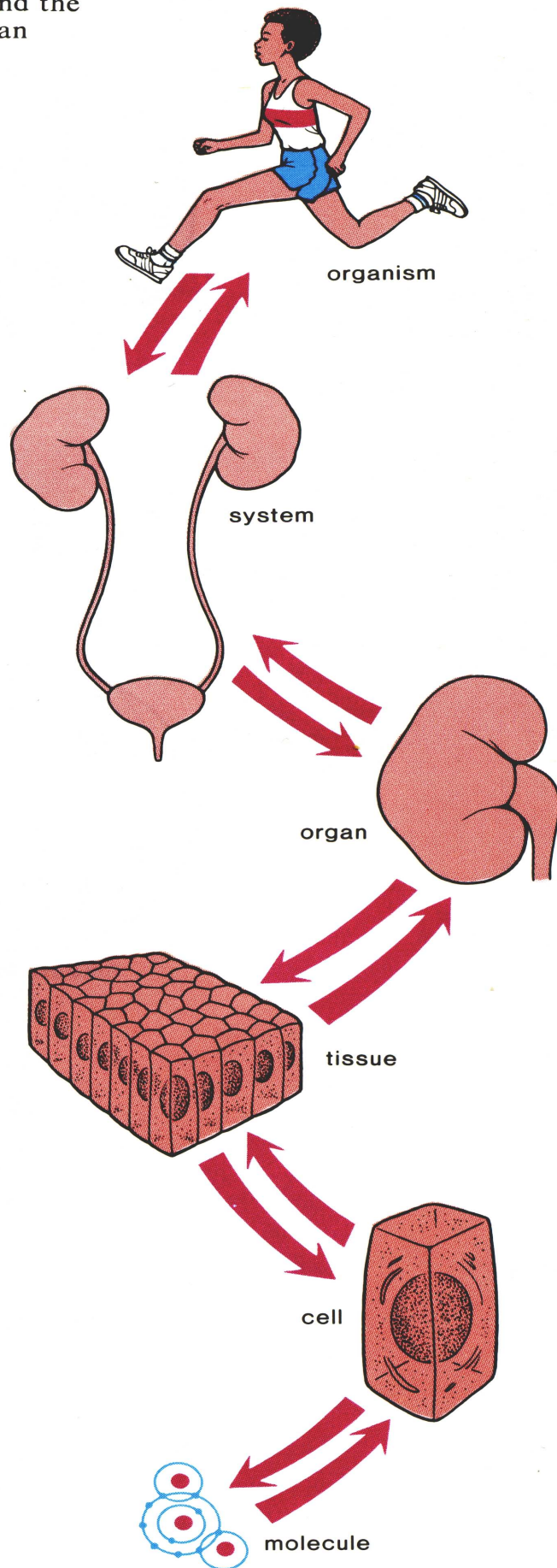
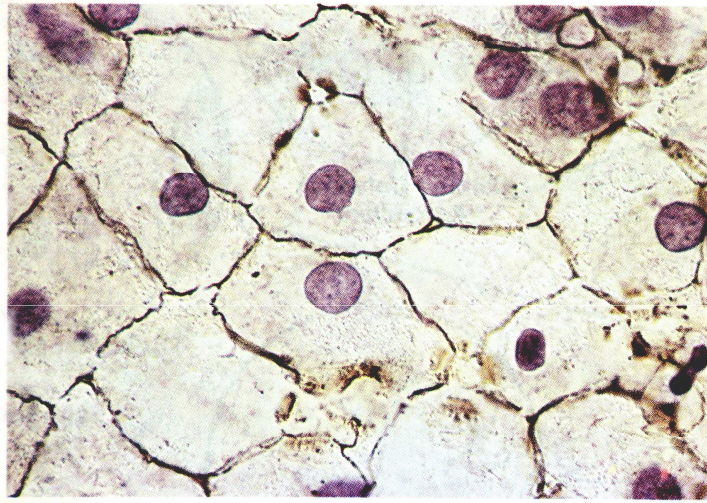


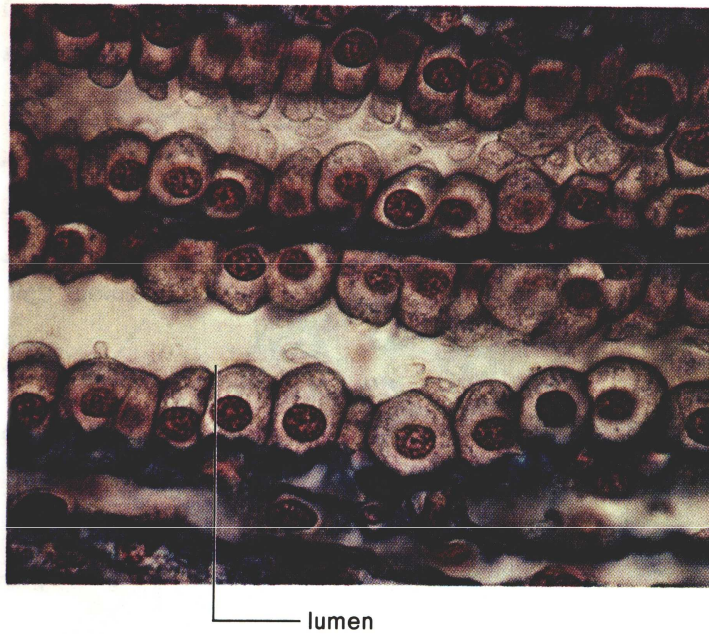
**FIGURE 3.2** Levels of organization in the human body. Cells are composed of chemicals; tissues are made up of cells; organs are composed of tissues, and the organism contains organ systems.



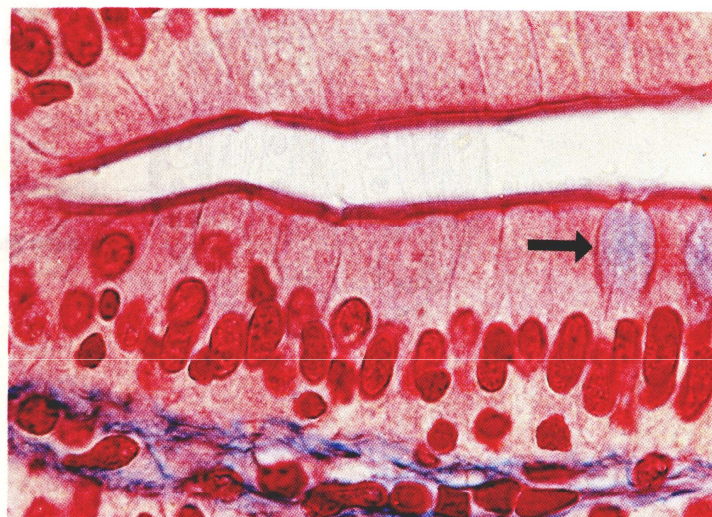
**FIGURE 3.4** Simple epithelial tissue. *a.* Simple squamous consists of a single layer of thin cells. *b.* Simple cuboidal is composed of cells that look like cubes. *c.* Simple columnar cells resemble columns because they are elongated. (The arrow points to a goblet cell.)



**a.**



**b.**



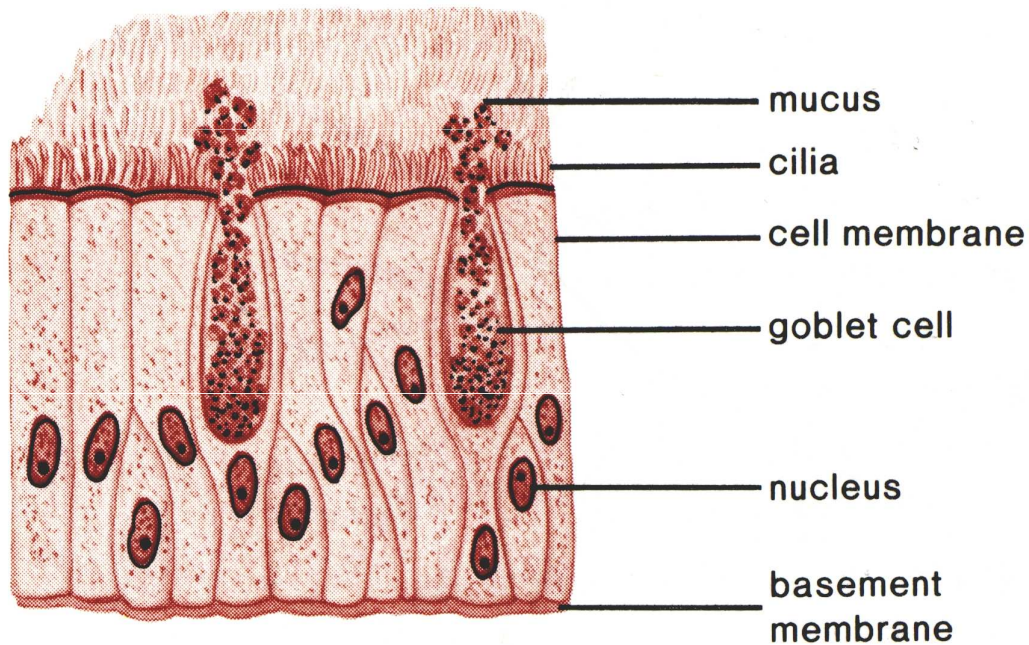
**c.**

## Epitelové tkáně

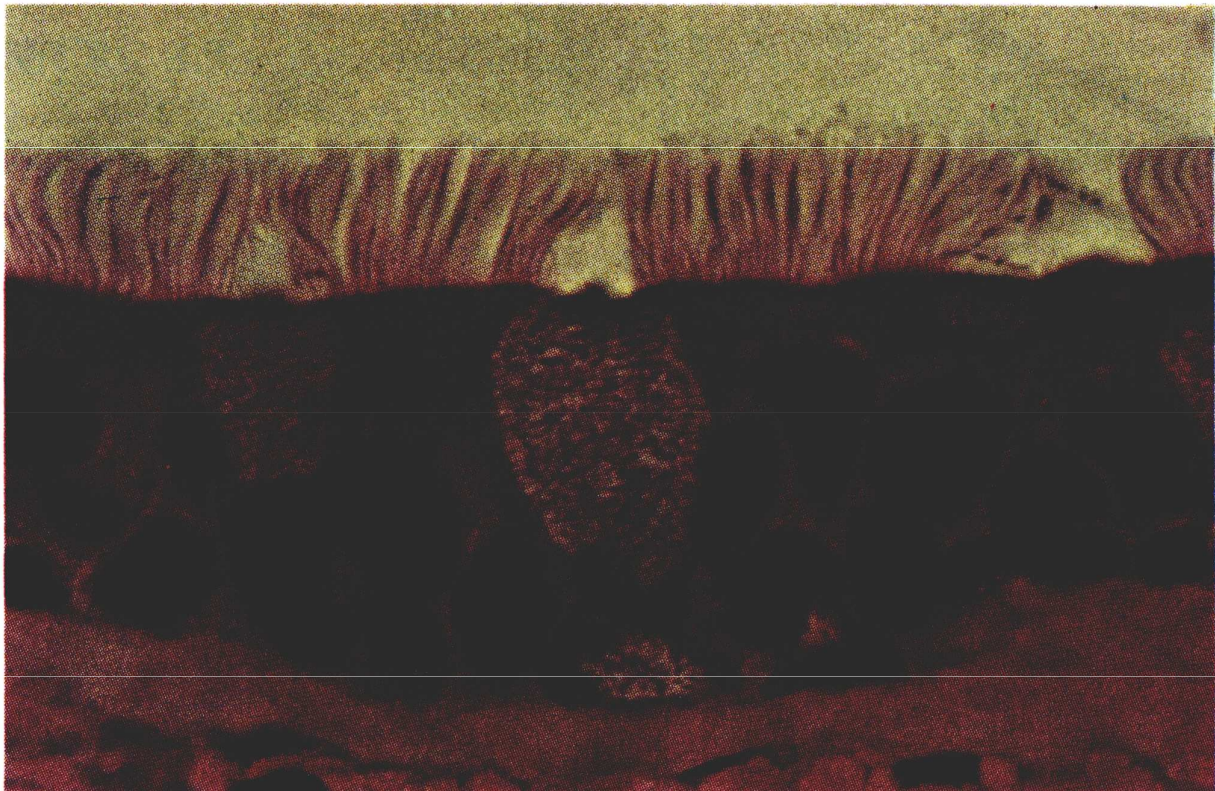
<b>Druh</b>	<b>Funkce</b>	<b>Lokalizace</b>
<b>Jednovrstevný plošný</b>	<b>filtrace, difuze, osmóza</b>	<b>ústní dutina, stěny kapilár, výstelka krevních vlásečnic</b>
<b>Jednovrstevný krychlový</b>	<b>sekrece, absorbce</b>	<b>povrch vaječníků, výstelka ledvinových kanálků</b>
<b>Jednovrstevný válcový</b>	<b>ochrana, sekrece, absorbce</b>	<b>výstelka dělohy, trubice zažívacího traktu</b>
<b>Pseudostratifikovaný válcový</b>	<b>ochrana, sekrece, posun hlenů a pohlavních buněk</b>	<b>výstelka dýchacích cest, různé trubice reprodukčního systému</b>
<b>Vícevrstevný plošný</b>	<b>ochrana</b>	<b>vnější vrstva kůže, pochva a konečník</b>



**FIGURE 3.6** *a.* Pseudostratified ciliated columnar epithelium from the lining of the windpipe. When you cough, material trapped in the mucus secreted by goblet cells is moved upward to the throat, where it can be swallowed. *b.* Photomicrograph of pseudostratified ciliated columnar epithelium.



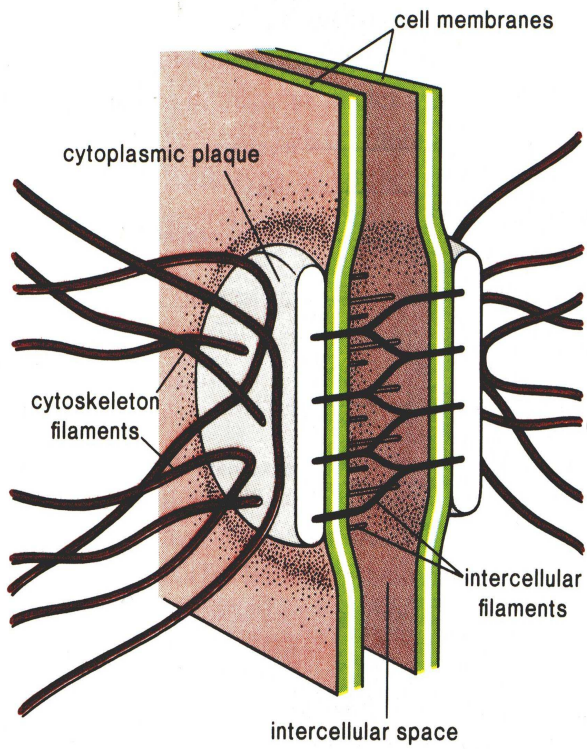
**a.**



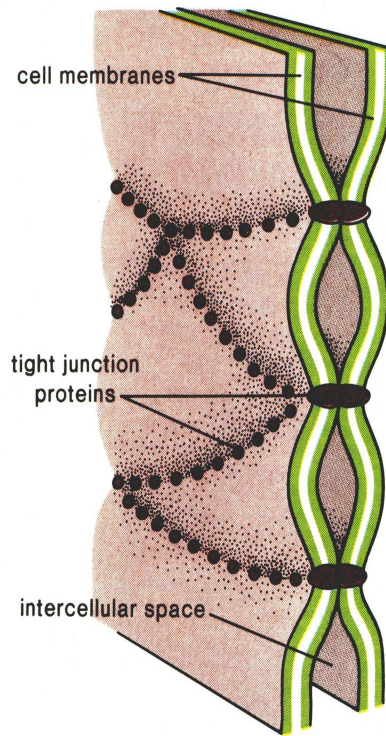
**b.**



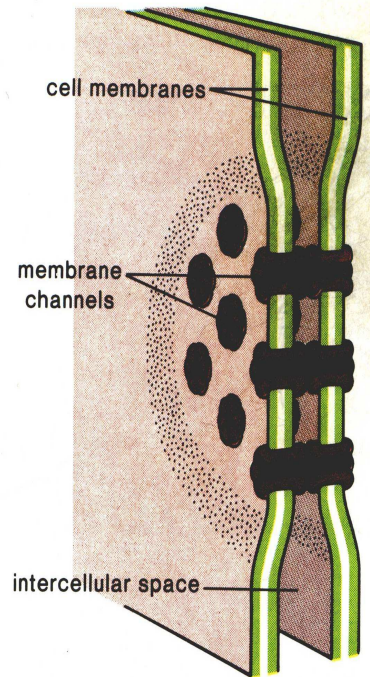
**FIGURE 3.7** Epithelial cells are held tightly together by (a) desmosomes and (b) tight junctions. c. Gap junctions allow materials to pass from cell to cell.



a. spot desmosome



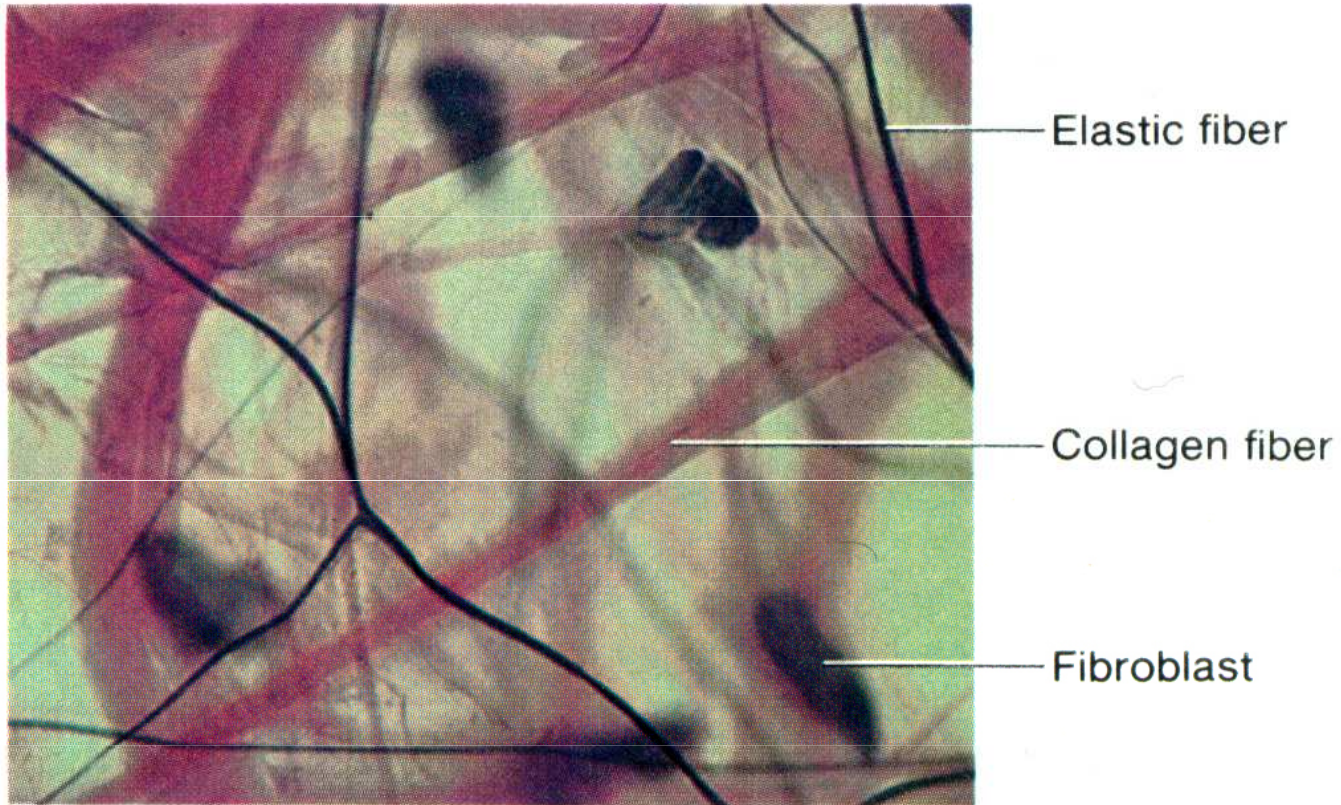
b. tight junction



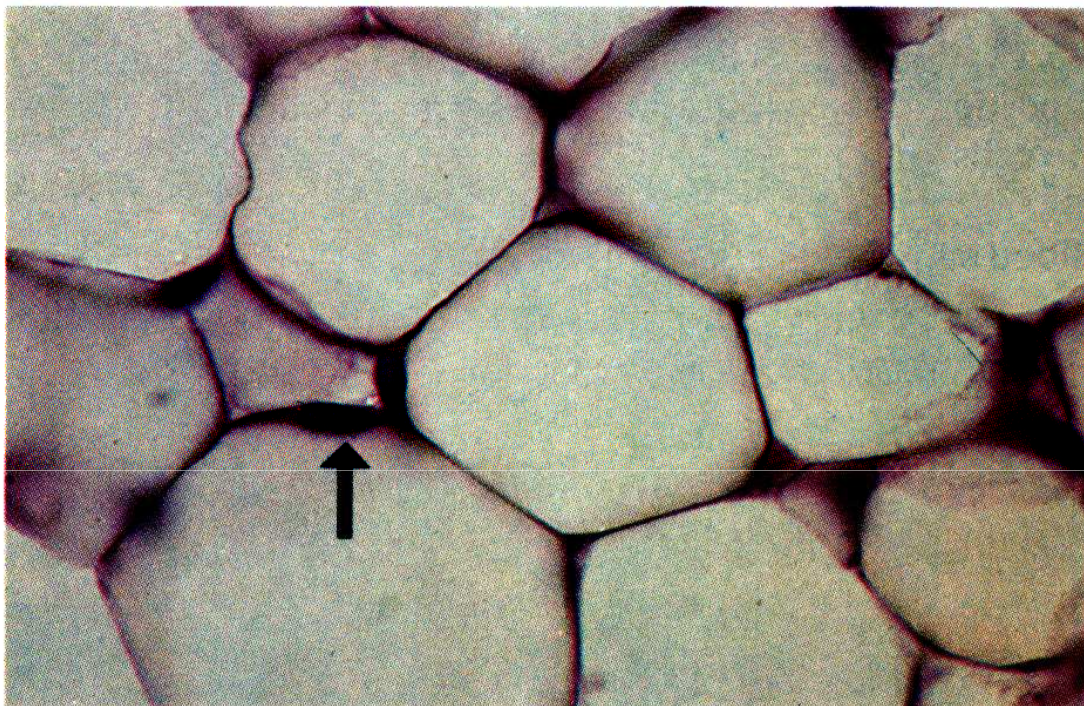
c. gap junction



**FIGURE 3.8** Loose connective tissue has plenty of space between components. This type of tissue is found surrounding and between the organs.



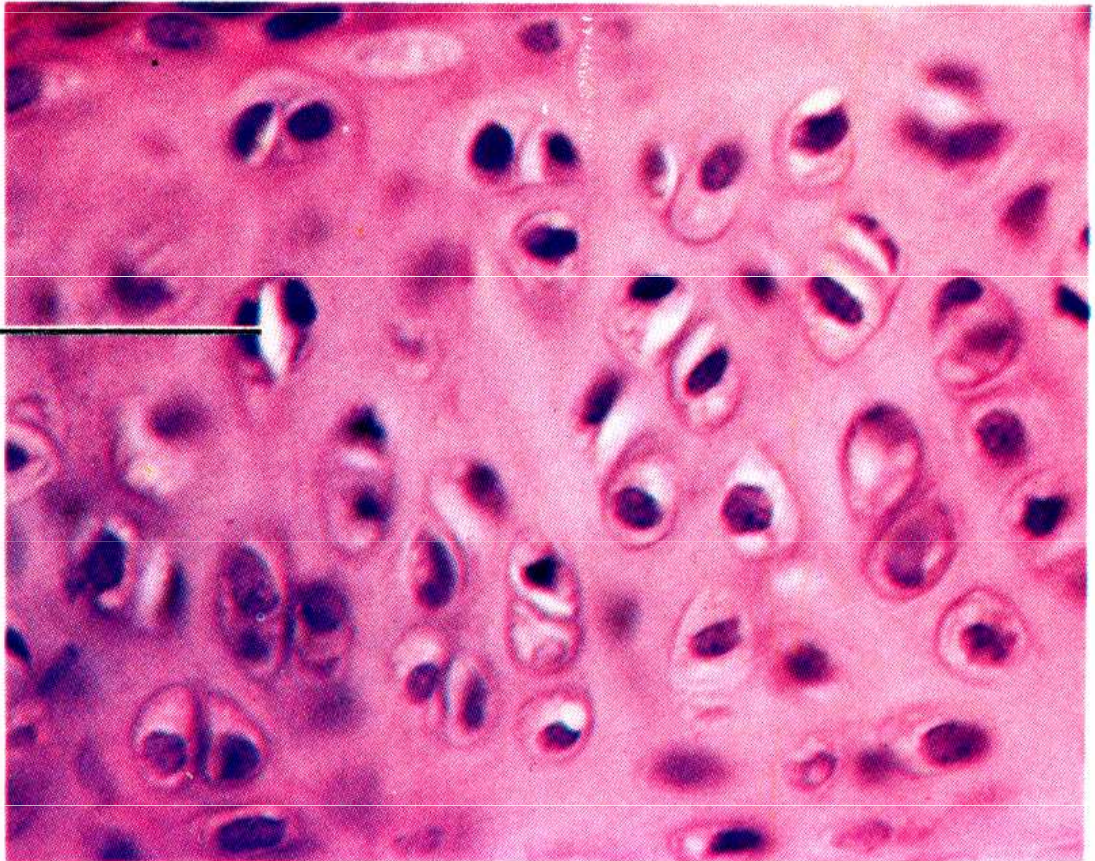
**FIGURE 3.9** Adipose tissue cells look like white “ghosts” because they are filled with fat. The nucleus of one cell is indicated by the arrow.





**FIGURE 3.10** Hyaline cartilage cells, located in lacunae, are separated by a flexible matrix rich in protein and fibers. This type of cartilage forms the embryonic skeleton, later replaced by bone.

cells  
within lacuna

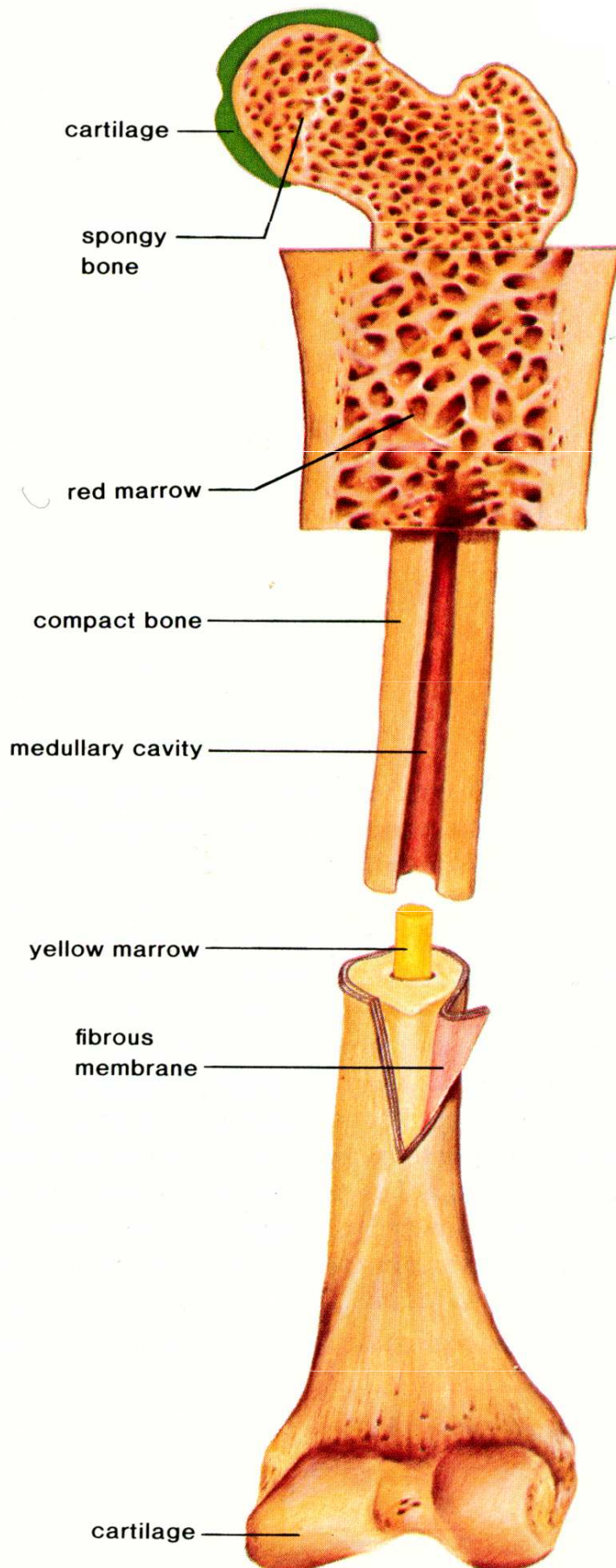


Pojivové tkáně

<b>Druh</b>	<b>Funkce</b>	<b>Lokalizace</b>
<b>Vazivová tkáň</b>	<b>spojuje dohromady orgány</b>	<b>pod kůží, pod většinou epitelových vrstev</b>
<b>Tuková tkáň</b>	<b>izolace, ukládání tuku</b>	<b>pod kůží, okolo ledvin</b>
<b>Vláknité pojivo</b>	<b>spojuje dohromady orgány</b>	<b>šlachy a vazy</b>
<b>Hyalinní chrupavka</b>	<b>ochrana a opora</b>	<b>konce kostí, chrupavka nosu, chrupavky ve stěně průdušnice</b>
<b>Elastická chrupavka</b>	<b>ochrana a opora</b>	<b>vnější ucho, část hrtanu</b>
<b>Vazivová chrupavka</b>	<b>ochrana a opora</b>	<b>meziobratlové ploténky, kolenní kloub</b>
<b>Kostní tkáň</b>	<b>ochrana a opora</b>	<b>celá kostra</b>

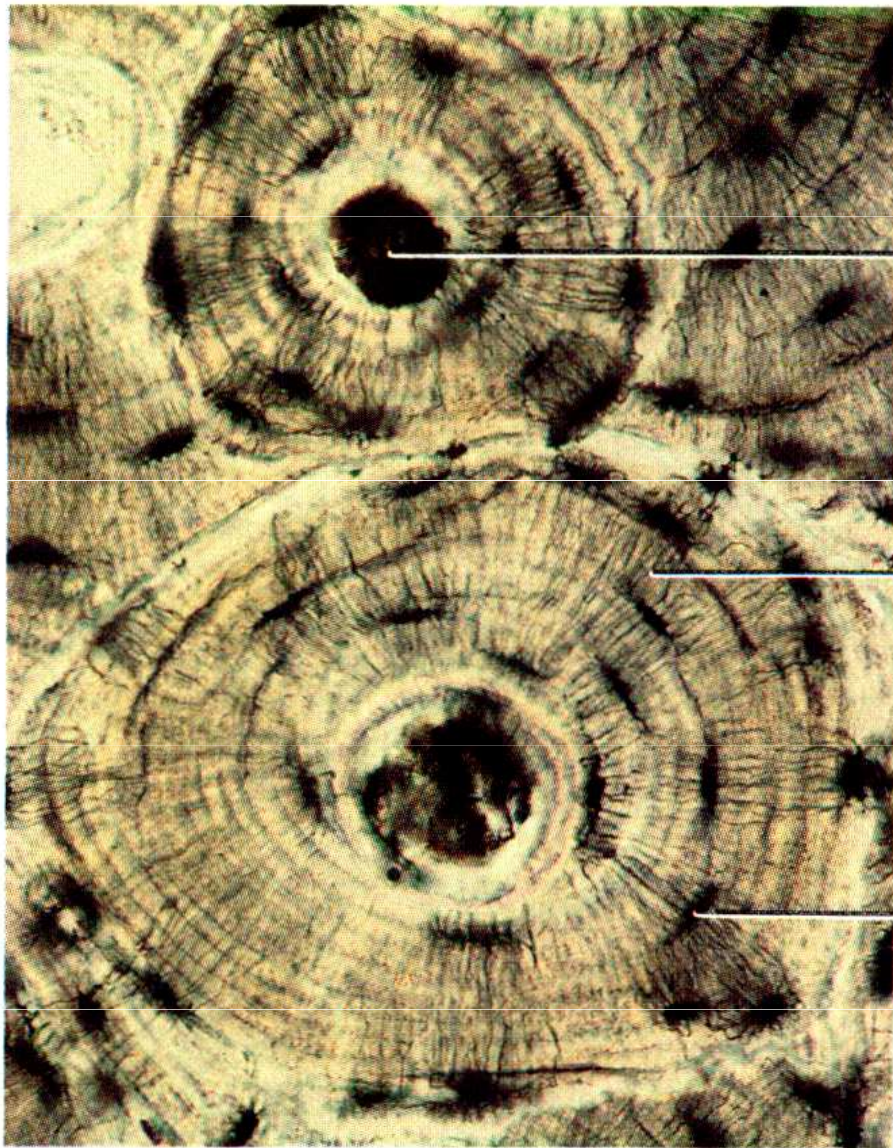


**FIGURE 11.8** Anatomy of a long bone. A long bone is encased by fibrous membrane except where it is covered by articular cartilage at the ends. The central shaft is composed of compact bone, but the ends are spongy bone, which can contain red marrow. A central medullary cavity contains yellow marrow.





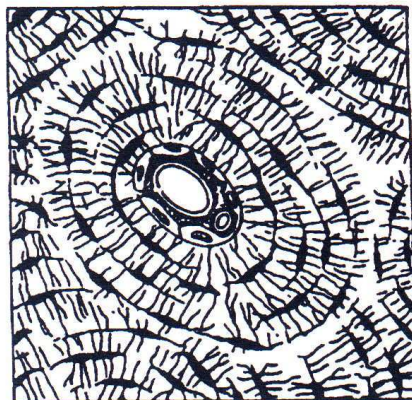
**FIGURE 3.11** Compact bone is highly organized. The cells are arranged in circles about a central (Haversian) canal that contains a nutrient-bearing blood vessel.



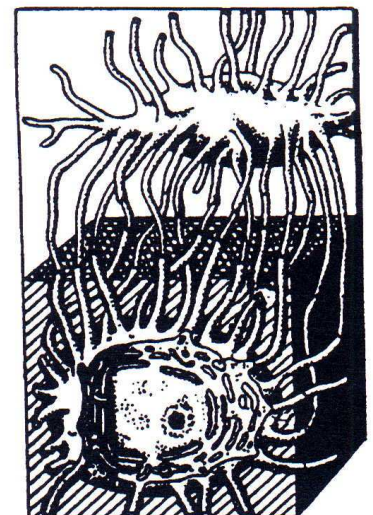
Haversian canal

canaliculi

osteocyte  
within a lacuna



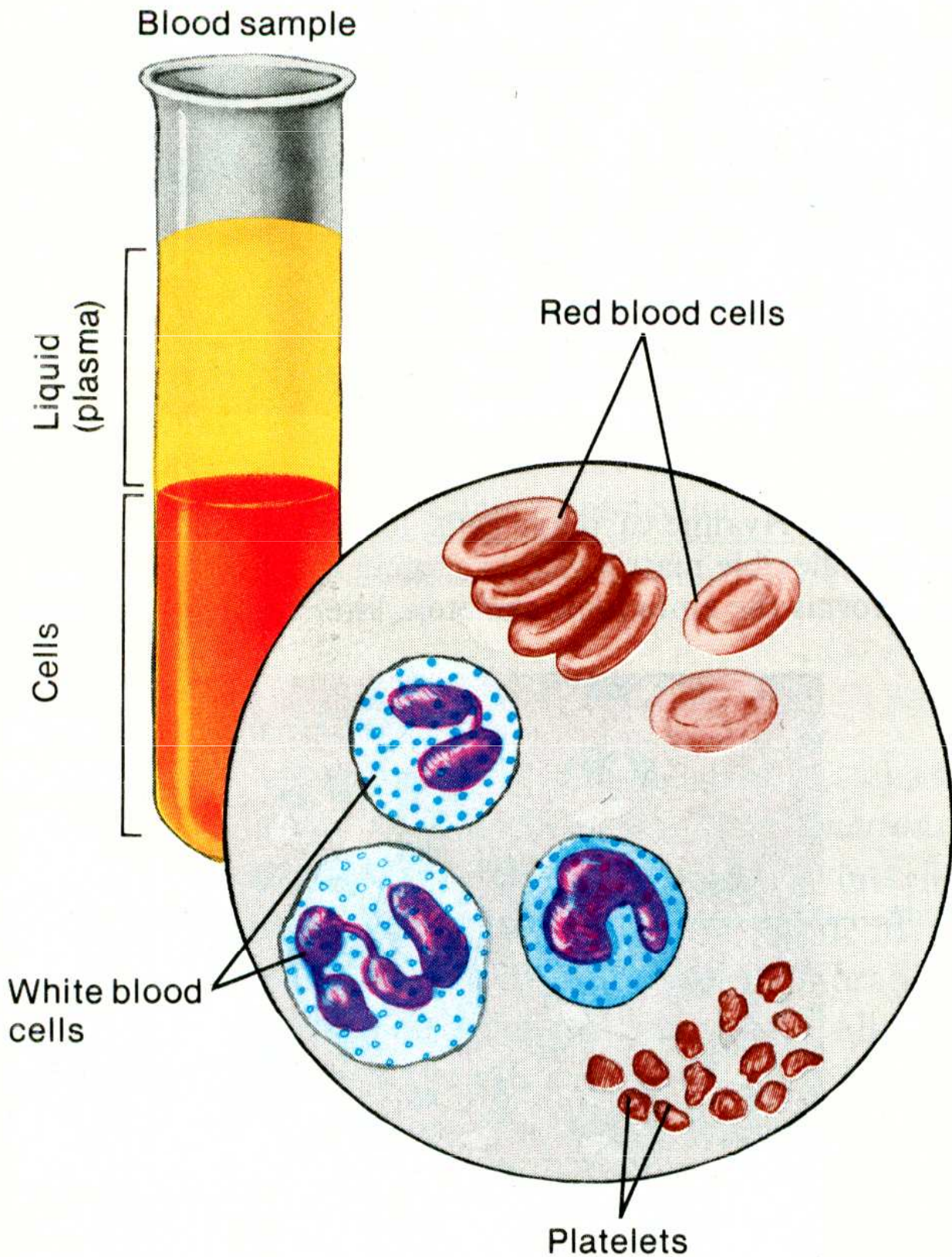
A



B



**FIGURE 3.12** Blood is classified as connective tissue. Plasma, the liquid portion of blood, contains the formed elements (red cells, white cells, and platelets).

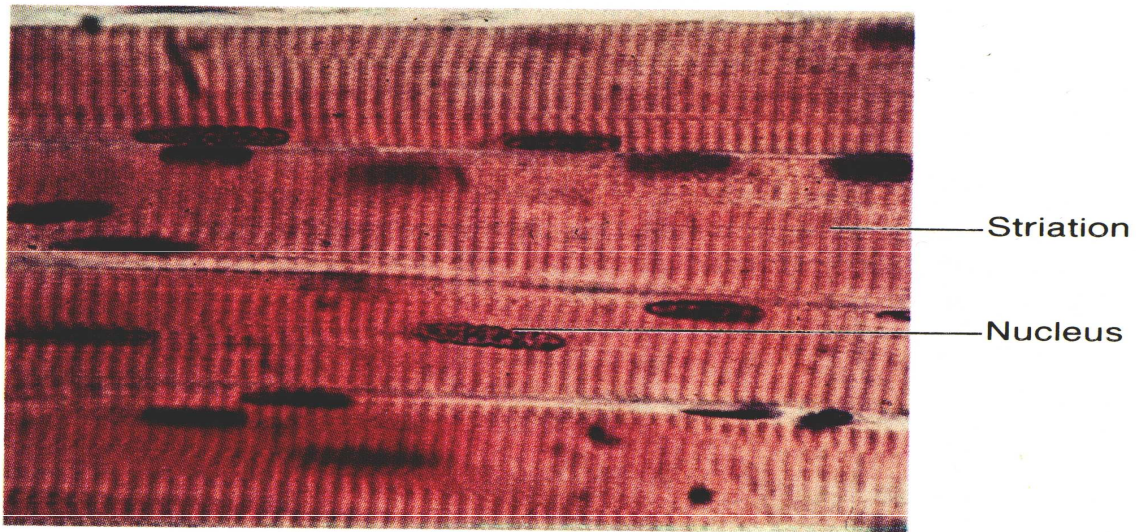


## Složení krevní plasmy

<b>voda</b>	<b>92% plasmy</b>
<b>Anorganické ionty (soli)</b>	<b>Na<sup>+</sup>, Ca<sup>++</sup>, K<sup>+</sup>, Mg<sup>++</sup>, Cl<sup>-</sup>, HCO<sub>3</sub><sup>-</sup>, HPO<sub>4</sub><sup>-</sup>, SO<sub>4</sub><sup>-</sup>,</b>
<b>Plyny</b>	<b>O<sub>2</sub>, CO<sub>2</sub></b>
<b>Plasmatické bílkoviny</b>	<b>albumin, globulin, fibrinogen</b>
<b>Organické živiny</b>	<b>glukóza, tuky, fosfolipidy, aminokyseliny atd.</b>
<b>Dusíkaté odpadní látky</b>	<b>močovina, amoniak, kyselina močová</b>
<b>Regulační látky</b>	<b>hormony, enzymy</b>



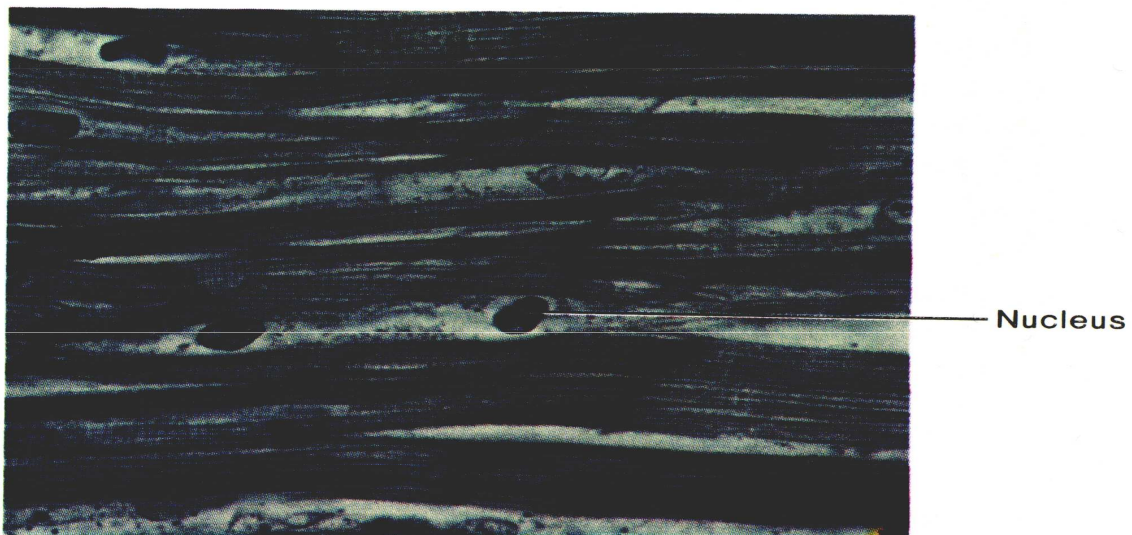
**FIGURE 3.13** How do you distinguish a plant from an animal? One way is to detect motion—only animals have contractile fibers that permit movement. *a.* Skeletal muscle is found within the muscles attached to the skeleton. *b.* Smooth muscle cells are found in the walls of internal organs. *c.* Cardiac muscle permits the pumping of the heart.



**a.**

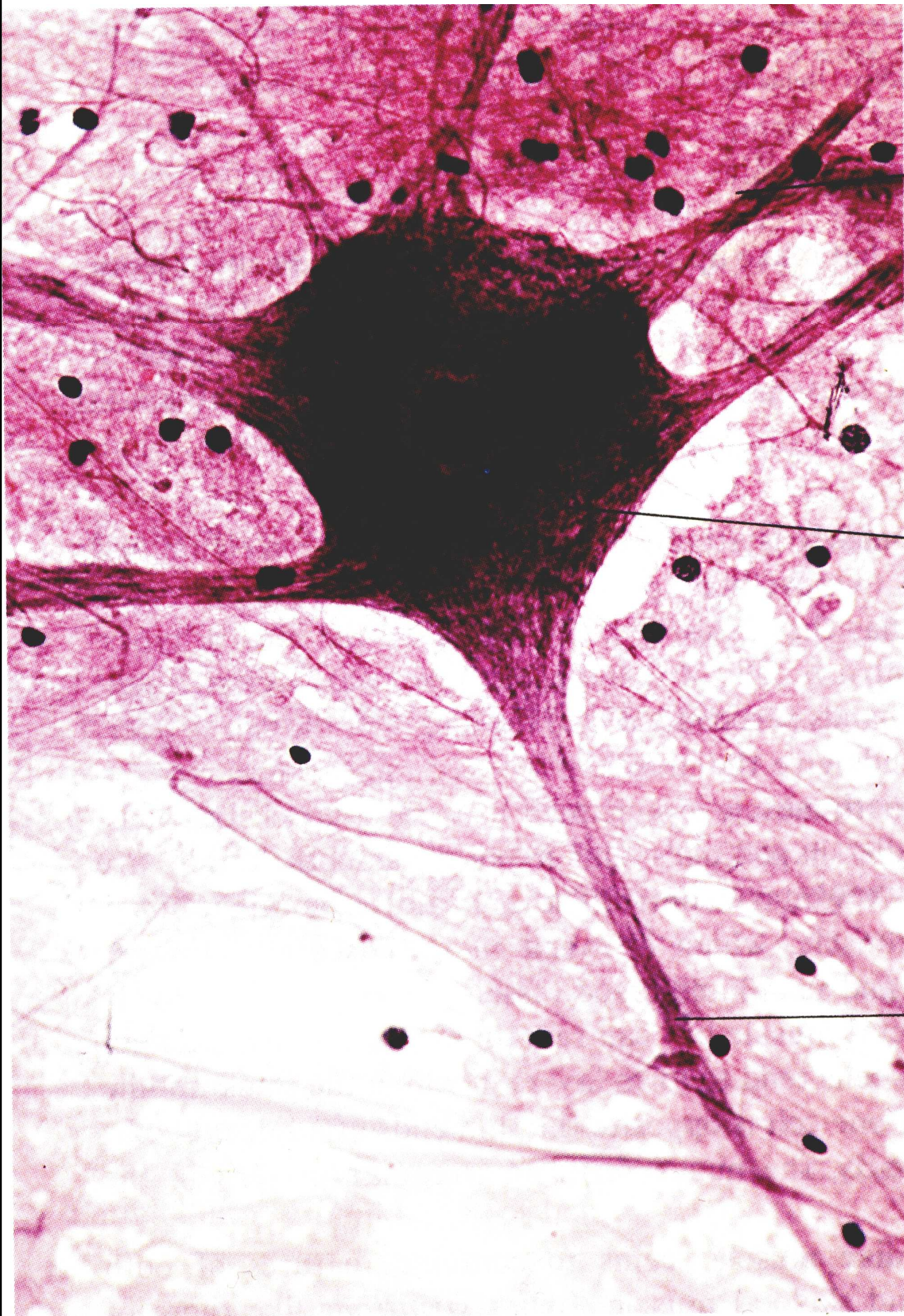


**b.**



**c.**



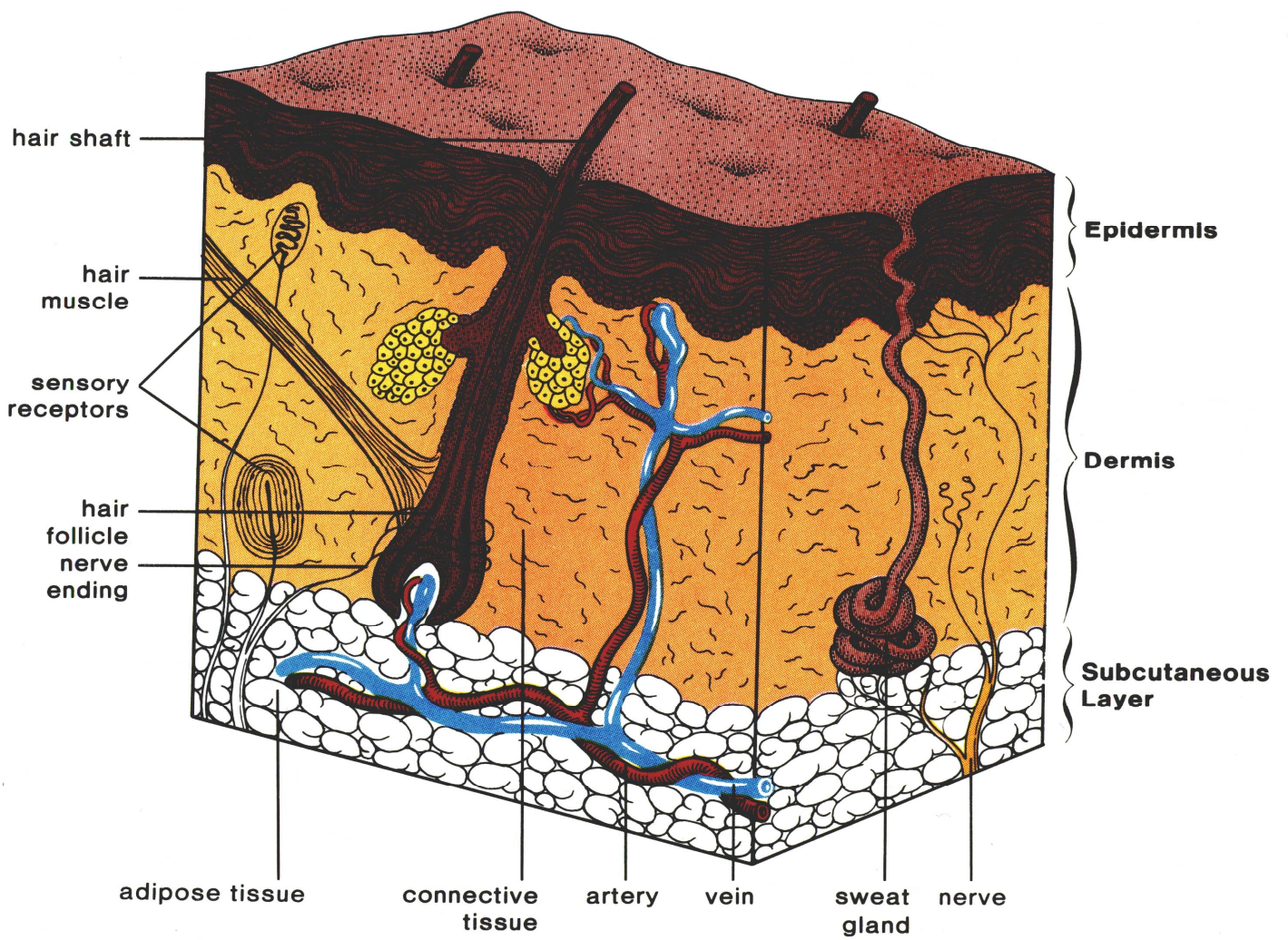


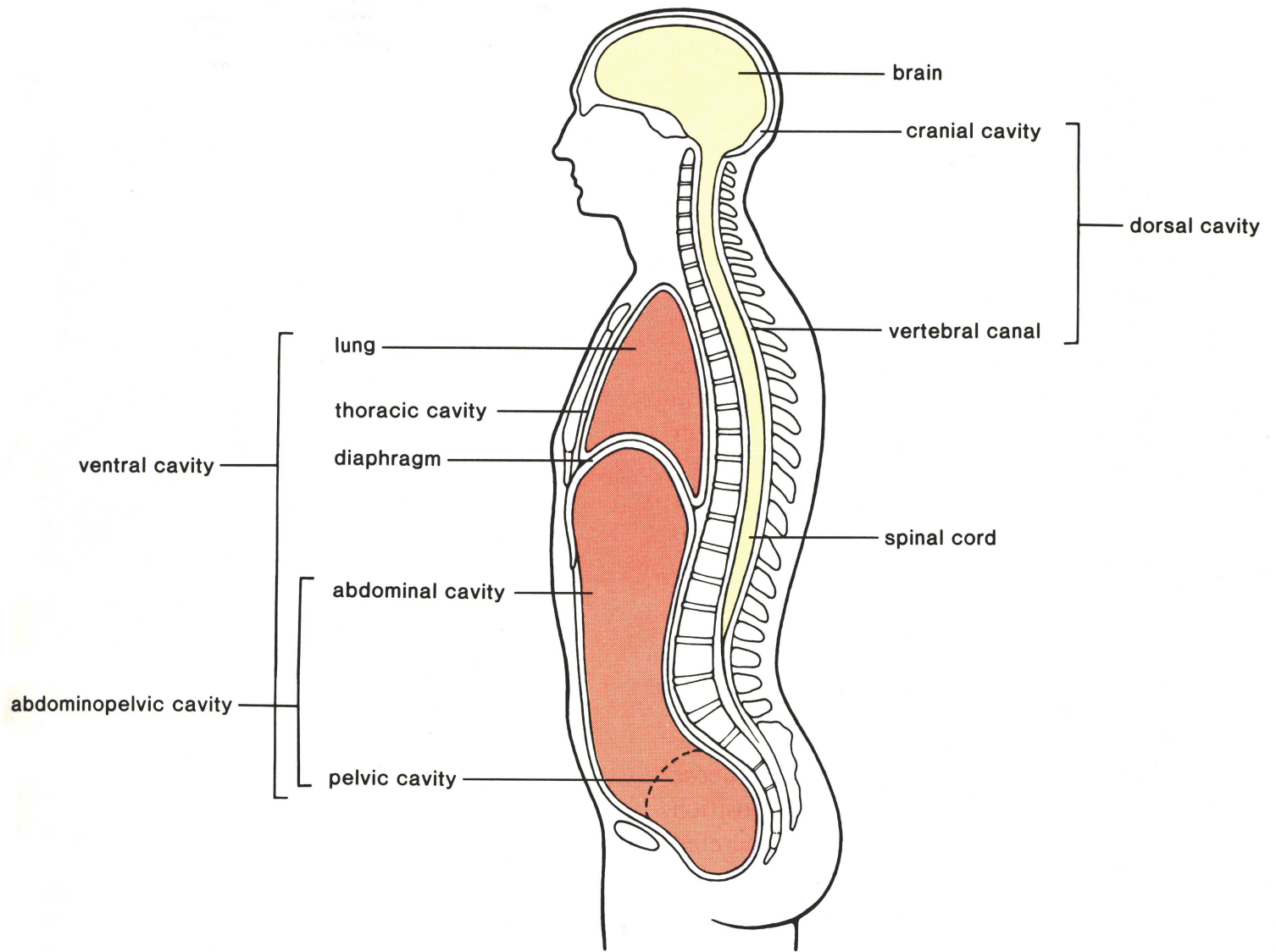
dendrite

cell body

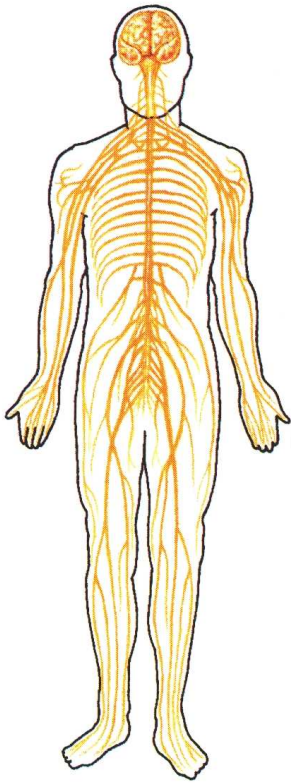
axon



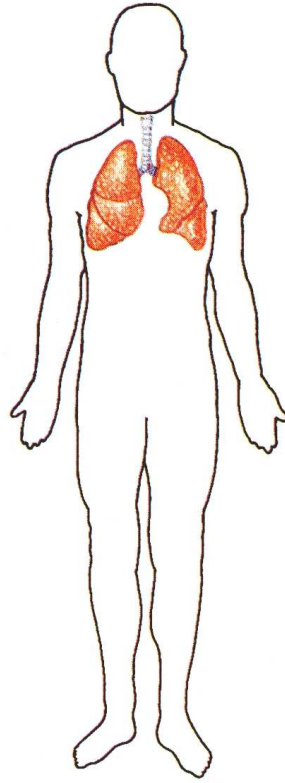




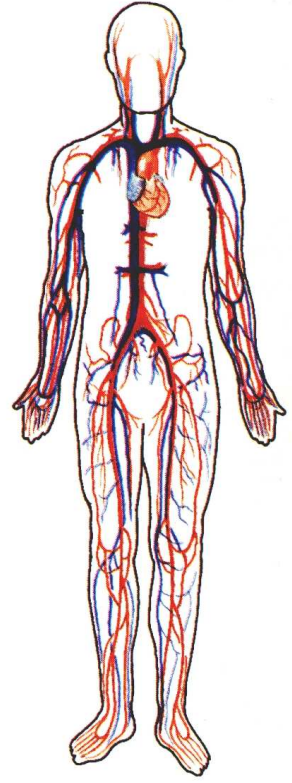




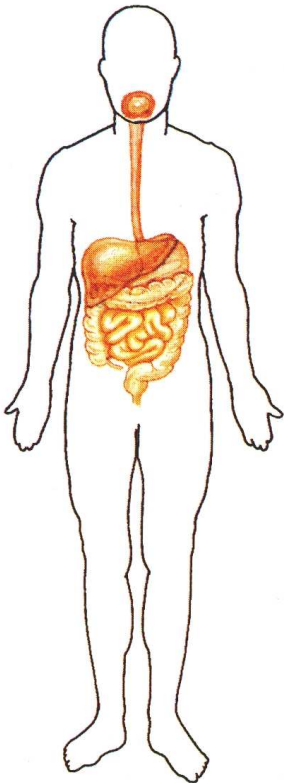
**Nervous system** Function: regulation of all body activities: learning and memory



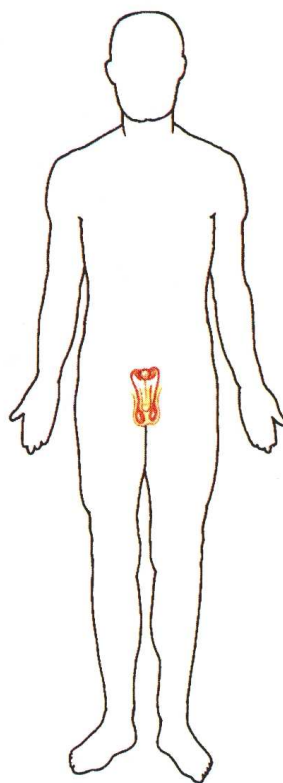
**Respiratory system** Function: gaseous exchange between external environment and blood



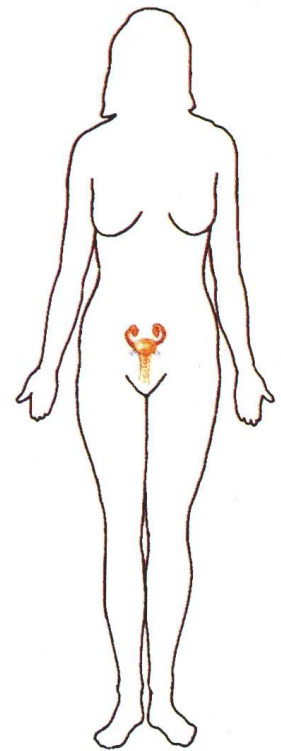
**Circulatory system** Function: transport of life-sustaining materials to body cells; removal of metabolic wastes from cells



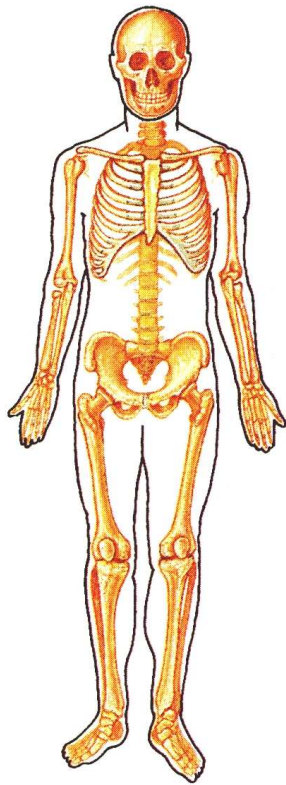
**Digestive system** Function: breakdown and absorption of food materials



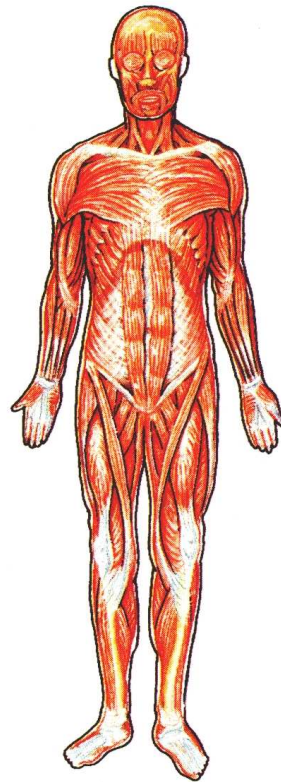
**Male reproductive system** Function: production of male sex cells (sperm); transfer of sperm to reproductive system of female



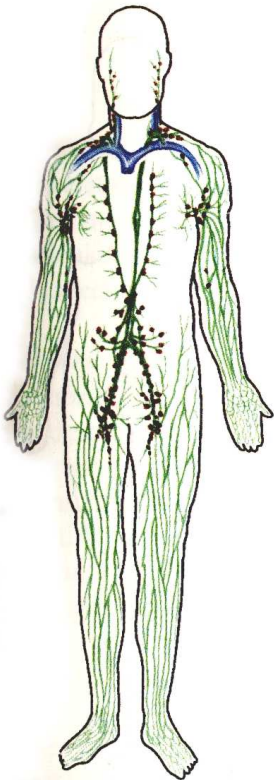
**Female reproductive system** Function: production of female sex cells (ova); receptacle of sperm from male; site for fertilization of ovum, implantation, and development of embryo and fetus; delivery of fetus



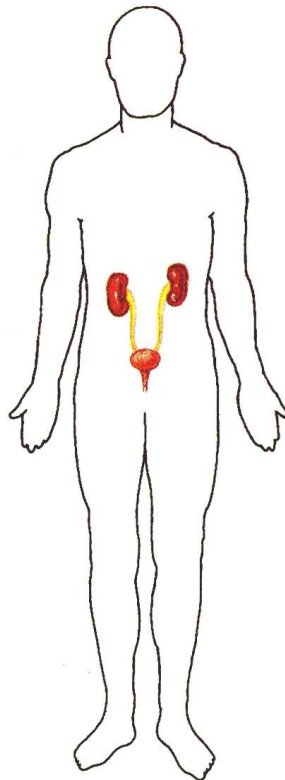
**Skeletal system** Function: internal support and flexible framework for body movement; production of blood cells



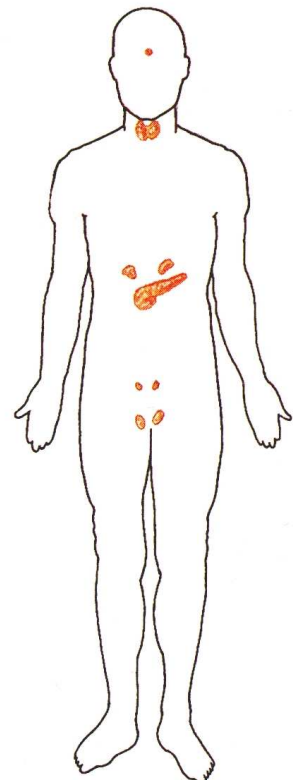
**Muscular system** Function: body movement; production of body heat



**Lymphatic system** Function: body immunity; absorption of fats; drainage of tissue fluid



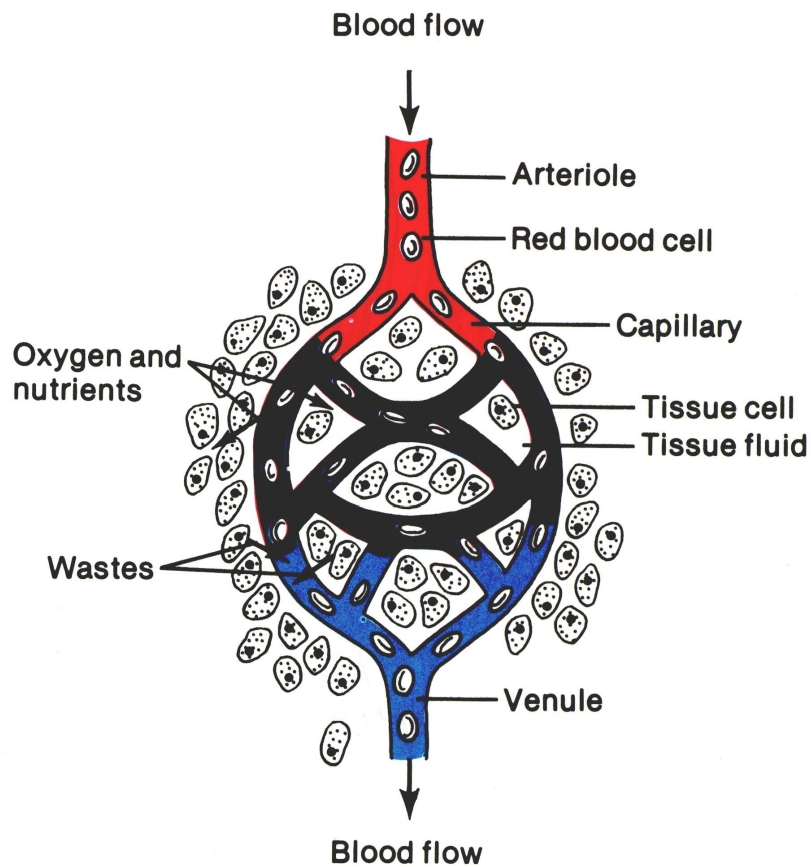
**Urinary system** Function: filtration of blood; maintenance of volume and chemical composition of the blood



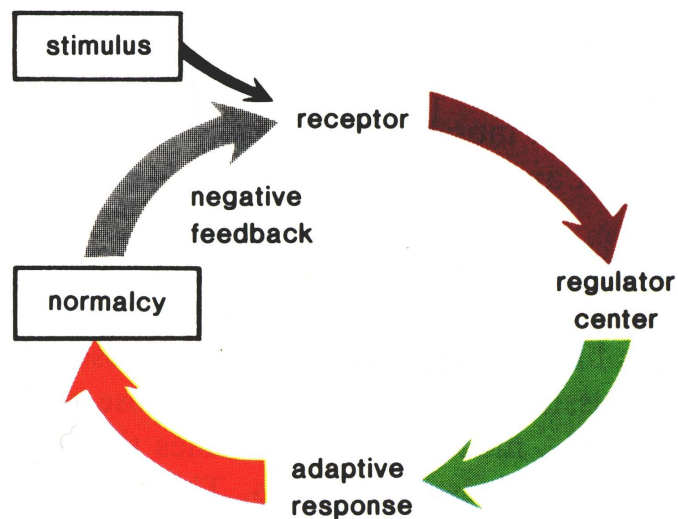
**Endocrine system** Function: secretion of hormones for chemical regulation

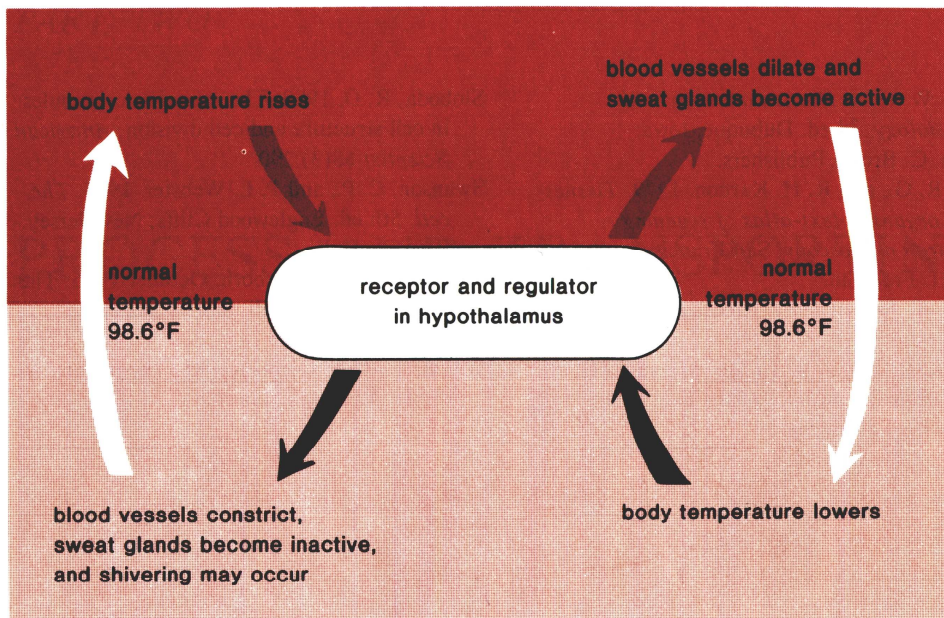


**FIGURE 3.18** The internal environment of the body is the blood and tissue fluid. Tissue cells are surrounded by tissue fluid, which is continually refreshed because nutrient molecules constantly exit from and waste molecules continually enter the bloodstream as shown.



**FIGURE 3.19** Diagram illustrating the principle of feedback control. A receptor (sense organ) responds to a stimulus, such as high or low temperature, and notifies a regulator center that directs an adaptive response, such as sweating. Once normalcy, such as a normal temperature, is achieved, the receptor is no longer stimulated.





**FIGURE 3.20** Temperature control. When the body temperature rises, the blood vessels dilate and the sweat glands become active. When the body temperature lowers, the blood vessels constrict and shivering may occur. In between these extremes the receptor is not stimulated and thus body temperature fluctuates above and below normal.