

Chapter 5

The Body as a Whole

Learning Objectives

1. Recognize the relationship of cells, tissues, and organs, and list the major body systems.
2. List four types of tissue and recognize terms for their abnormal development.
3. Recognize the directional terms and **planes of the body**, match them with their descriptions, and write their combining forms.
4. Identify the **body cavities**, the body regions, and the four abdominal quadrants.
5. Recognize the terms for diagnostic procedures and disorders presented in Chapter 5.

Learning Objectives, cont.

6. Recognize the meanings of Chapter 5 word parts and use them to build and analyze medical terms.
7. Write **terms pertaining to body fluids and blood** and their disorders, as well as associated terms.
8. Write terms about body defenses, immunity, and bioterrorism when given their definitions or match them with their meanings.
9. Spell medical terms correctly.

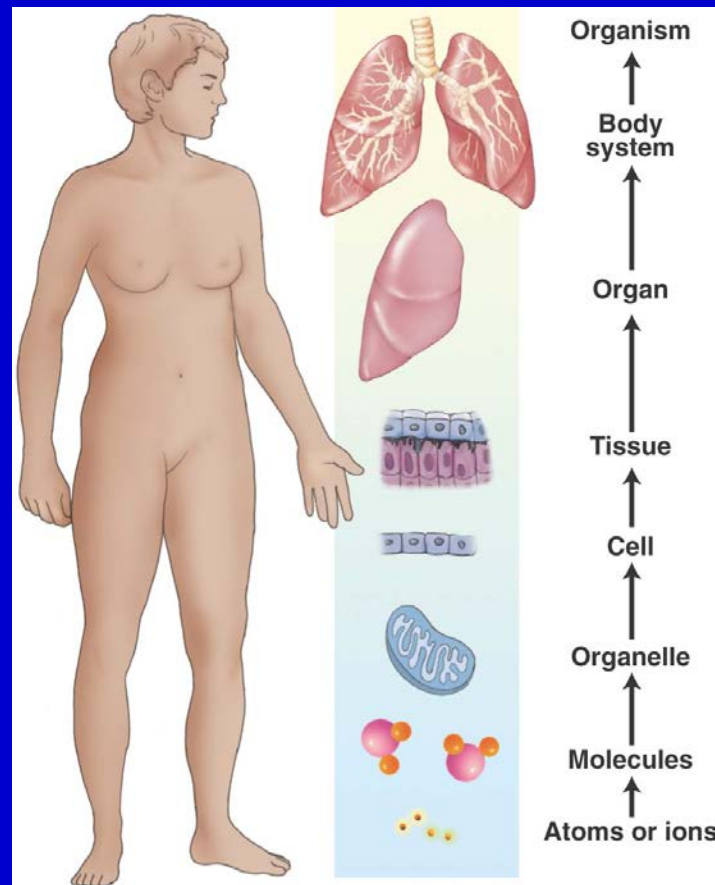


Fig. 5-1 Organization scheme of the body. All of its parts, from tiny atoms to visible structures, work together to make a functioning whole.

The cell is the fundamental unit of life.

Body Systems

- muscular
- skeletal
- cardiovascular
- lymphatic
- respiratory
- digestive

Body Systems, cont.

- urinary
- reproductive
- integumentary
- nervous
- endocrine

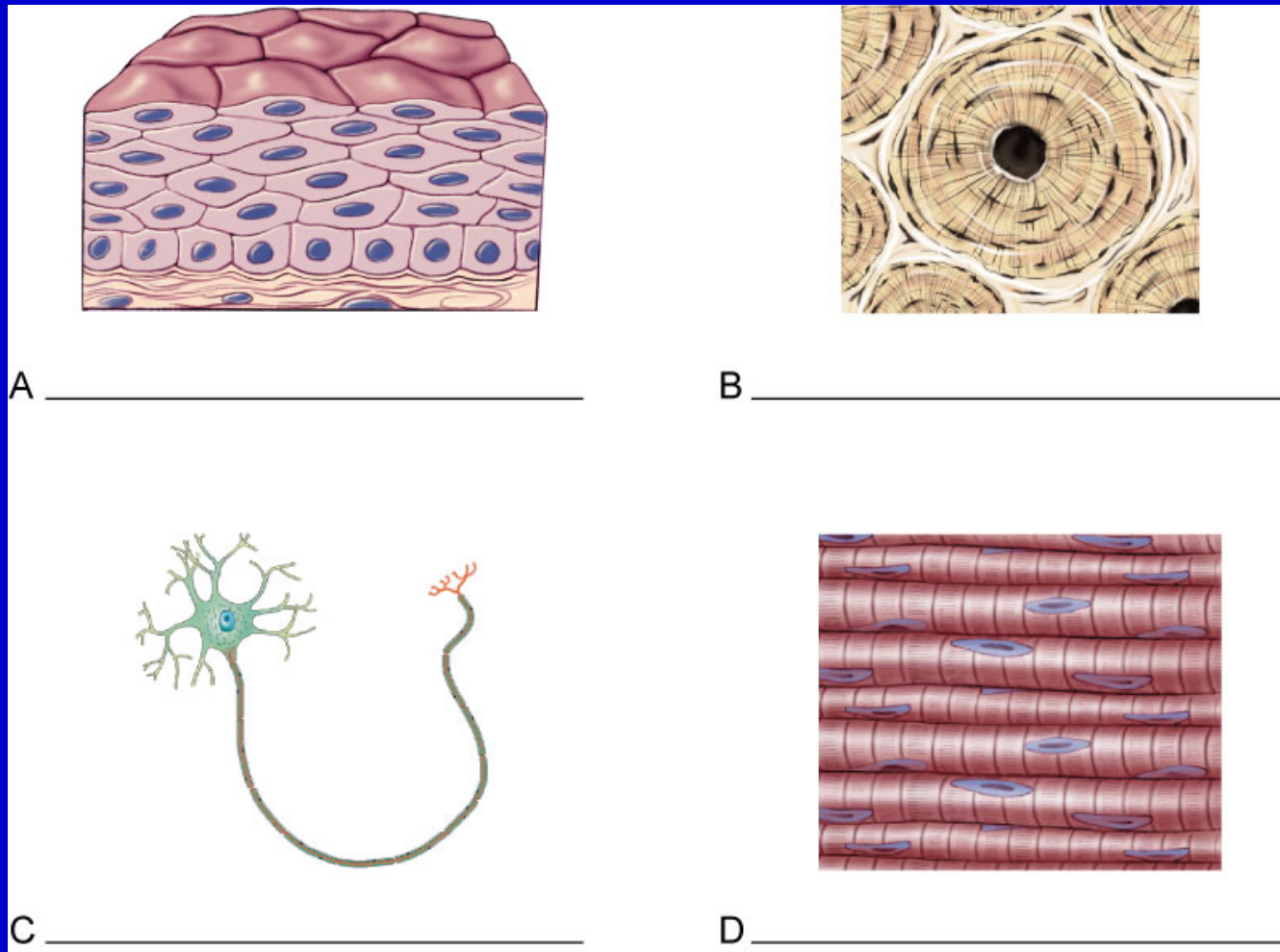


Fig. 5-2 Major types of tissue. Label the types of tissue: **A**, epithelial tissue of the type that comprises several cellular layers; **B**, connective tissue of elastic fibers; **C**, nervous tissue; **D**, muscle tissue of the striated type.

A and D from Herlihy B, Maebius, NK: *The human body in health and illness*, ed 2, Philadelphia, 2003, Saunders.

Cell Development Terms

-plasia means formation

- dysplasia
- aplasia
- hypoplasia
- hyperplasia
- anaplasia

-trophy means nutrition

- hypertrophy

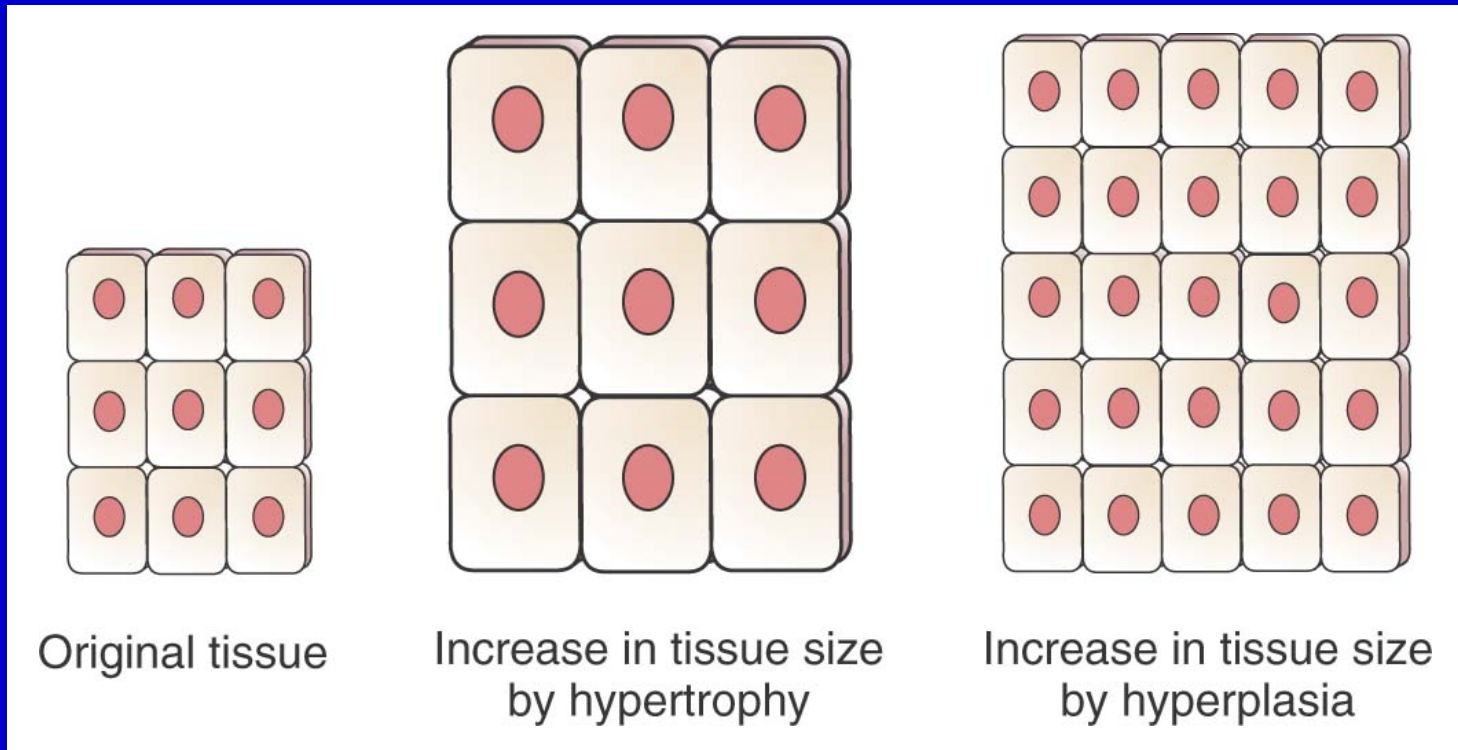


Fig. 5-3 Comparison of hypertrophy and hyperplasia. A representation of tissue enlargement by hypertrophy and hyperplasia.

From Ignatavicius MS, Workman ML, Mishler MA: *Medical-surgical nursing across the health care continuum*, ed 5, Philadelphia, 2006, Saunders-Elsevier.

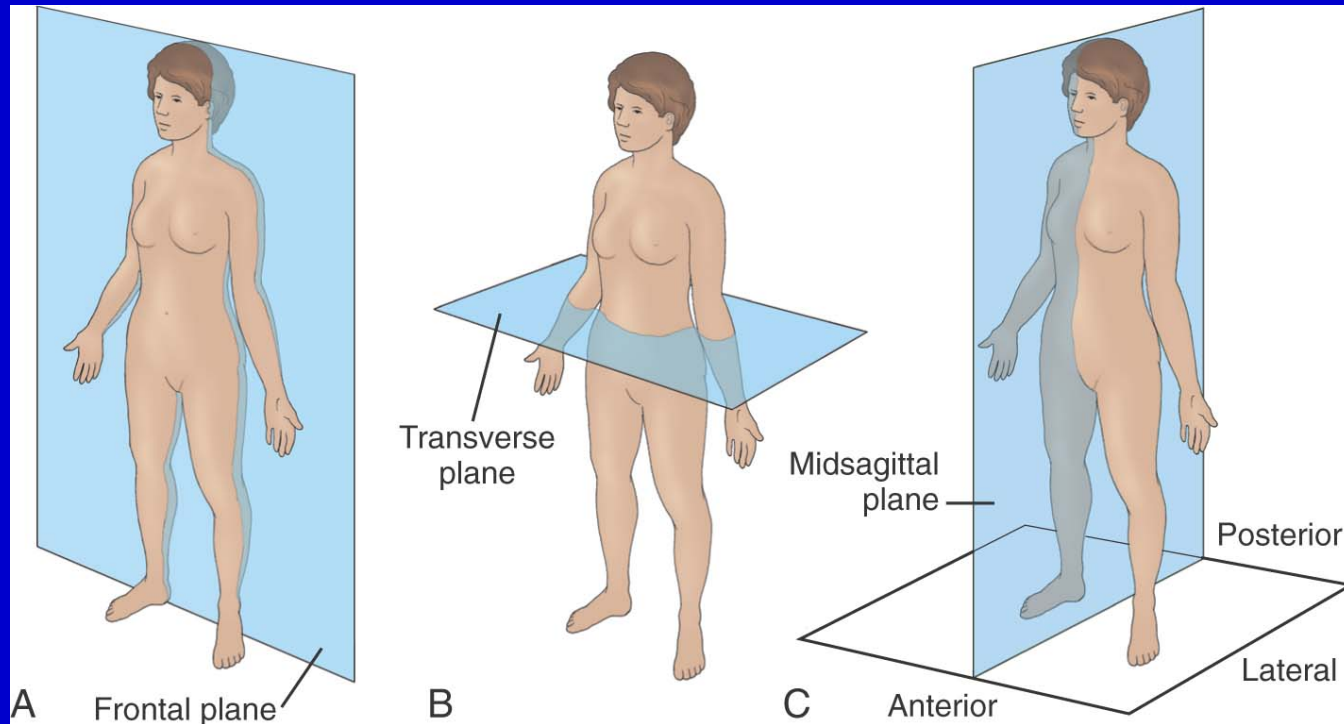


Fig. 5-4 Anatomic position with reference systems. The erect anterior view with palms forward is used as the point of reference in anatomic nomenclature. **A**, Frontal plane; **B**, transverse plane; **C**, midsagittal plane, also showing the posterior, lateral, and anterior aspects.

Directional Word Parts and Terms

- anter/o toward the front; ventral
- poster/o toward the back, dorsal
- ventr/o belly side
- dors/o back side
- medi/o middle
- later/o toward the side
- trans- across

Directional Word Parts and Terms, Cont.

- super/o uppermost
- infer/o lowermost
- proxim/o nearer the origin
- dist/o far or distant (so does tel/e)
- cephal/o toward the head
- caud/o toward the tail

Directional Word Parts and Terms, Cont.

combining forms combine to form directional terms

- anter/o + medi/o + -an = anteromedian
- poster/o + medi/o = posteromedian
- dors/o + later/o = dorsolateral
- poster/o + later/o = posterolateral
- anter/o + later/o = anterolateral
- medi/o + later/o = mediolateral
- infer/o + medi/o = inferomedian

Quick Quiz!

What term means *the abnormal development of tissues or organs*?

- A. aplasia
- B. anaplasia
- C. dysplasia
- D. hypoplasia



Fig. 5-5 Patient positioning for a chest x-ray. **A**, In a posteroanterior (PA) projection, the anterior aspect of the chest is closest to the image receptor. **B**, In an anteroposterior (AP) projection, the posterior aspect of the chest is closest to the image receptor. **C**, In a left lateral chest projection, the left side of the patient is placed against the image receptor.

From Ballinger PW, Frank ED: *Merrill's atlas of radiographic positions and radiologic procedures*, vol 1, ed 10, St Louis, 2003, Mosby.

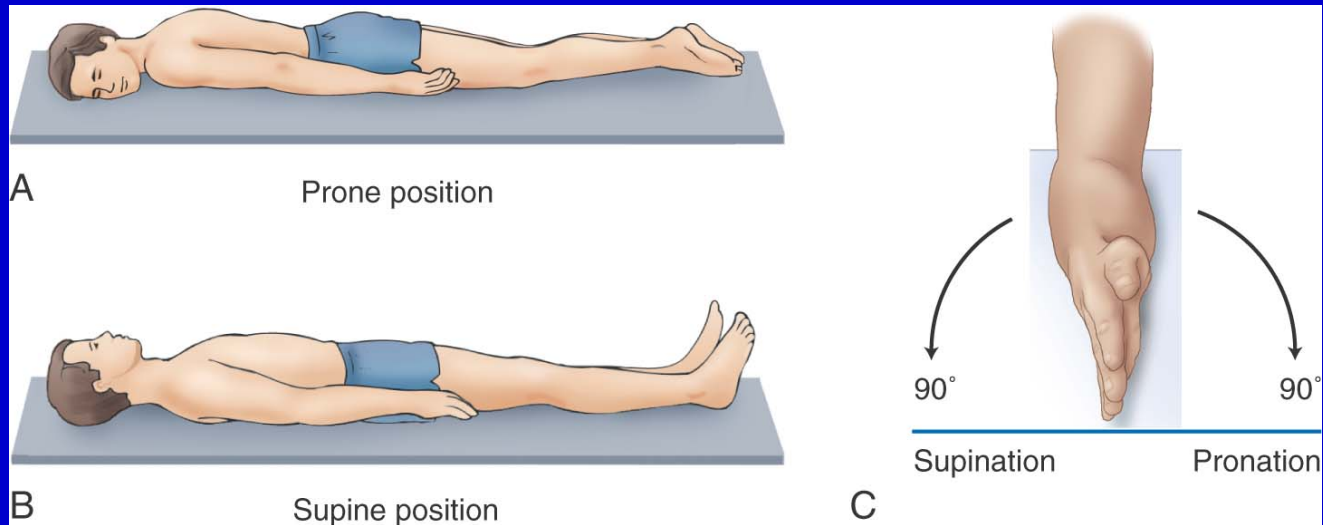


Fig. 5-6 Comparison of pronation and supination. **A**, Prone, lying facedown. **B**, Supine, lying on the back. **C**, Supination and pronation of the elbow and wrist joints, which permit the palm of the hand to turn up (supination) or down (pronation).

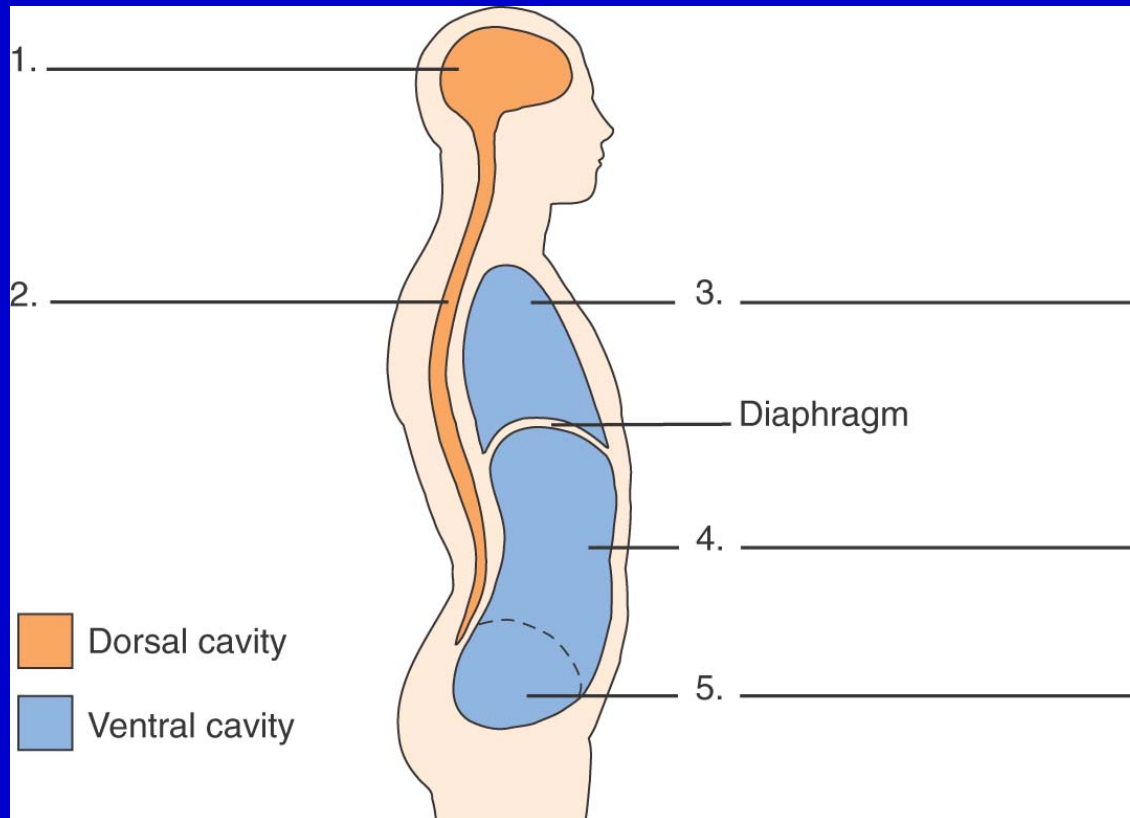


Fig. 5-7 The dorsal and ventral cavities. Label the numbered structures as you read. The dorsal cavity is divided into the cranial cavity (1) and spinal cavity (2). The ventral cavity is divided into the thoracic cavity (3) and the abdominopelvic cavity, which is subdivided into the abdominal cavity (4) and the pelvic cavity (5).

Directional Word Parts and Terms, Cont.

- telecardiogram

Body Regions

- head
- neck
- torso
- extremities

Combining Forms: Body Regions and Structures

- abdomin/o abdomen
- acr/o extremities
- blephar/o eyelid
- cephal/o head

Combining Forms: Body Regions and Structures

- chir/o hands
- cyst/o cyst, bladder, or sac
- dactyl/o digits
- lapar/o abdominal wall
- omphal/o umbilicus
- onych/o nail

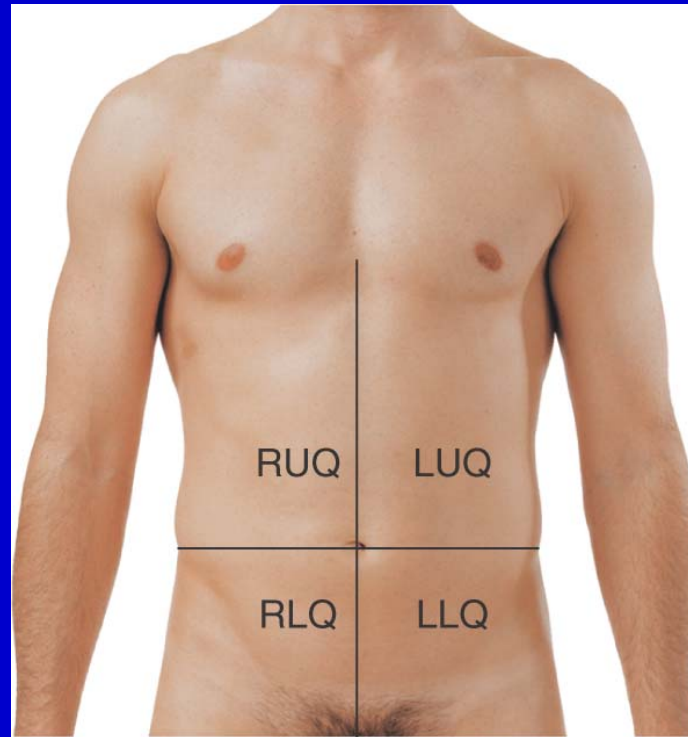


Fig. 5-8 Abdominal quadrants. The four quadrants in this anatomic division of the abdomen are determined by drawing a vertical and horizontal line through the umbilicus. RUQ, LUQ, RLQ, and LLQ are abbreviations for right upper quadrant, left upper quadrant, right lower quadrant, and left lower quadrant, respectively.

From Thompson JM, Wilson SF: *Health assessment for nursing practice*, St Louis, 1996, Mosby.

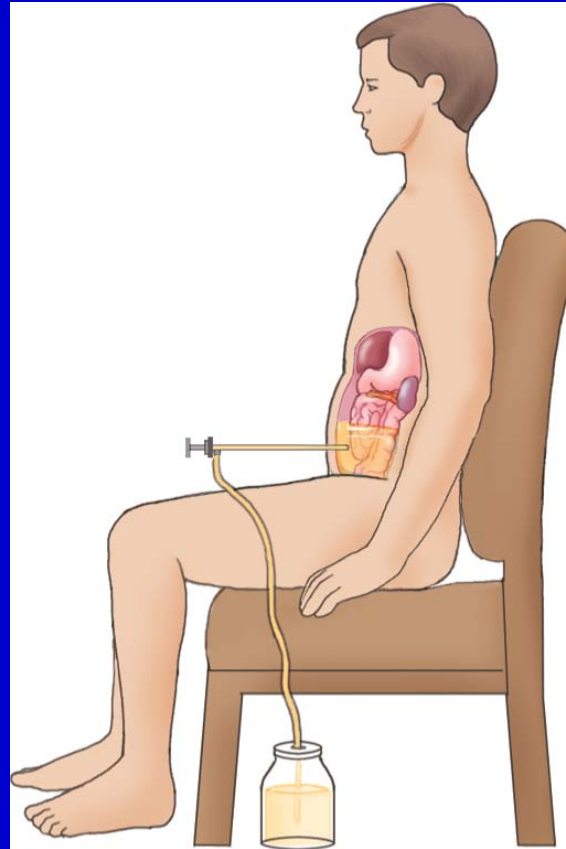


Fig. 5-9 Abdominal paracentesis. In this surgical puncturing of the abdomen, fluid is withdrawn for diagnosis or to remove excess fluid.



Fig. 5-10 Ascites. This abnormal accumulation of a fluid in the peritoneal cavity is treated with dietary therapy and drugs. Abdominal paracentesis may be performed to relieve the pressure of the accumulated fluid.

From Lewis SM, Heitkemper MM, Dirksen SR, et al: *Medical-surgical nursing: assessment and management of clinical problems*, ed 7, St Louis, 2007, Mosby-Elsevier.

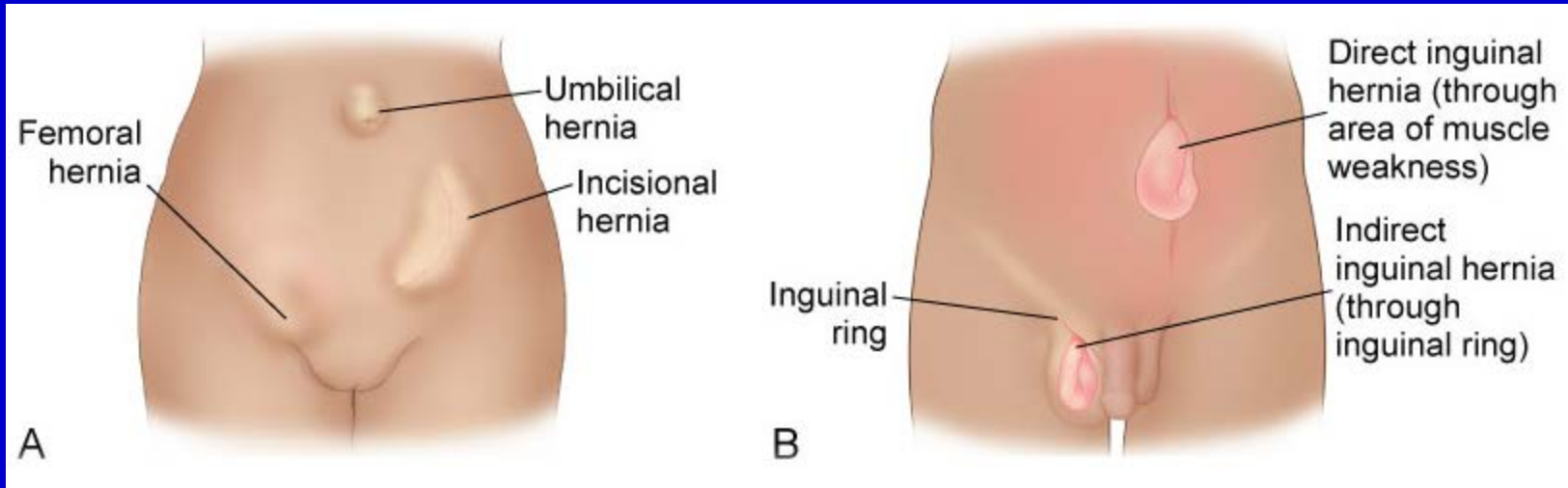


Fig. 5-11 Common types of abdominal hernias. **A**, *Umbilical* hernias result from a weakness in the abdominal wall around the umbilicus. An *incisional* hernia is herniation through inadequately healed surgery. In a *femoral* hernia, a loop of intestine descends through the femoral canal into the groin (femoral means pertaining to the thigh). **B**, *Inguinal* hernias are of two types. A *direct* hernia occurs through an area of weakness in the abdominal wall. In an *indirect* hernia, a loop of intestine descends through the inguinal canal, an opening in the abdominal wall for passage of the spermatic cord in males, and a ligament of the uterus in females.

Body Fluids

- intracellular
- extracellular
- edema

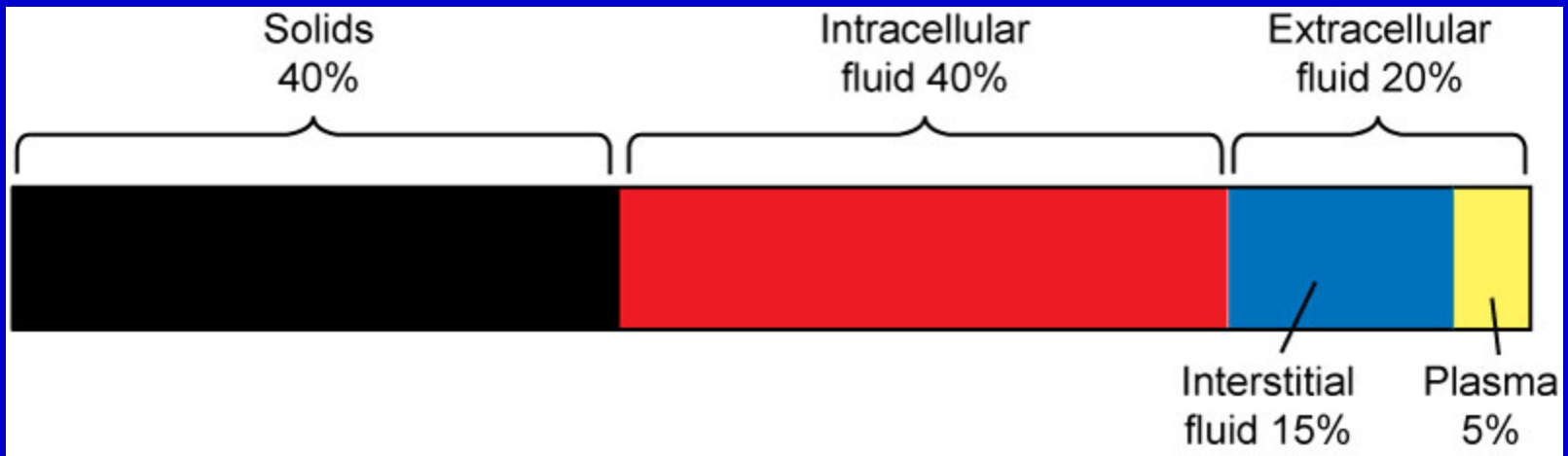


Fig. 5-12 The body's fluid compartments. Fluid makes up 60% of the adult's body weight, and most is intracellular fluid. Two types of extracellular fluid are interstitial fluid and plasma. Plasma is the fluid part of the blood.

Word Parts: Body Fluids

- crin/o, -crine secrete
- dacry/o, lacrim/o tear, tearing or crying
- -emia condition of the blood
- hidr/o sweat or perspiration
- hydr/o water

Word Parts: Body Fluids, cont.

lymph/o

lymph

muc/o

mucus

-poiesis

production

-poietin

substance that causes production

py/o

pus

sial/o

saliva (or salivary glands)

ur/o

urine (or urinary tract)

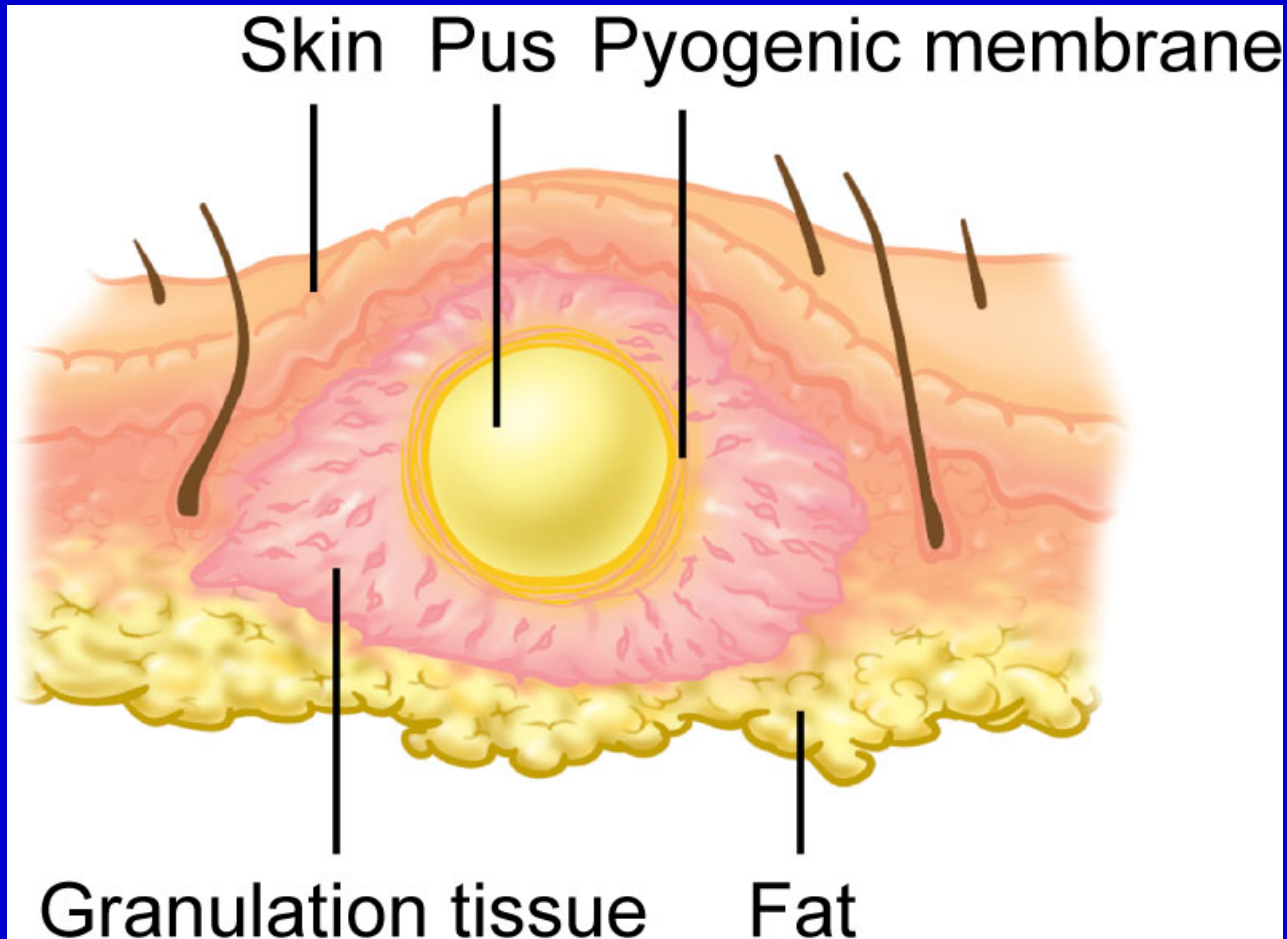


Fig. 5-13 An abscess. The pus is contained within a thin, pyogenic membrane surrounded by harder granulation tissue, the tissue's response to the infection.

From *Dorland's illustrated medical dictionary*, ed 31, Philadelphia, 2007, Saunders-Elsevier.

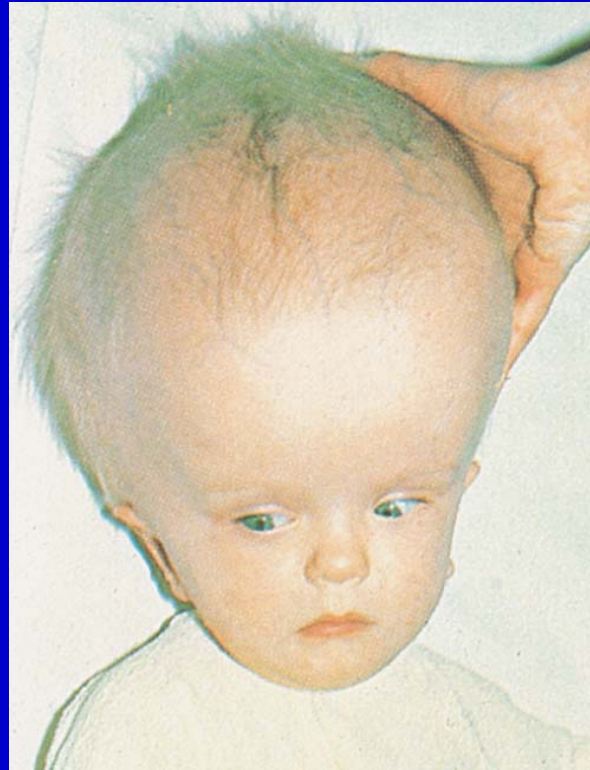


Fig. 5-14 Four-month-old child with hydrocephalus. Hydrocephalus is usually caused by obstruction of the flow of cerebrospinal fluid. If hydrocephalus occurs in an infant, the soft bones of the skull push apart as the head increases in size.

From Hart CA, Broadhead RL: *Colour atlas of pediatric infectious diseases*, London, 1992, Mosby-Wolfe.

Word Parts: Body Fluids, cont.

- coagul/o coagulation
- cyt/o cell
- erythr/o red
- hem/o, hemat/o blood

Word Parts: Body Fluids, con

leuk/o

white

thromb/o

clot

-cyte

cell

-osis

increased or
abnormal when
cellular components

-penia

deficiency

Quick Quiz!

What does *sial/o* mean?

- A. sodium
- B. saliva or salivary gland
- C. sweat
- D. cell

Glands

salivary

thyroid

adrenal

sudoriferous

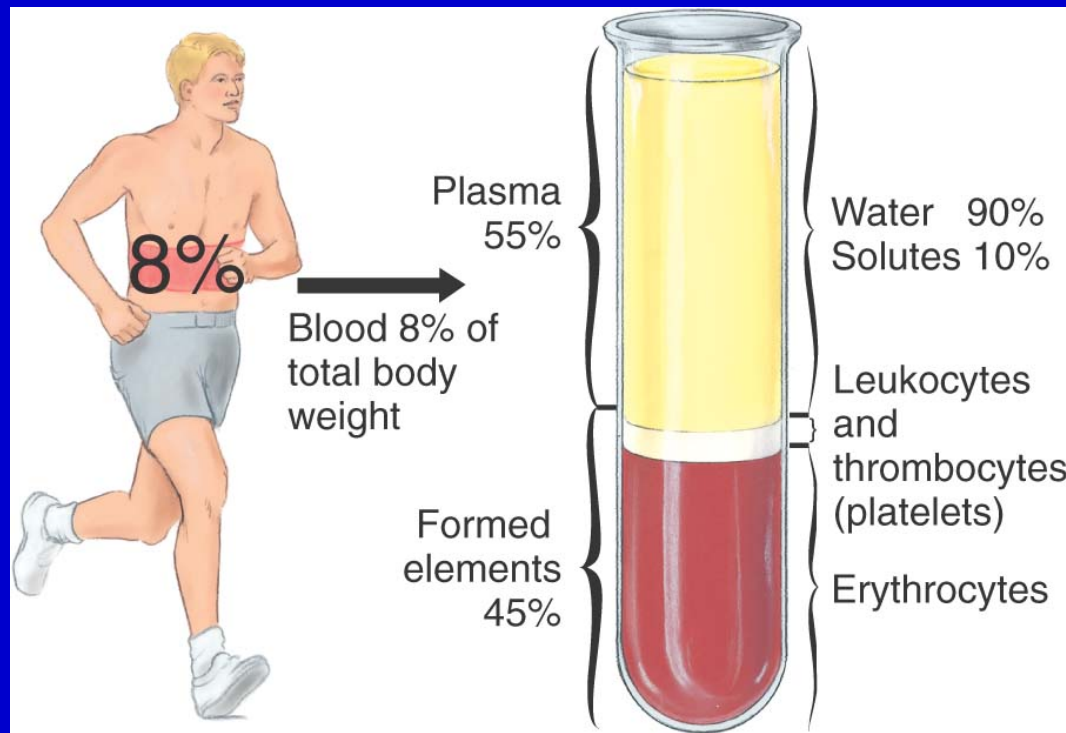


Fig. 5-15 Composition of the blood. The cells and cell fragments are heavier than the liquid matrix, the plasma. When treated blood is spun in a centrifuge, the heavier elements (erythrocytes, leukocytes, and blood platelets) are packed into the bottom of the tube.

From Applegate E: *The anatomy and physiology learning system*, ed 2, Philadelphia, 2000, Saunders.

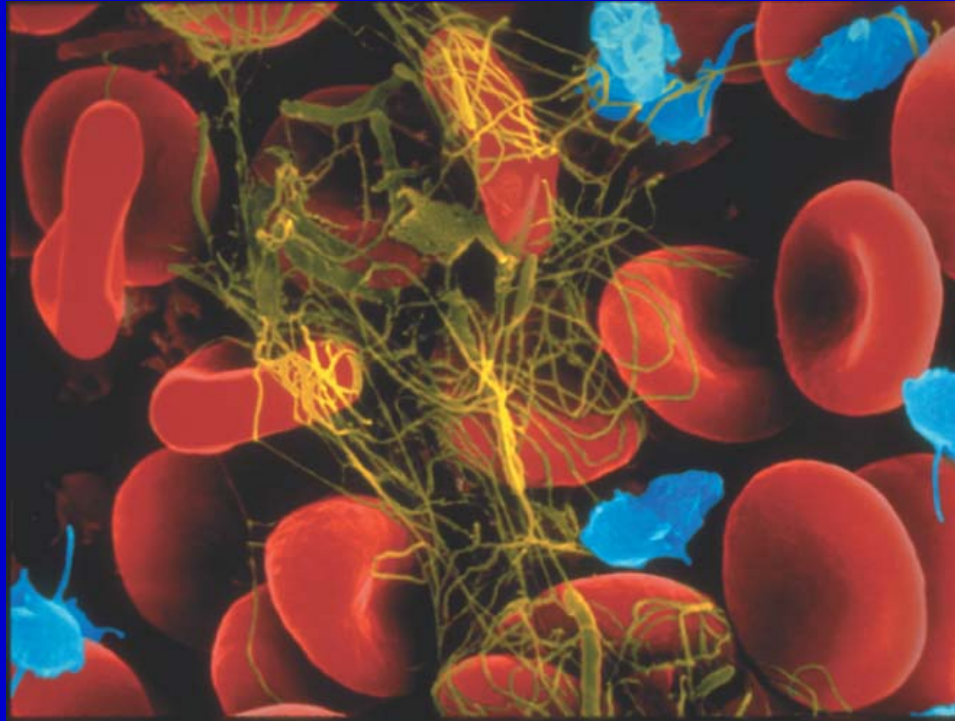


Fig. 5-16 Blood coagulation. This scanning electron micrograph has been colored to emphasize the different structures. Red blood cells (*red*) are entangled with the fibrin (*yellow*). Note the thin center and the thick edges that give red blood cells a concave appearance. The platelets (*blue*), which initiate clotting, are also visible.

Copyright Dennis Kunkel Microscopy, Inc, 1994.

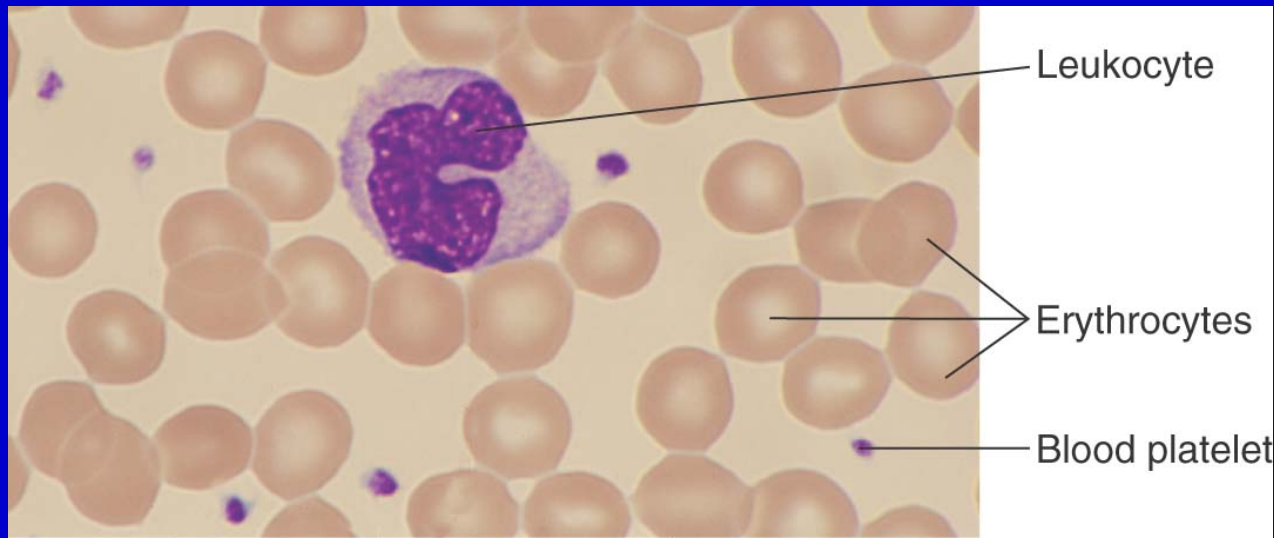


Fig 5-17 Stained blood. There are normally many more erythrocytes (red blood cells) than leukocytes (white blood cells). Only one leukocyte is shown here, although there are many types, each containing a nucleus. Platelets, tiny cell fragments, are also shown.

From Gartner LP, Hiatt JL: *Color textbook of histology*, ed 2, Philadelphia, 2001, Saunders.

Blood Terminology

erythrocytosis

erythrocytopenia, erythropenia

leukocytosis

leukocytopenia, leukopenia

leukemia

thrombocytosis

thrombopenia

Blood Defenses and Immunity

immunity

resistance

susceptibility

inflammation

Blood Defenses and Immunity, cont.

phagocytosis

interferon

complement

antigen

antibody

Blood Defenses and Immunity, cont.

- immunization
- vaccination
- immunocompromised, immunosuppressive, immunosuppressant
- hypersensitivity, allergies, anaphylaxis
- AIDS

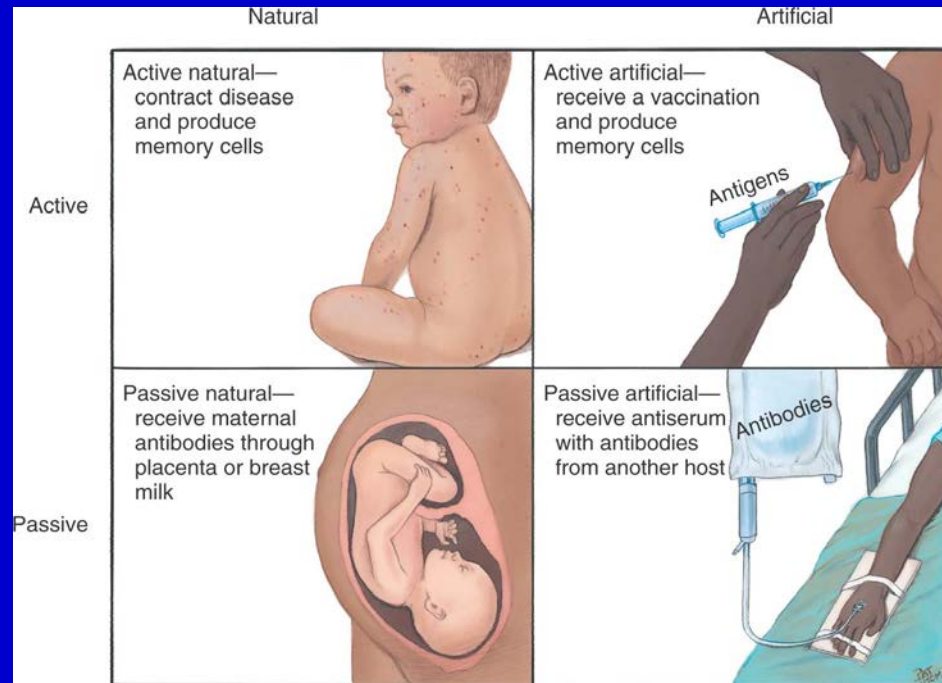


Fig. 5-18 Four types of specific immunity. Active natural immunity and passive natural immunity, as the names imply, occur through the normal activities of either an individual contracting a disease or a fetus being exposed to maternal antibodies. Both active artificial and passive artificial immunities require deliberate actions of receiving vaccinations or antibodies.

From Applegate E: *The anatomy and physiology learning system*, ed 2, Philadelphia, 2000, Saunders.

Additional Terminology

- benign
- malignant
- metastasis, metastasize
- bioterrorism

Quick Quiz!

The two kinds of body defenses are

- A. nonspecific and specific resistance
- B. cell-mediated and antibody-mediated
- C. erythropoiesis and leukopoiesis
- D. vaccination and antibiotic

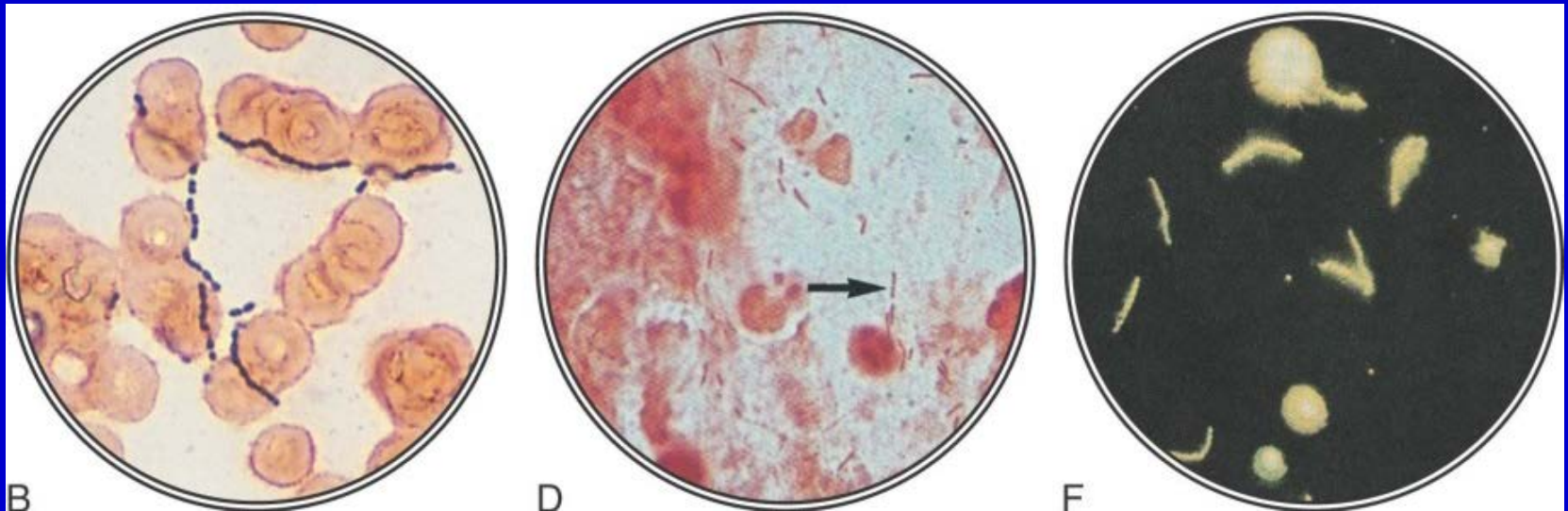


Fig. 5-19 Bacteria in body fluids. **B**, Gram-positive cocci in a Gram stain of a direct smear. Note the small size of the bacteria (which stain purple) compared with the much larger cells. **D**, Gram-negative bacilli (*arrow*) in the presence of numerous leukocytes in a Gram stain of a direct smear. **F**, Spirochetes in a special preparation from material collected from a chancre, a skin lesion that occurs in syphilis.

B from Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA: *Medical microbiology*, ed 3, St Louis, 1994, Mosby; D from Forbes BA, Sahm DF, Weissfeld AS: *Bailey & Scott's diagnostic microbiology*, ed 11, St Louis, 2002, Mosby; F from Atlas RM: *Principles of microbiology*, St Louis, 1995, Mosby.

Acronyms and Abbreviations

- AIDS
- CA
- CBC, cbc
- CDC
- CSF
- FEMA
- HIV

Acronyms and Abbreviations, cont.

- LLQ
- LUQ
- RBC
- RLQ
- RUQ
- WBC
- WMD