STRUCTURES OF THE BODY

The body is made up of increasingly larger and more complex structural units. From smallest to largest, these are **cells**, **tissues**, **organs**, and the **body systems**. Working together, these structures form the complete body and enable it to function properly.

Cells form ⟶ Tissues form ⟶ Organs form ⟶ body systems.

CELLS

Cells are the basic structural and functional units of the body.
Cells are specialized and grouped together to form **tissues** and **organs**.

TISSUES:

A **tissue** is a group or layer of similarly **specialized cells** that join together to perform certain specific functions.

The four main types of tissue are:

- **Epithelial** (ep-ih-THEE-lee-al) **tissue:** Epithelial tissue covers external surfaces of the body, lines body structures, and forms glands. The skin is an example of an organ that is made up of epithelial tissue.
- **Connective tissue:** Connective tissue functions to support and shape the body structures and keeps them in place. Tendons and ligaments, blood, bone, cartilage, and fat are examples of connective tissue.
- **Muscle tissue:** Muscle tissue takes its name from its location in the body; for example:
  1- in the heart it is called **cardiac** muscle tissue.
  2- Within organs, such as the **stomach** and **intestines**, it is called **visceral** (VIS-er-al) muscle tissue.
  3- Muscle associated with bones is called **skeletal** muscle tissue.
- **Nervous tissue:** This tissue makes up nerves that conduct electrical impulses throughout the body. The brain, spinal cord, and nerves are made up of nervous tissue.

Word Parts Pertaining to Cells, Tissues, and Organs

TABLE 4-1 Roots for Cells and Tissues

ROOT	MEANING	EXAMPLE	DEFINITION OF EXAMPLE
morph/o	form	polymorphic *pol-ē-MOR-fik*	having many forms
cyt/o, -cyte	cell	cytogenesis *sī-tō-JEN-e-sis*	the formation (-genesis) of cells
nucle/o	nucleus	nuclear *NŪ-klē-ar*	pertaining to a nucleus
kary/o	nucleus	karyotype (Fig. 4-6) *KAR-ē-ō-tīp*	picture of the chromosomes of a cell organized according to size
hist/o, histi/o	tissue	histologist *his-TOL-ō-jist*	specialist in the study of tissue
fibr/o	fiber	fibrosis *fī-BRŌ-sis*	abnormal formation of fibrous tissue

TABLE 4-1 Roots for Cells and Tissues, *continued*

ROOT	MEANING	EXAMPLE	DEFINITION OF EXAMPLE
reticul/o	network	reticulum *re-TIK-ū-lum*	a network
aden/o	gland	adenoma *ad-e-NO-ma*	tumor (-oma) of a gland
papill/o	nipple	papilliform *pa-PIL-i-form*	resembling a nipple
myx/o	mucus	myxadenitis *miks-ad-e-NĪ-tis*	inflammation of a gland that secretes mucus
muc/o	mucus, mucous membrane	mucorrhea *mū-kō-RĒ-a*	increased flow (-rhea) of mucus
somat/o, -some	body	*sō-MAT-ik*	pertaining to the body (as compared with the germ cells or the mind)

Fill in the blanks:

1. Karyomegaly is enlargement (-megaly) of the_____.

2. Adenitis (ad-*e-NI -tis*) is inflammation (-itis) of a _____.

3. Nucleoplasm (NU-kle-o-plazm) is the material that fills the _____.

4. A fibril (*FI-bril*) is a small _____.

5. Histogenesis is the formation (-genesis) of _____.

TABLE 4-2 Roots for Cell Activity

ROOT	MEANING	EXAMPLE	DEFINITION OF EXAMPLE
blast/o, -blast	immature cell, productive cell, embryonic cell	leukoblast *LŪ-kō-blast*	an immature white blood cell
gen	origin, formation	genetics *je-NET-iks*	the science of genes and heredity
phag/o	eat, ingest	phagocyte *FAG-ō-sīt*	cell that ingests waste and foreign matter
phil	attract, absorb	acidophilic *a-sid-ō-FIL-ik*	attracting acid stain
plas	formation, molding, development	hyperplasia *hī-per-PLĀ-jē-a*	overdevelopment of an organ or tissue
trop	act on, affect	chronotropic *kron-o-TROP-ik*	affecting rate or timing
troph/o	feeding, growth, nourishment	atrophy *AT-rō-fē*	wasting away (lack of nourishment)

Match the following terms and write the appropriate letter to the left of each number:

1. erythroblast (*e-RITH ro-blast*) a. organism capable of make its food
2. hypertrophy (*hi-PER-tro-fe*) b. formation of a nucleus
3. phagocytosis (*fag-o-si-TO-sis*) c. increased growth of tissue
4. karyogenesis (*kar-e-o-JEN-e-sis*) d. ingestion of waste by a cell
5. autotroph (*AW-to-trof*) e. immature red blood cell

TABLE 4-3 Suffixes and Roots for Body Chemistry

WORD PART	MEANING	EXAMPLE	DEFINITION OF EXAMPLE
SUFFIXES			
-ase	enzyme	lipase *LĪ-pās*	enzyme that digests fat (lipid)
-ose	sugar	lactose *LAK-tōs*	milk sugar
ROOTS			
hydr/o	water, fluid	hydrophilic *hī-drō-FIL-ik*	attracting water
gluc/o	glucose	glucosuria *glu-kō-SŪ-rē-a*	presence of glucose in the urine (-ur/o)
glyc/o	sugar, glucose	hyperglycemia *hī-per-glī-SĒ-mē-a*	high blood sugar
sacchar/o	sugar	polysaccharide *pol-ē-SAK-a-rīd*	compound containing many sugars
amyl/o	starch	amyloid *AM-i-loyd*	resembling starch
lip/o	lipid, fat	lipogenesis *lip-ō-JEN-e-sis*	formation of fat
adip/o	fat	adipocyte *AD-i-pō-sīt*	cell that stores fat
steat/o	fatty	steatorrhea *stē-a-tō-RĒ-a*	discharge (-rhea) of fatty stools
prote/o	protein	protease *PRŌ-tē-ās*	enzyme that digests protein

Exercise 4-3

Fill in the blanks:

1. Amylase (*AM-i-la s*) is an enzyme that digests _____.
2. The ending *-ose* indicates that maltose is a(n) _____.
3. Glucogenesis (*gl u-ko-JEN-e-sis*) is the formation of _____.
4. Hydrotherapy is treatment using _____.
5. Liposuction is the surgical removal of _____.
6. Adipose tissue stores _____.

TABLE 5-3 Prefixes for Position and Direction

PREFIX	MEANING	EXAMPLE	DEFINITION OF EXAMPLE
circum-	around	circumoral *ser-kum-OR-al*	around the mouth
peri-	around	perivascular *per-ē-VAS-kū-lar*	around a vessel (*vascul/o*)
intra-	in, within	intrauterine *in-tra-Ū-ter-in*	within the uterus
epi-	on, over	epithelium *ep-i-THĒ-lē-um*	tissue that covers surfaces
extra-	outside	extracellular *eks-tra-SEL-ū-lar*	outside a cell or cells
infra-*	below	infrapatellar *in-fra-pa-TEL-ar*	below the kneecap (patella)
sub-*	below, under	sublingual *sub-LING-gwal*	under the tongue (*lingu/o*)
inter-	between	intercostal *in-ter-KOS-tal*	between the ribs (*cost/o*)
juxta-	near, beside	juxtaposition *juks-ta-pō-ZI-shun*	a location near or beside another structure
para-	near, beside behind	parasagittal *par-a-SAJ-i-tal*	near or beside a sagittal plane
retro-	backward	retroperitoneal *re-trō-per-i-tō-NĒ-al*	behind the peritoneum
supra-	above	suprascapular *su-pra-SKAP-ū-lar*	above the scapula (shoulder blade)