

**BUILDING WORDS**

Use combinations of prefixes and suffixes to build words for the definitions that follow.

<u>Prefixes</u>	<u>The Meaning</u>	<u>Suffixes</u>	<u>The Meaning</u>
chloro-	green	-karyo(te)	nucleus
chromo-	color	-plast(id)	formed, molded, "body"
cyto-	cell	-some	body
eu-	good, well, "true"		
leuko-	white (without color)		
lyso-	loosening, decomposition		
micro-	small		
myo-	muscle		
pro-	"before"		

<u>Prefix</u>	<u>Suffix</u>	<u>Definition</u>
_____	-phyll	1. A green pigment that traps light for photosynthesis.
_____	_____	2. Organelles containing pigments that give fruits and flowers their characteristic colors.
_____	-plasm	3. Cell contents exclusive of the nucleus.
_____	-skeleton	4. A complex network of protein filaments within the cell.
glyoxy-	_____	5. A microbody containing enzymes used to convert stored fats in plant seeds to sugars.
_____	_____	6. An organelle that is not pigmented and is found primarily in roots and tubers, where it is used to store starch.
_____	_____	7. An organelle containing digestive enzymes.
_____	-filaments	8. Small, solid filaments, made of actin, that make up part of the cytoskeleton of eukaryotic cells.
_____	-tubules	9. Small, hollow filaments, made of tubulin, that make up part of the cytoskeleton of eukaryotic cells.
_____	-villi	10. Small, finger-like projections from cell surfaces that increase surface area.
_____	-sin	11. A muscle protein that, together with actin, is responsible for muscle contraction.
peroxi-	_____	12. An organelle containing enzymes that split hydrogen peroxide, rendering it harmless.
_____	_____	13. Precursor organelles.
_____	-karyotes	14. Organisms that evolved before organisms with nuclei.
_____	-sol	15. The fluid component of the cytoplasm.
_____	_____	16. An organism with a distinct nucleus surrounded by nuclear membranes.

## MATCHING

Terms:

- a. Actin
- b. Centriole
- c. Chloroplast
- d. Endoplasmic reticulum
- e. Granum
- f. Mitochondrion
- g. Nuclear envelope
- h. Nucleolus
- i. Plasma membrane
- j. Ribosome
- k. Secretory vesicle
- l. Stroma
- m. Vacuole
- n. Vesicle
- o. Cristae

For each of these definitions, select the correct matching term from the list above.

- \_\_\_ 1. One of a pair of small, cylindrical organelles lying at right angles to each other near the nucleus.
- \_\_\_ 2. Site of ribosome synthesis.
- \_\_\_ 3. An intracellular organelle that is the site of aerobic respiration.
- \_\_\_ 4. A fluid-filled, membrane-bounded sac found within the cytoplasm; may function in storage, digestion, or water elimination.
- \_\_\_ 5. Any small sac, especially a small spherical membrane-bounded compartment, within the cytoplasm.
- \_\_\_ 6. A chlorophyll containing intracellular organelle of some plant cells.
- \_\_\_ 7. A stack of thylakoids within a chloroplast.
- \_\_\_ 8. The fluid region of the chloroplast.
- \_\_\_ 9. An interconnected network of intracellular membranes.
- \_\_\_ 10. An organelle that is part of the protein synthesis machinery.
- \_\_\_ 11. Folds of the inner membrane in the mitochondria.

**MAKING COMPARISONS**

Fill in the blanks.

Cell Structure	Location of Structure	Function of Structure	Kind of Cell Containing This Structure
Nuclear area containing a single strand of circular DNA	Cytoplasm	Inheritance, control center	Prokaryotic
#1	Cytoplasm and RER	Synthesis of polypeptides	#2
Golgi complex	#3	#4	Most eukaryotic
Mitochondria	#5	#6	#7
Complex chromosomes	#8	Inheritance	#9
#10	Centrosome	#11	#12
#13	#14	Protection, support	Prokaryotic and eukaryotic
#15	#16	Encloses cellular contents; regulates passage of materials into and out of cell	#17
Chloroplasts	#18	#19	Eukaryotic (primarily plants)

**MAKING CHOICES**

Place your answer(s) in the space provided. Some questions may have more than one correct answer.

- \_\_\_\_ 1. A micrometer ( $\mu\text{m}$ ) is
- one billionth of a meter.
  - one millionth of a centimeter.
  - one thousandth of a millimeter.
  - one millionth of a micrometer.
  - one thousandth of a micrometer.
- \_\_\_\_ 2. Which of the following is in the nucleolus, but not normally found in the rest of chromatin?
- DNA
  - protein
  - chromosomes
  - RNA
  - ribosomes
- \_\_\_\_ 3. Cell membrane functions include
- isolation of chemical reactions.
  - selective permeability.
  - moderating between a cell's internal and external environments.
  - maintaining cell shape.
  - concentration of reactants.
- \_\_\_\_ 4. The low resolution attained by the light microscope is attributed to its use of
- fixed specimens.
  - electromagnetic lenses.
  - short wavelengths.
  - grid patterns.
  - electrons instead of light.

- \_\_\_ 5. Cells are small at least in part because as size increases the surface-to-volume ratio
- a. doubles.
  - b. decreases to half.
  - c. increases.
  - d. decreases.
  - e. reduces efficiency of cell activities.
- \_\_\_ 6. Inner membranous folds in mitochondrion
- a. are called cristae.
  - b. increase membrane surface area.
  - c. extend into the intermembrane space.
  - d. contain enzymes.
  - e. contain structural proteins.
- \_\_\_ 7. The Golgi complex functions to
- a. modify proteins.
  - b. process proteins.
  - c. packages glycoproteins.
  - d. sort molecules.
  - e. break down large carbohydrates.
- \_\_\_ 8. The membranes that comprise the endomembrane system include
- a. Golgi complex.
  - b. lysosomes.
  - c. endoplasmic reticulum.
  - d. transport vesicles.
  - e. plasma membrane.
- \_\_\_ 9. Lysosomes
- a. contain digestive enzymes.
  - b. contain nucleic acids.
  - c. possess a membrane.
  - d. break down complex molecules.
  - e. break down organelles.
- \_\_\_ 10. Which of the following cells contain plastids?
- a. animal
  - b. plant
  - c. some eukaryotic
  - d. some prokaryotic
  - e. algae
- \_\_\_ 11. The "cytoskeleton" of eukaryotic cells
- a. changes constantly.
  - b. includes microfilaments.
  - c. includes some DNA.
  - d. functions in cell movements.
  - e. includes protein.
- \_\_\_ 12. The cell theory states that
- a. new cells come from preexisting cells.
  - b. all cells are descended from ancient cells.
  - c. cells divide.
  - d. living things are composed of cells.
  - e. cells contain genetic material.
- \_\_\_ 13. Chloroplasts and mitochondria both
- a. are found in plant cells.
  - b. have two membranes.
  - c. contain DNA.
  - d. are found in animal cells.
  - e. contain a matrix.
- \_\_\_ 14. Ribosomal RNA is synthesized in the
- a. cytoplasm.
  - b. nuclear matrix.
  - c. cristae.
  - d. mitochondria.
  - e. nucleolus.
- \_\_\_ 15. Actin, myosin, and tubulin are
- a. proteins.
  - b. in chromatin.
  - c. primarily in neurons.
  - d. components of filaments.
  - e. components of the plasma membrane.
- \_\_\_ 16. Fluorescence microscopy
- a. uses stains bound to antibodies.
  - b. uses stains that absorb visible light.
  - c. uses special filters.
  - d. can detect location of specific molecules.
  - e. provide better resolution than electron microscopes.

## BUILDING WORDS

Use combinations of prefixes and suffixes to build words for the definitions that follow.

<u>Prefixes</u>	<u>The Meaning</u>	<u>Suffixes</u>	<u>The Meaning</u>
desm(o)-	bond	-cyto(sis)	cell
endo-	within	-desm(a)	bond
exo-	outside, outer, external	-some	body
hyper-	over		
hypo-	under		
iso-	equal, "same"		
phago-	eat, devour		
pino-	drink		

<u>Prefix</u>	<u>Suffix</u>	<u>Definition</u>
_____	_____	1. A process whereby materials are taken into the cell.
_____	_____	2. The process whereby waste or secretion products are ejected from a cell by fusion of a vesicle with the plasma membrane.
_____	-tonic (-osmotic)	3. Having an osmotic pressure or solute concentration that is greater than a standard solution.
_____	-tonic (-osmotic)	4. Having an osmotic pressure or solute concentration that is less than a standard solution.
_____	-tonic (-osmotic)	5. Having an osmotic pressure or solute concentration that is the same as a standard solution.
_____	_____	6. The ingestion of large solid particles, such as bacteria and food, by a cell.
_____	_____	7. A type of endocytosis whereby fluid is engulfed by vesicles originating at the cell surface.
_____	_____	8. A button-like plaque (body) present on two opposing cell surfaces, that holds (bonds) the cells together by means of protein filaments that span the intercellular space.
plasma-	_____	9. A cytoplasmic channel connecting (bonding) adjacent plant cells and allowing for the movement of small molecules and ions between cells.

**MATCHING***Terms:*

- a. Active transport
- b. Concentration gradient
- c. Co-transport
- d. Dialysis
- e. Diffusion
- f. Facilitated diffusion
- g. Fluid-mosaic model
- h. Plasmodesmata
- i. Osmosis
- j. Signal transduction
- k. Selectively permeable membrane
- l. Tight junction
- m. Turgor pressure

For each of these definitions, select the correct matching term from the list above.

- \_\_\_ 1. The modern picture of membranes in which protein molecules float in a phospholipid bilayer.
- \_\_\_ 2. The diffusion of water across a selectively permeable membrane.
- \_\_\_ 3. The transport of ions or molecules across a membrane and down a concentration gradient by a specific carrier protein.
- \_\_\_ 4. Regions in a system of differing concentration, such as exist in a cell and its environment, that cause molecules to move from areas of higher concentration to lower concentration.
- \_\_\_ 5. Energy-requiring transport of a molecule across a membrane from a region of low concentration to a region of high concentration.
- \_\_\_ 6. A membrane that allows some substances to cross it more easily than others.
- \_\_\_ 7. The random movement of molecules from a region of higher concentration to one of lower concentration of that substance.
- \_\_\_ 8. The internal pressure in a plant cell caused by the diffusion of water into the cell.
- \_\_\_ 9. A specialized structure between some animal cells, producing a tight seal that prevents materials from passing through the spaces between the cells.
- \_\_\_ 10. Structure allowing passage of certain small molecules and ions between plant cells.

## MAKING COMPARISONS

Fill in the blanks.

Transport Mechanism	Description of the Transport Mechanism
Diffusion	Net movement of a substance from an area of high concentration to an area of low concentration
Phagocytosis	#1
#2	The passive transport of solutes down a concentration gradient aided by a specific protein in a membrane
#3	The active transport of substances into the cell by the formation of invaginated regions or "folds" of the plasma membrane that pinch off and become cytoplasmic vesicles
#4	Transfer of solutes by proteins located within the membrane
Desmosomes	#5
Exocytosis	#6
Osmosis	#7
#8	Transport of substances across a membrane requiring the expenditure of energy by the cell
Pinocytosis	#9
#10	Points of attachment between cells that hold cells together

## MAKING CHOICES

Place your answer(s) in the space provided. Some questions may have more than one correct answer.

- \_\_\_ 1. Simple diffusion
- a. moves molecules with a gradient.
  - b. does not occur in prokaryotes of cells.
  - c. requires use of ATP.
  - d. involves protein channels.
  - e. moves substances both into and out
- \_\_\_ 2. Active transport
- a. can move molecules against a gradient. cells.
  - b. does not occur in prokaryotes of cells.
  - c. requires use of ATP.
  - d. occurs in animal cells, not in plant
  - e. moves substances both into and out
- \_\_\_ 3. A molecule is called amphipathic when it
- a. prevents free passage of substances.
  - b. is in a membrane.
  - c. has hydrophobic and hydrophilic regions.
  - d. is a lipid.
  - e. is embedded in a bilipid layer.

- \_\_\_ 4. If membranes were not fluid and dynamic, which of the following might still occur normally?
- a. active transport
  - b. facilitated diffusion
  - c. simple diffusion
  - d. endo- and exocytosis
  - e. osmosis
- \_\_\_ 5. Membrane fusion enables
- a. diversity of proteins.
  - b. exocytosis.
  - c. endocytosis.
  - d. fusion of vesicles and plasma membrane.
  - e. formation of Golgi complexes.

**Plants are placed in three beakers containing the following solutions: beaker A, distilled water; beaker B, isotonic solution; beaker C, 13% salt solution. Use this information to answer questions 7-9.**

- \_\_\_ 6. The cells in beaker C
- a. shriveled.
  - b. swelled.
  - c. plasmolyzed.
  - d. were unaffected.
  - e. probably eventually burst.
- \_\_\_ 7. The cells in beaker A
- a. shriveled.
  - b. swelled.
  - c. plasmolyzed.
  - d. were unaffected.
  - e. probably eventually burst.
- \_\_\_ 8. The cells in beaker B
- a. shriveled.
  - b. swelled.
  - c. plasmolyzed.
  - d. were unaffected.
  - e. probably eventually burst.
- \_\_\_ 9. Plasma membranes of eukaryotic cells have a large amount of
- a. cholesterol.
  - b. phospholipid.
  - c. rigidity.
  - d. fluidity.
  - e. protein.
- \_\_\_ 10. Diffusion rate depends on
- a. the flow of water.
  - b. concentration gradient.
  - c. energy from the cell.
  - d. the plasma membrane.
  - e. kinetic energy.
- \_\_\_ 11. Endocytosis may include
- a. secretion vacuoles.
  - b. pinocytosis.
  - c. phagocytosis.
  - d. a combination of inbound particles with proteins.
  - e. receptor-mediation.
- \_\_\_ 12. Plasmodesmata
- a. are channels in cytoplasm.
  - b. connect plant cells.
  - c. are plant cell structures equivalent to animal cell desmosomes.
  - d. are the same as several plasmodesma.
  - e. connect ER of adjacent cells.
- \_\_\_ 13. The principal cell adhesion molecules in vertebrates are known as
- a. cadherins.
  - b. integral proteins.
  - c. glycoproteins.
  - d. plasmodesma.
  - e.  $\beta$ -pleated molecules.

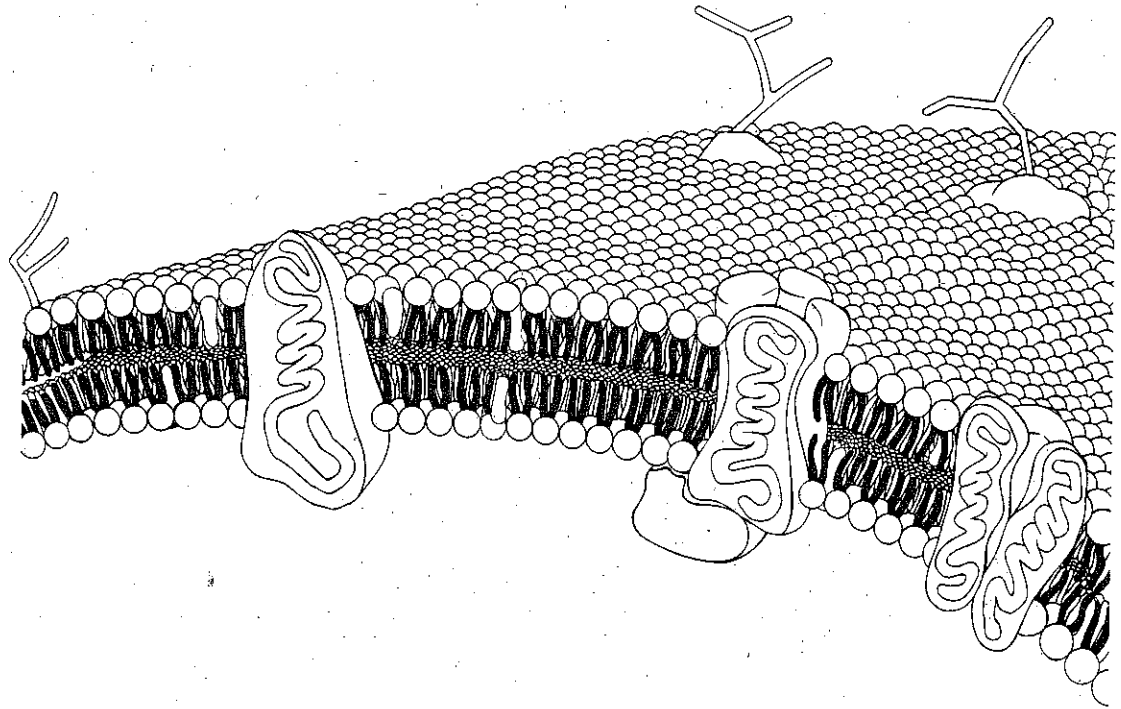


14. Sugars may be added to proteins
- a. and porins.
  - b. to form gated channels.
  - c. resulting in a glycoprotein.
  - d. in the lumen of ER.
  - e. in the extracellular space.

### VISUAL FOUNDATIONS

Color the parts of the illustration below as indicated. Label the interior and exterior of the cell, the carbohydrate chains, and the lipid bilayer.

- |        |                          |  |
|--------|--------------------------|--|
| RED    | <input type="checkbox"/> | alpha helix                                  |
| GREEN  | <input type="checkbox"/> | hydrophilic region of transmembrane proteins |
| YELLOW | <input type="checkbox"/> | hydrophobic region of transmembrane proteins |
| BLUE   | <input type="checkbox"/> | glycolipid                                   |
| ORANGE | <input type="checkbox"/> | glycoprotein                                 |
| BROWN  | <input type="checkbox"/> | cholesterol                                  |
| TAN    | <input type="checkbox"/> | peripheral protein                           |



1. What is the name of the model for membrane structure illustrated above? \_\_\_\_\_
2. Which of the colored parts is most important in forming junctions between adjacent cells?  
\_\_\_\_\_
3. Which of the colored parts is important in maintaining fluidity in animal cells? \_\_\_\_\_