Chapter 4 Study Guide

Introduction to the Cell and Cell Membrane

I. Cell Theory

1. Discovery of Cells
   1. In 1655, \_\_\_\_\_ used a microscope to examine a thin slice of \_\_\_\_\_ (dead plant cell walls).
   2. What he saw what looked like \_\_\_\_\_, like the living spaces that the monks called \_\_\_\_\_.

B. Theory Developed regarding cells:

1. All living things are made up of \_\_\_\_\_.

2. Cells are the \_\_\_\_\_ for all of life.

3. All cells are produced from \_\_\_\_\_.

D. Cells are diverse in \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.

1. Unicellular: Composed of \_\_\_\_\_.

2. Multicellular: composed of \_\_\_\_\_ that may organize into tissues, organs, etc.

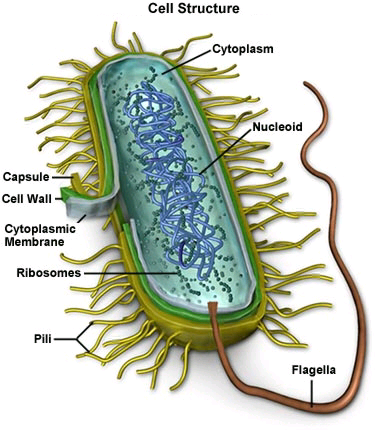
E. Common Features of Cells:

1. Cell \_\_\_\_\_: \_\_\_\_\_ around the cell that \_\_\_\_\_ it from the outside world.

2. \_\_\_\_\_: Separate units \_\_\_\_\_, which perform certain functions.

3. Contain \_\_\_\_\_

4. All cells contain: \_\_\_\_\_ \_\_\_\_\_ (protective layer around cell); \_\_\_\_\_ (jelly-like, supports, protects organelles); \_\_\_\_ (nucleic acid of genetic information); \_\_\_\_\_ (produce proteins).

F. Prokaryotic Cells

1. Characteristics:

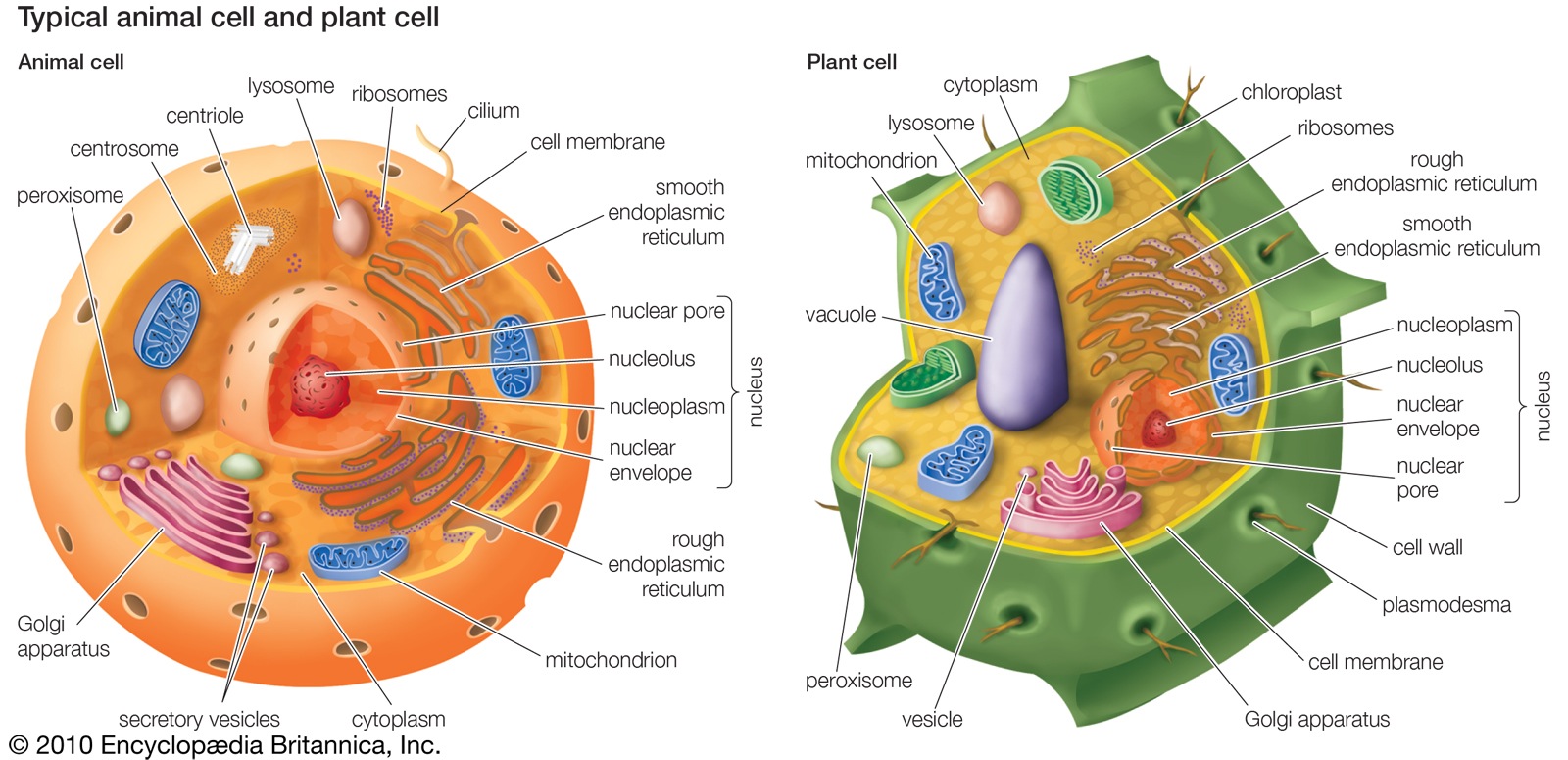
* + - * + Cells that lack a \_\_\_\_\_ & \_\_\_\_\_ Organelles.
        + Includes \_\_\_\_\_ and \_\_\_\_\_.
        + \_\_\_\_\_ type of cell
        + Singular, \_\_\_\_\_.

2. Structure:

* + - * + \_\_\_\_\_ Region: (center) contains the \_\_\_\_\_ in the cytoplasm
        + Surrounded by a \_\_\_\_\_ and \_\_\_\_\_.
        + No membrane bound \_\_\_\_\_ organelles.
        + Contains \_\_\_\_\_ in their \_\_\_\_\_ to make \_\_\_\_\_.

**G. Eukaryotic Cells**

1. Characteristics:

* + - * + Cells that have a \_\_\_\_\_ and \_\_\_\_\_ & non-membrane bound organelles.
        + Includes \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
        + More complex type of cells

**H. The Differences Between Eukaryotic and Prokaryotic Cells.**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Prokaryote** | **Eukaryote** |
| **Cell (Plasma) Membrane** |  |  |
| **Nucleus** |  |  |
| **Nuclear Material** |  |  |
| **Organelles (with or without membranes)** |  |  |
| **Cell Wall** |  | Animals –  Plants - |
| **Cytoplasm** |  |  |

II. Cellular Functions and Processes

* 1. Characteristics of the Cell Membrane

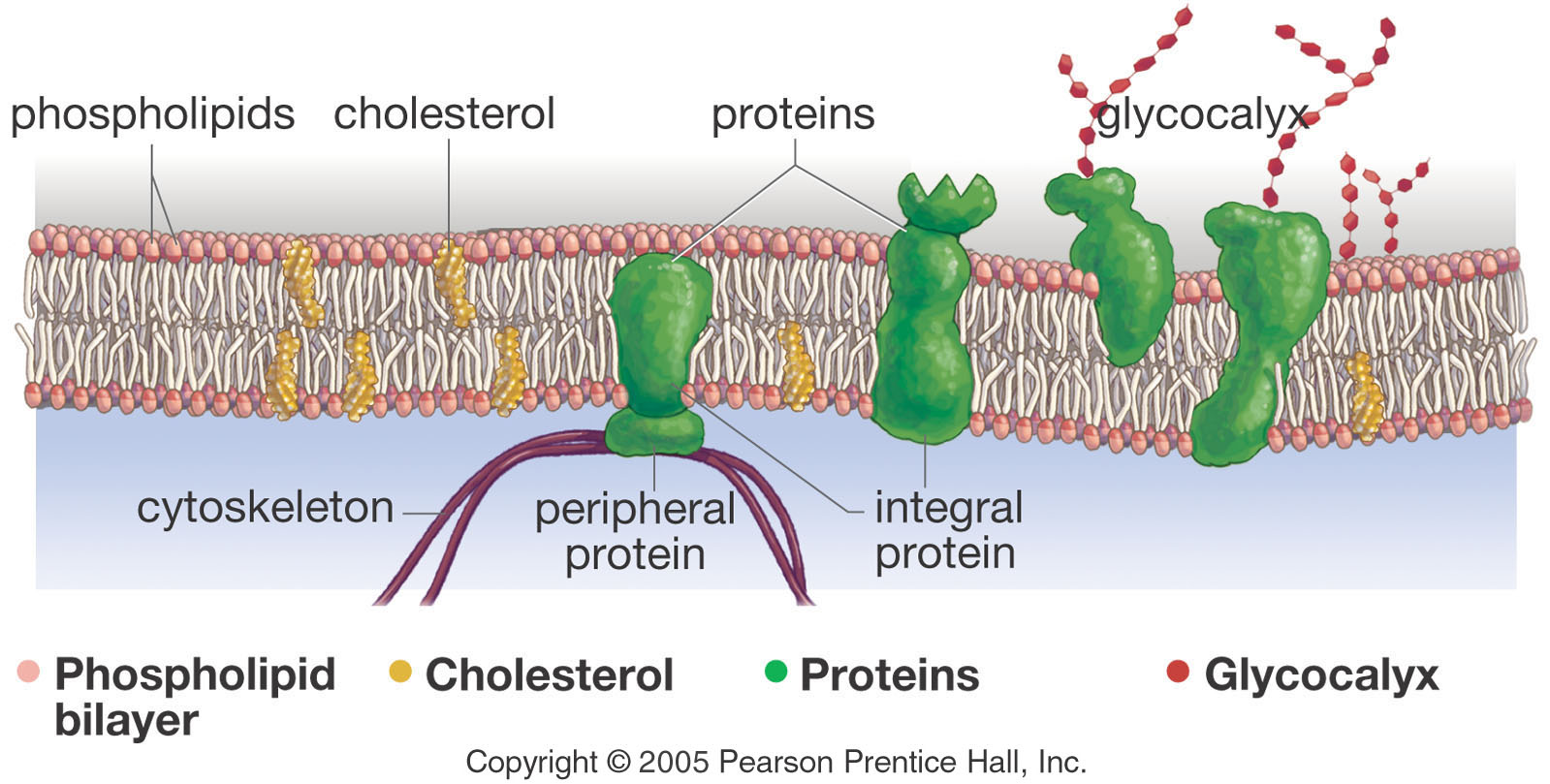
1. Made up of mostly of \_\_\_\_\_ and \_\_\_\_\_.

2. \_\_\_\_\_ boundary of the cell

3. Regulates which molecules can get \_\_\_\_\_ of the cell. (\_\_\_\_\_ permeable)

4. Helps with cell to cell \_\_\_\_\_.

* 1. Main Components:

1. Double layer of \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. Cholesterol

carbohydrates

1. Phospholipids
2. Heads contain \_\_\_\_\_ and \_\_\_\_\_ and are \_\_\_\_\_ (attract \_\_\_\_\_)
3. Tails are made of \_\_\_\_\_ and are \_\_\_\_\_ (\_\_\_\_\_ water).
4. They make up the \_\_\_\_\_ where the tails point \_\_\_\_\_ toward each other.
5. This makes the membrane \_\_\_\_\_ to what crosses it.
6. Fluid Mosaic Model
   1. Fluid: because individual \_\_\_\_\_ and \_\_\_\_\_ can move side-to-side within the layer, like a liquid.
   2. Mosaic: because of the \_\_\_\_\_ produced by the scattered \_\_\_\_\_ molecules when the membrane is viewed from above.
   3. Cell Membrane Proteins
7. Help to move \_\_\_\_\_ molecules in and out of the cell and aid in \_\_\_\_\_.
8. \_\_\_\_\_ proteins are attached on the \_\_\_\_\_.
9. \_\_\_\_\_ proteins are \_\_\_\_\_ completely through the membrane.

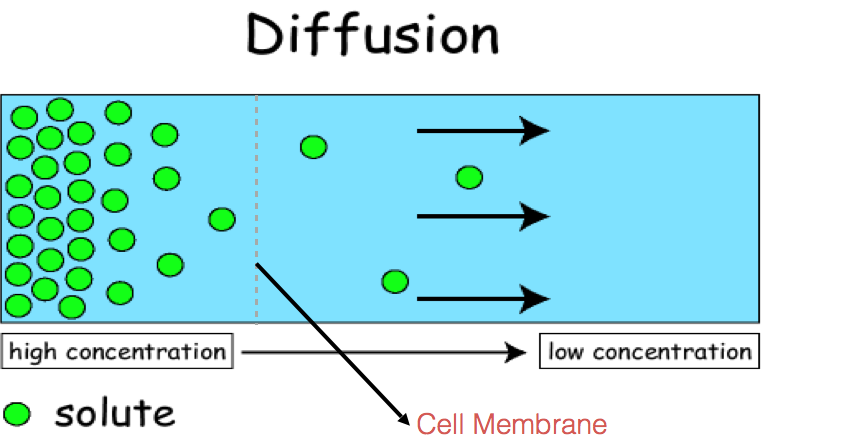
* They function as a channel to \_\_\_\_\_ of substances \_\_\_\_\_ of the cell.

F. Semipermeable Membrane

* + 1. In general, \_\_\_\_\_, non-charged \_\_\_\_\_ molecules that are soluble in lipids can pass through the cell membrane easily.

Examples: O2, CO2, H2O.

* + 1. Ions, \_\_\_\_\_, and \_\_\_\_\_\_\_\_ molecules such as \_\_\_\_\_ and \_\_\_\_\_ do \_\_\_\_\_ move through the membrane on their own.

 E. Passive Transport across Cell Membranes

1. Passive Transport: \_\_\_\_\_ Diffusion

- Does not require \_\_\_\_\_.

- Moves from \_\_\_\_\_ to \_\_\_\_\_ concentration

- down a concentration \_\_\_\_\_.

-Example: \_\_\_\_\_ diffusing into a cell.

2. Passive Transport: \_\_\_\_\_ Diffusion

- Does not require \_\_\_\_\_.

- uses \_\_\_\_\_ to move from \_\_\_\_\_ to \_\_\_\_\_ concentration

- example glucose moving from the blood stream into the cell.

3. Passive Transport: Osmosis

- Diffusion of water across a \_\_\_\_\_ \_\_\_\_\_.

- Membrane only permeable to \_\_\_\_\_.

- Moves from a \_\_\_\_\_ water potential or concentration (\_\_\_\_\_ solute) to \_\_\_\_\_ water potential or concentration (\_\_\_\_\_ solute).

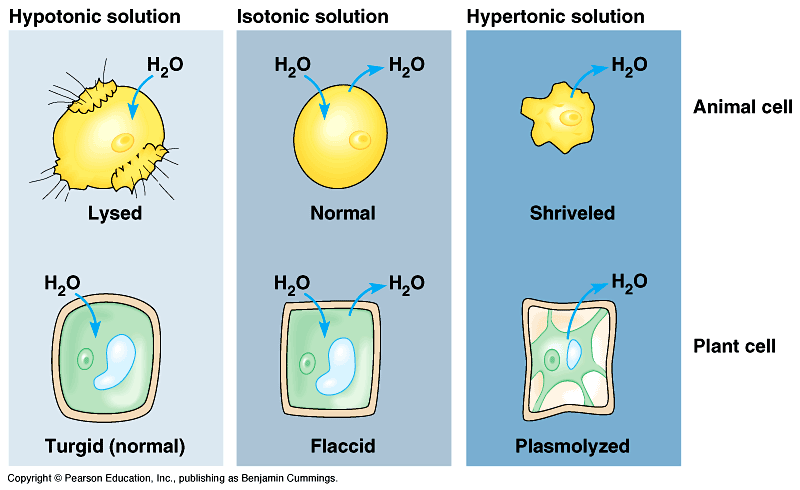
- Passive transport so \_\_\_\_\_ is required.

T\_\_\_\_\_: 🡪 the relative concentration of solute (particles) \_\_\_\_\_ the cell compared with the inside of the cell.

E. Solutions:

1. Hypertonic Solution: \_\_\_\_\_ H2O potential or concentration \_\_\_\_\_ Solute concentration \_\_\_\_\_ cell

2. Isotonic Solution: \_\_\_\_\_ H2O potential or concentration \_\_\_\_\_ Solute concentration OUTSIDE cell.

2. Hypotonic Solution: \_\_\_\_\_ H2O potential or concentration \_\_\_\_\_ Solute concentration OUTSIDE cell.

F. Active Transport:

Requires \_\_\_\_\_.

Requires a \_\_\_\_\_.

Moves materials from \_\_\_\_\_ to **\_\_\_\_\_\_** concentration.

Flows **\_\_\_\_\_\_\_\_\_\_\_** the concentration gradient.

1. Exocytosis

Molecules are moved **\_\_\_\_\_\_** of the cell by **\_\_\_\_\_\_\_\_\_\_\_**that fuse with the plasma membrane. Remember “exit” for exocytosis.

This is how hormones are **\_\_\_\_\_\_\_\_\_\_\_** and how nerve cells **\_\_\_\_\_\_\_\_\_\_\_\_\_** with one another through neurotransmitters.

2. Endocytosis

Molecules move \_\_\_\_\_ by endocytosis.

\_\_\_\_\_: Cell moves large quantities of \_\_\_\_\_ into the cell.

\_\_\_\_\_: Used to engulf \_\_\_\_\_\_\_\_ \_\_\_\_\_ particles such as food, bacteria, etc. into vesicles and bring into the cell.

|  |  |  |  |
| --- | --- | --- | --- |
| Summary of Transport Mechanisms | | | |
| General Mode of Transport | Examples | Energy Required | Movement |
|  |  |  | Down Concentration Gradient |
|  | * Membrane Pumps |  | \_\_\_\_\_\_\_\_\_\_\_ Concentration Gradient |
| Cytosis |  |  | Up or Down Concentration Gradient |