Name _____ **Period** _____

Regents Biology **Date** _____

REVIEW 2: CELLS

CELLS

Cells are the basic unit of both structure and function of all living organisms. This means that all living organisms are built out of cells and all the functions of a living organism are the result of the work of its cells. In other words, everything you do is the result of the work of your cells — walking, talking, even thinking and feeling. When you get sick, it is because your cells are not working correctly.

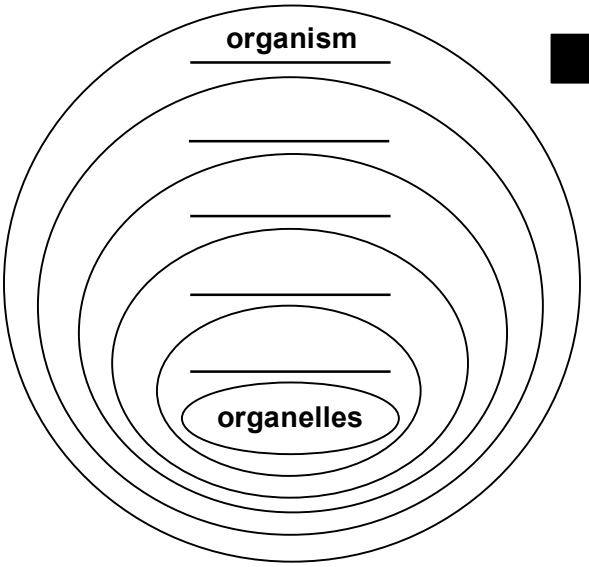
All cells come from existing cells. In other words, cells are only made from other cells growing and dividing in a process we call **mitosis**. This might seem obvious now, but at one time people believed in *spontaneous generation*, the idea that living things regularly emerged from nonliving things. Living creatures can be **unicellular** and made of only one cell (like a *Paramecium* or an *Amoeba*) or living creatures can be **multicellular** and made of many *trillions* of cells (like humans).

ORGANIZATION OF MULTICELLULAR BODIES

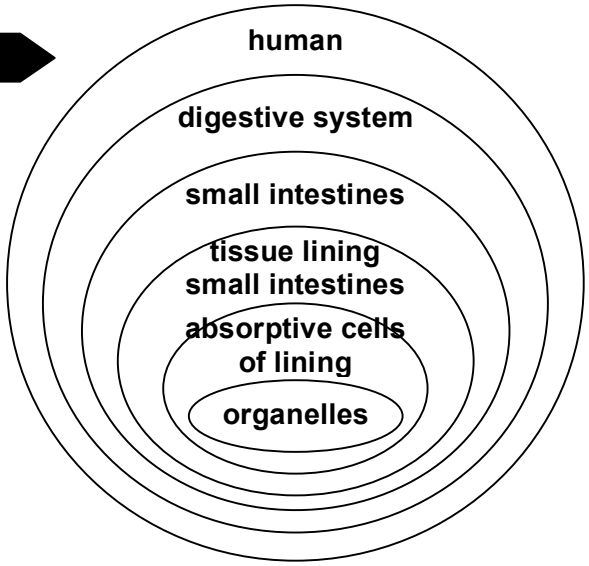
If cells are the building blocks of organisms, then how do you go from a trillion cells to an organized working body? This is done by organizing cells into coordinated groups:

- **organelles** are the working parts of cells
- **cells** are the working units of bodies
- **tissues** are a group of specialized cells working together in one function
- **organs** are a group of tissues working together
- an **organ system** is a group of tissues working together

Complete the labels on this diagram illustrating the organization of living creatures:



Here is a specific example of this organization in the human body:



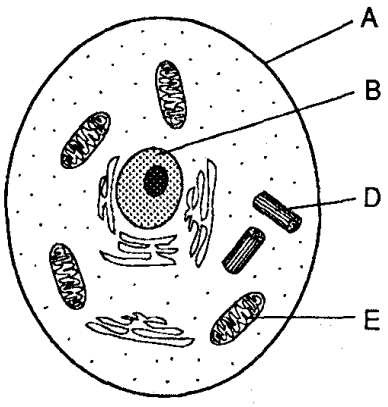
ORGANELLES

Name the following organelles

1. _____
   - controls the cell
   - contains hereditary material (chromosomes, genes, DNA)
2. _____
   - fluid/liquid in the cell – mostly water & salts
   - helps transport material around cell
3. _____
   - carries out cellular respiration
   - gives cell energy ("powerhouse of the cell").
4. _____
   - reads mRNA & builds proteins from amino acids.
5. _____
   - stores food, water and waste
   - food vacuoles may digest large molecules
   - waste vacuoles may excrete waste out the cell membrane
6. _____
   - carries out photosynthesis
   - only found in plant and algae cells
7. _____
   - gives **plant** cell shape, structure and protection
   - NEVER found in animal cells
8. _____
   - separates cell interior from environment
   - controls what enters and leaves the cell
     - material leaves & enters cells through _____
     - signals from other cells are received by _____
     - has _____ which are proteins that identify the cell and prevent the cell from being attacked by its own immune system

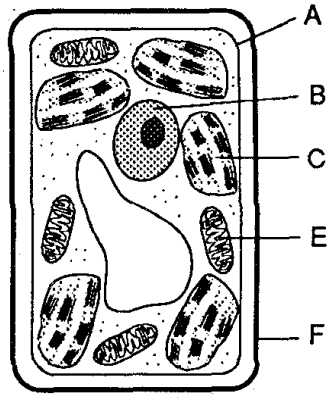
What kind of cell?

_____



What kind of cell?

_____



Label organelles:

A = _____

B = _____

C = _____

D = centriole (helps mitosis)

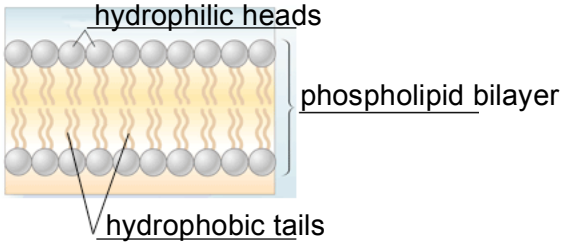
E = _____

F = _____

MOVEMENT ACROSS THE CELL MEMBRANE

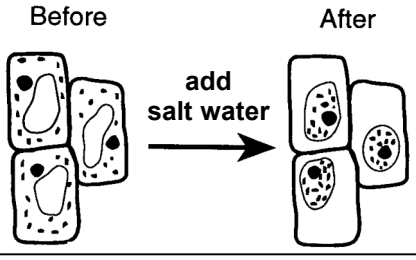
9. All cells need to move materials across the cell membrane.
   - _____, _____, and _____ need to move into the cell.
   - _____, _____, and _____ need to move out of the cell.

   a. The cell membrane is made of a double-sided lipid layer.

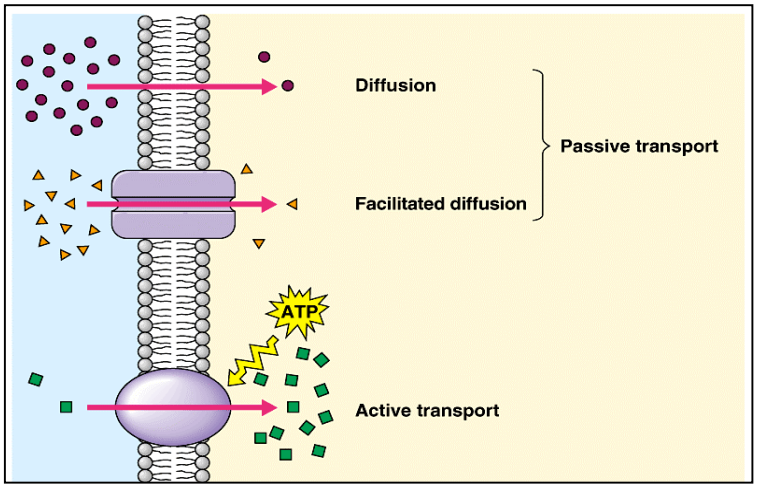


   b. Passive Transport
      - Diffusion: _____
        - Since the flow of materials is from _____ concentration to _____ concentration, diffusion requires _____ energy.
        - Lipids move directly through the membrane, so we call that process **simple diffusion**
        - Other small molecules (like glucose) cannot flow directly across the lipid layer, so there must protein channels that allow them to diffuse through the cell membrane. We call this process **facilitated diffusion** (diffusion with help).
      - Osmosis: _____
        - Since osmosis is just a special case of diffusion — the flow of **water** is still from _____ concentration of water to _____ concentration of water, osmosis requires _____ energy.

   c. Active Transport
      - When cells need to move material in the opposite direction as diffusion, from _____ concentration to _____ concentration, they need to pump it, so this **requires energy**.
      - _____ is the molecule that all cells use as energy.
      - Proteins in the cell membrane act as the active transport pumps.

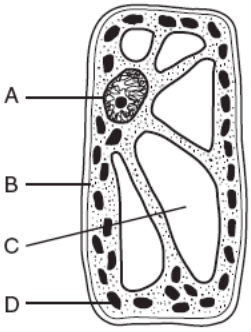


Osmosis: H_2O diffused out of the cells



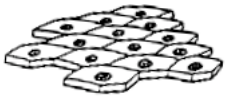
QUESTIONS

1. Which letter in the diagram to the right indicates a cell structure that directly controls the movement of molecules into and out of the cell?

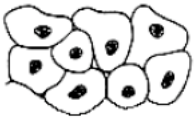


   a. A
   b. B
   c. C
   d. D

2. Some human body cells are shown in the diagrams below.


Cells from skin


Blood cells


Cells from lining of bladder


Cells from lining of trachea

   These groups of cells represent different
   a. tissues in which similar cells function together
   b. organs that help to carry out a specific life activity
   c. systems that are responsible for a specific life activity
   d. organelles that carry out different functions

3. Which sequence illustrates the increasing complexity of levels of organization in multicellular organisms?
   a. organelle → cell → tissue → organ → organ system → organism
   b. cell → organelle → tissue → organ → organ system → organism
   c. organelle → tissue → cell → organ → organ system → organism
   d. cell → organism → organ system → organ → tissue → organelle

4. In a cell, information that controls the production of proteins must pass from the nucleus to the
   a. cell membrane
   b. chloroplasts
   c. mitochondria
   d. ribosomes

5. Describe how *two* of the cell structures listed below interact to help maintain a balanced internal environment in a cell.

   • mitochondrion • nucleus • cell membrane
   • ribosome • vacuole

   In your answer be sure to:

   a. select *two* of these structures, write their names, and state *one* function of each

   b. describe how each structure you selected contributes to the functioning of the other

   a. name _____ _____

      name _____ _____

   b. _____

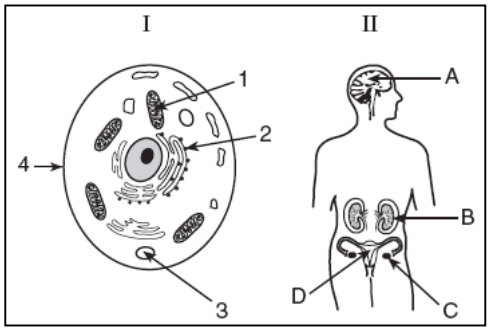
   _____

   _____

   _____

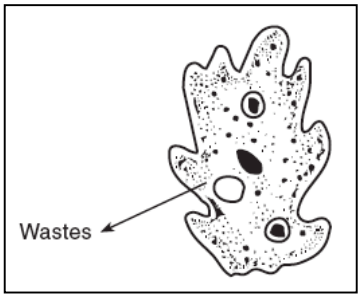
   _____

6. Which structures in diagram I and diagram II carry out a similar life function?



   a. 1 and C
   b. 2 and D
   c. 3 and A
   d. 4 and B

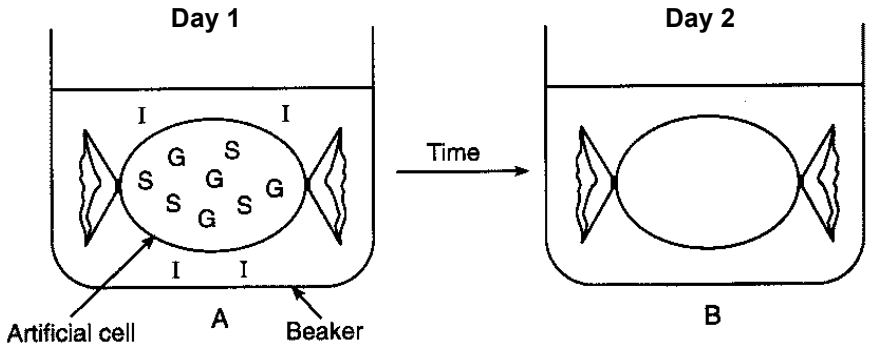
7. A single-celled organism is represented in the diagram below. An activity is indicated by the arrow.



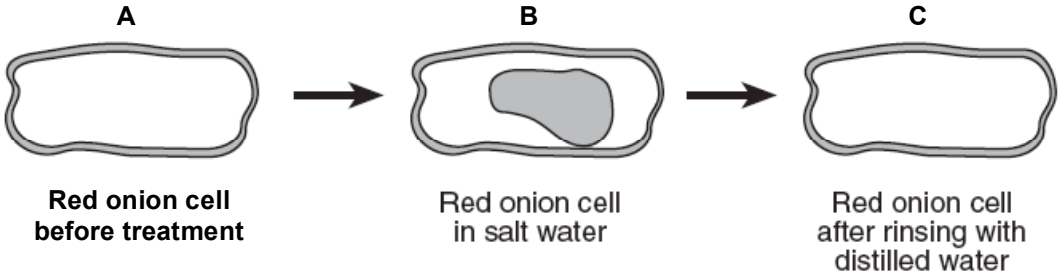
   If this activity requires the use of energy, which substance would be the source of this energy?

   a. DNA
   b. ATP
   c. a hormone
   d. an antibody

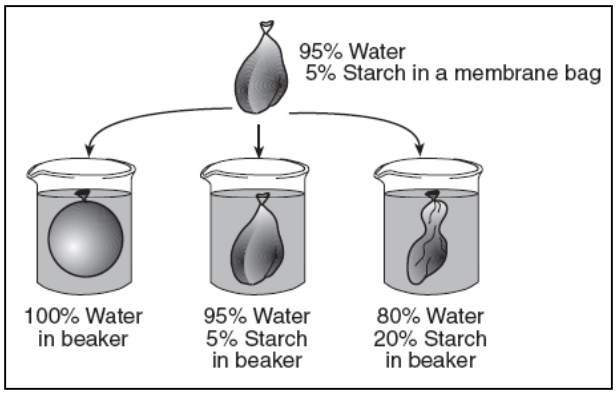
8. Complete the diagram based on the results from the Osmosis and Diffusion Lab we completed this year.



9. A student prepared a wet-mount slide of some red onion cells and then added some salt water to the slide. The student observed the slide using a compound light microscope. Diagram *B* is typical of what the student observed after adding salt water. Complete diagram *A* to show how the contents of the red onion cells should appear ***before*** the salt water treatment. Complete diagram *C* to show how the contents of the red onion cells should appear if the cell were then ***rinsed with distilled water*** for several minutes.



10. An investigation was set up to study the movement of water through a membrane. The results are shown in the diagram at the right.



Based on these results, which statement correctly predicts what will happen to red blood cells when they are placed in a beaker containing a water solution in which the salt concentration is much higher than the salt concentration in the red blood cells?

a. The red blood cells will absorb water and increase in size.

b. The red blood cells will lose water and decrease in size.

c. The red blood cells will first absorb water, then lose water and maintain their normal size.

d. The red blood cells will first lose water, then absorb water, and finally double in size.