MEMBRANE AND TRANSPORT

1) What controls the movement of materials into and out of the cell?

2) What characteristics of the cell membrane determine what gets into the cell and what doesn’t?

3) What determines whether the cell will use the transport proteins?

4) If a cell membrane were composed of just phosphate heads what properties would it have?

5) What different roles and functions do membrane proteins serve?

6) Why would some cells more permeable to some substances (sodium ions, for example) than others?

Complete the following statements.

7) The carbohydrate molecule’s function is...

8) The plasma membrane is composed of a double layer of molecules called __________________________. These molecules, which have a __________________________ head and 2 __________________________ tails, align themselves with the tails pointing toward each other. The mechanical stability of the membrane lies with __________________________molecules. The protein molecules function in __________________________, __________________________ and __________________________.

Write the letter of the definition next to the correct vocabulary word.

9) _____ lipid bilayer
10) _____ selectively permeable
11) _____ passive transport
12) _____ diffusion
13) _____ facilitated diffusion
14) _____ osmosis
15) _____ aquaporin
16) _____ active transport

A) movement of water through a selectively permeable membrane
B) process by which particles move randomly from high to low concentration until equilibrium is reached
C) protein channel in the cell membrane that allows water to pass through
D) type of cellular transport that does not use cellular energy
E) some substances can pass through and others cannot
F) type of cellular transport requiring cellular energy
G) process through which molecules pass through special protein channels in the cell membrane without using energy
H) double-layered sheet that gives the cell membrane a strong, flexible barrier

17) Explain the two main functions of the cell membrane in the cell.

Explain why it is important for cell membranes to be selectively permeable. (Why is this necessary for the cell to survive?)

Complete the table by checking the correct column for each statement:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Isotonic solution</th>
<th>Hypotonic solution</th>
<th>Hypertonic solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes a cell to swell</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doesn’t change the shape of a cell</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causes osmosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causes a cell to shrink</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Complete the following comparison chart for the different types of cellular transport. Place an “X” if the characteristic is true for each type of cellular transport.

<table>
<thead>
<tr>
<th>Type of cellular transport</th>
<th>Does not use cellular energy</th>
<th>Does use cellular energy</th>
<th>Occurs across the cell membrane</th>
<th>Involves proteins in the cell membrane</th>
<th>Involves molecules and/or ions</th>
<th>Based on the random movement of particles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffusion</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilitated diffusion</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active transport</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Match the term with its correct description:

a. Energy 
   d. exocytosis 
   g. passive transport
b. active transport 
   e. endocytosis 
   h. channel protein
c. facilitated diffusion 
   f. carrier protein

- Transport protein that provides a tube-like opening in the plasma membrane through which particles can diffuse
- is used during active transport but not passive transport
- Process by which a cell takes in material by forming a vacuole around it
- Particle movement from an area of higher concentration to an area of lower concentration
- Process by which a cell expels wastes from a vacuole
- a form of passive transport that uses transport proteins
- Particle movement from an area of lower concentration to an area of higher concentration
- Transport protein that changes shape when a particle binds with it

Match the term with its correct description:

a. transport protein 
   d. active transport 
   g. diffusion
b. passive transport 
   e. osmosis 
   h. endocytosis
c. exocytosis 
   f. equilibrium

- The diffusion of water through a cell membrane
- The movement of substances through the cell membrane without the use of cellular energy
- Used to help substances enter or exit the cell membrane
- When energy is required to move materials through a cell membrane
- When the molecules of one substance are spread evenly throughout another substance to become balanced
- A vacuole membrane fuses (becomes a part of) the cell membrane and the contents are released
- The cell membrane forms around another substance, for example, how the amoeba gets its food
- When molecules move from areas of high concentration to areas of low concentration

Label the diagrams of cells using the following terms: **diffusion, active transport, osmosis, equilibrium**. The arrows show the direction of transport. You may use the terms more than once!