My report on "Diffusion, Osmosis, and Active Transport"

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Submission Time: 10/2/13 1:39 PM

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1. After looking at the path taken by several red dye molecules, their motion can best be described as:

(a) moving in a directed way from high to low concentration
(b) moving randomly through collisions in no particular direction
(c) staying close to other red dye molecules
(d) moving in clumps of molecules together

My answer is (b) (11:42:32 AM)

2. It is often stated that substances diffuse from highly concentrated areas to areas of low concentration. Describe how this works if a molecule can't tell that it is in a region of high concentration and just diffuses randomly through collisions.

In areas of high molecular concentration there are more collisions than in area of low molecular concentration, so molecules in high molecular concentration will be randomly moved toward the areas of low concentration, as stated, more so than in areas of low molecular concentration.
(1:01:13 PM)

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1. Set up the model so that there is a high concentration of something outside and a low concentration of that same thing inside. What are the chances that a molecule will move into or out of the cell?

(a) There is a greater chance that a molecule will move from the lower concentrated area to the higher concentrated area.
(b) There is a greater chance that a molecule will move from the higher concentrated area to the lower concentrated area.
(c) There is a equal chance that a molecule will move in either direction.

My answer is (b) (1:04:25 PM)

2. Describe the flow of molecules when there is an area of high and low concentration.

(a) Molecules move from the side with high concentration to low concentration.
(b) Molecules move from the side with low concentration to high concentration.
(c) Both a and b, but there is a greater flow from high to low concentration than low to high concentration.
(d) The flow will be equal in both directions regardless of the starting concentrations.

My answer is (c) (11:48:25 AM)

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1. What is true of the concentrations when equilibrium has been reached?

(a) They will be higher inside the cell.
(b) They will be higher outside of the cell.
(c) They will reach a minimum inside and outside.
(d) They will be the same inside and outside.

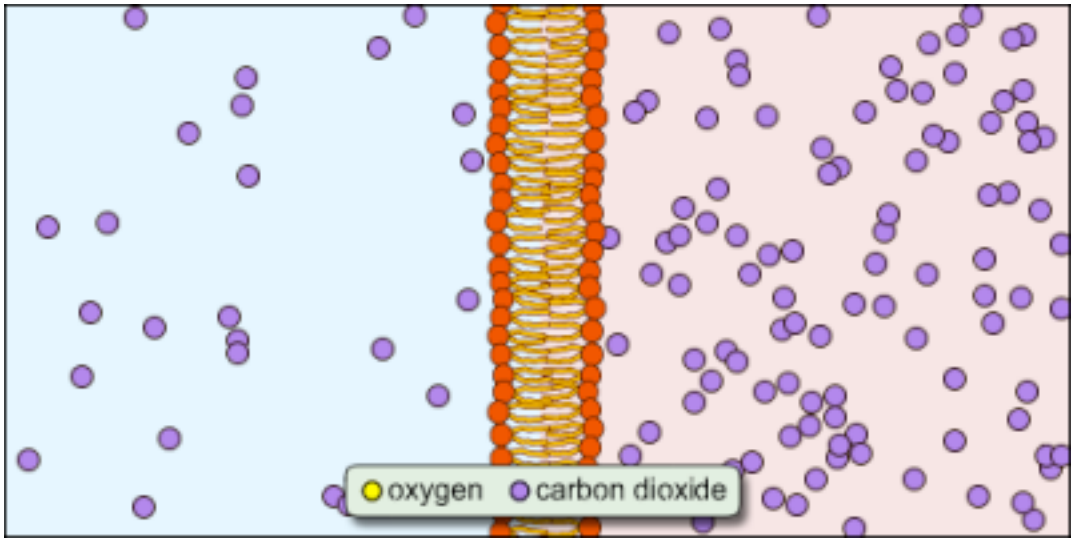
My answer is (d) (11:49:08 AM)

2. What is true of the rate at which molecules move into and out of the cell at equilibrium?

(a) More move into the cell than out of it.
(b) More move out of the cell than into it.
(c) Equal amounts move into and out of the cell.
(d) They move randomly, so it is not predictable.

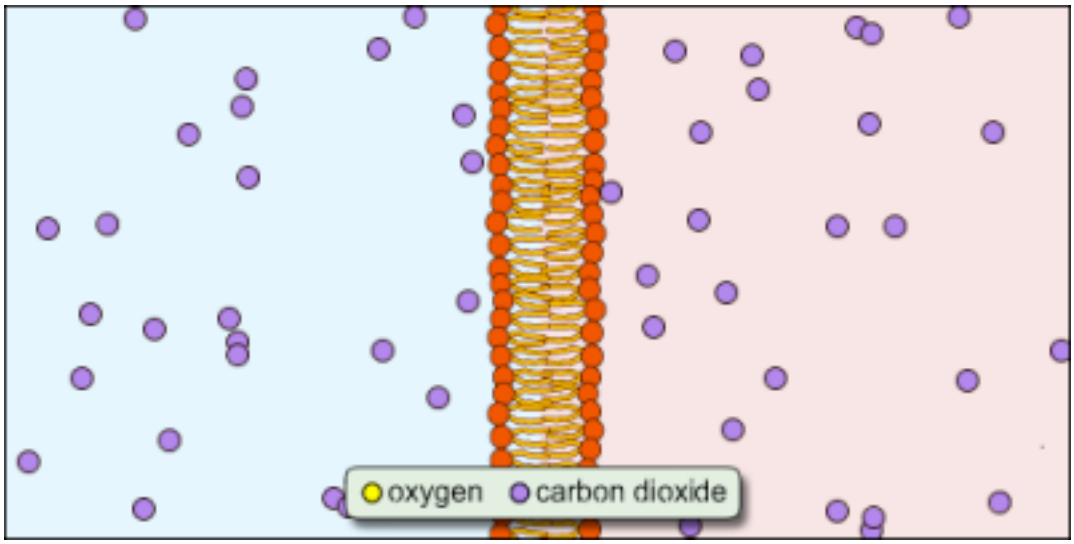
My answer is (c) (11:49:17 AM)

3. Set up the model so that it is NOT in equilibrium. Then use the "snapshot" button below the model to take a picture of your setup. Use the "open" button below to place that image here.



The system appears to still be in the process of reaching a equilibrium. (Not in equilibrium) (1:05:59 PM)

4. Set up the model so that it is IN equilibrium. Then use the "snapshot" button below the model to take a picture of your setup. Use the "open" button below to place that image here.



In equilibrium. (1:06:20 PM)

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1. What happens to the oxygen concentration of the cell when you move it to a new environment?

(a) It stays the same.
(b) It goes up.
(c) It goes down.
(d) It goes up or down until it reaches equilibrium.

My answer is (d) (11:52:31 AM)

2. Explain how a red blood cell delivers oxygen from your lungs to the rest of your body. hint

RBC. When the RBC is in the O2 poor area in the capalaries the O2 in the RBC moves out of the RBC to the area of low O2 concentration. This happens repedatively as blood moves your RBCs around your body. (1:11:49 PM)

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1. Describe what happens when the red blood cell contains hemoglobin:

(a) It is the same as without hemoglobin.
(b) It speeds up the normal diffusion.
(c) It causes the concentration of oxygen to be higher inside the cell when equilibrium has been reached.
(d) It causes the oxygen concentration to be higher outside the cell when equilibrium has been reached.

My answer is (c) (12:00:04 PM)

2. Explain how hemoglobin helps transport more oxygen than could normally be done with simple diffusion:

The hemoglobin (now abbreviated heme) allows the RBC to have a higher concentration of O2 within the RBC than with only difisusion. This allows the RBC to move around the body with more O2 molecules. (1:15:10 PM)

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1. How does surface area affect diffusion rates?

(a) Surface area has no effect on diffusion rate.
(b) Smaller surface area = faster diffusion rate.
(c) Larger surface area = slower diffusion rate.
(d) Larger surface area = faster diffusion rate.

My answer is (d) (12:06:35 PM)

2. Single-celled organisms absorb everything they need directly through their "skin," their cell membrane. However, you could never get enough oxygen if oxygen could only diffuse through your skin. Explain why it is necessary to have lungs with large surface areas:

We cannot take in enough O2 through our skin because the surface area would not be great enough. In the lungs the surface area is much larger, so more O2 can be taken in through the lungs than over the skin. (1:18:51 PM)

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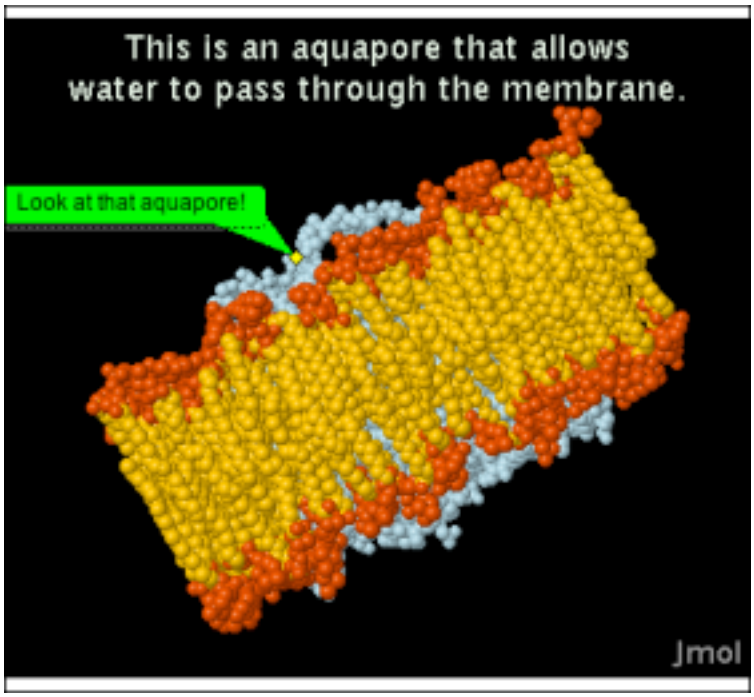
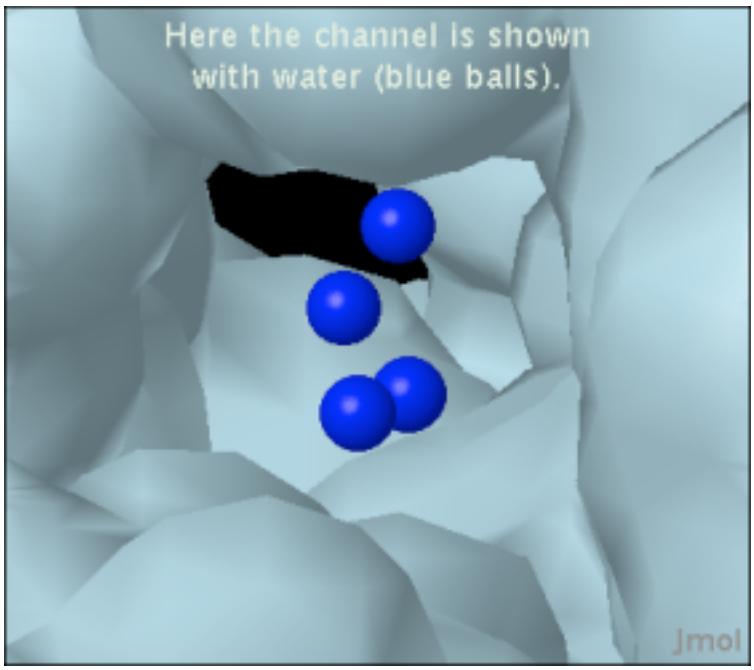
1. Take an image showing a side view of an aquapore poking out of both sides of a piece of cell membrane. (Note: You will need to find the right scene on the molecule tour and rotate the molecule yourself to get the correct image.)



(1:20:10 PM)

2. Take an image showing water going through the channel formed by the aquapore:



(1:22:04 PM)

3. Which are the only types of molecules that pass easily through the cell membrane without an aquapore?

(a) positive ions
(b) negative ions
(c) small non-polar molecules
(d) small polar molecules
(e) medium sized polar molecules

My answer is (c) (12:12:27 PM)

4. What is true of most naturally occuring pores?

(a) They allow only ions to pass through.
(b) They allow most molecules to pass through.
(c) They let anything that is the right size through.
(d) They are specific to one kind of molecule.

My answer is (d) (12:12:43 PM)

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1. Osmotic pressure is related to salt concentrations (or other dissolved substances) in what way?

(a) High concentrations cause high osmotic pressures.
(b) Low concentrations cause high osmotic pressures.
(c) High concentrations cause low osmotic pressures.
(d) It depends on what is dissolved in the water.

My answer is (a) (12:14:22 PM)

2. If you want water to flow out of the cell faster than into the cell you should:

(a) put the cell in pure distilled water.
(b) put the cell in a low concentration of salt or sugar water.
(c) put the cell in a high concentration of salt or sugar water.

My answer is (c) (12:15:32 PM)

3. Cells generally stay in equilibrium with their surroundings. What are two ways you know the cell has reached equilibrium?

(a) Water stops flowing into and out of the cell.
(b) The concentrations inside and outside of the cell are the same.
(c) The osmotic pressure inside and outside of the cell is the same.
(d) The cell gets as small as it possibly can.

My answer is (b) (c) (12:16:24 PM)

4. Describe the similarities and differences between diffusion and osmosis.

Both osmosis and diffusion are the processes by which molecules are moved through the cell membrane (lipid bilayer). Osmosis is only the movement of water across the membrane, while difussion is the movement of small non-polar molecules (like CO2) across the membrane. (1:27:39 PM)

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1. What must be done to get an electric potential (a voltage) across the membrane?

(a) Move all the water to one side.
(b) Make the concentrations equal inside and out.
(c) Make the concentrations of at least one ion different inside and out.
(d) Make the concentrations of both ions different inside and out.

My answer is (c) (12:19:41 PM)

2. How can you get the maximum voltage across the cell membrane?

(a) Move all the water to one side.
(b) Move all the positive to one side.
(c) Move all the negative to one side.
(d) Move all of the ions both + and - to one side.
(e) Move all the positives to one side and negatives to the other.

My answer is (e) (12:20:07 PM)

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1. What factor most affects how much chemical energy you start with?

(a) A low ATP concentration causes a high chemical energy.
(b) A high ATP concentration causes a high chemical energy.
(c) A low calcium ion concentration causes a high chemical energy.

(d) A high calcium ion concentration causes a high chemical energy.

My answer is (b) (12:22:04 PM)

2. Describe how the chemical energy in ATP is converted into electric potential energy. (hint)

As ATP (chemical energy) moves (decreaces) the Ca2+ ions to one side of the cell membrane, therefore the voltage potential increaces because of the difference of high and low concentrations of + and - ions. (1:34:40 PM)