

Unit One Homework Assignment

Chapter 3 / Cell Physiology

The Wacky History of the Cell Theory (6 min)

1. What are the three parts to the cell theory?
2. What did Leeuwenhoek discover?
3. What did Hooke discover?

Diffusion, Facilitated Diffusion, and Active Transport: Movement Across the Cell Membrane (5 min)

1. What is simple diffusion? Is energy required? Is a protein carrier molecule required? Do you need a membrane for diffusion to occur?
2. What is facilitated diffusion? What are the characteristics?
3. What is active transport?
4. What is Fick's Law?

How Osmosis Works (1:42 min)

1. What type of molecules can not cross a lipid membrane?
2. May water cross membrane even though it is charged? Why?
- 3.. What is osmosis?
4. What causes the movement of water molecules when urea is placed on one side of the membrane?
5. When are the two solutions isotonic? Hypertonic? Hypotonic? Water levels in each example?

Osmosis and Tonicity (3:48 min)

1. What is osmosis?
2. What is tonicity?
3. What will happen to a RBC volume if you put the RBC into pure water? Describe the tonicity of the water and cell?
4. What do we call the pressure able to lysis a cell?
5. How do cause the cell to lose volume?

A Tour of a Cell (14 min)

1. Why are cells small?
2. How should you describe the cytoskeleton?
3. What is the meaning of prokaryotic? Type of organisms?
4. What are eukaryotic?
5. What is common between the two cells types?
6. What is the structure/function of the 13 organelles covered in this video? Assign a nickname for each organelle.

Cell Membrane Proteins (8 min)

1. On average, how much protein is in a plasma membrane?
2. What type of lipid molecule is used to make a bilayer?
3. What are the two type of proteins found in the plasma membrane?
4. What are glycoproteins? Used for?

Trans Membrane Proteins (3 min)

1. What are channels?
2. What are the three type of transport across the membrane?
3. What is special about a gated channel?
4. What is active transport? Why is the transmembrane protein called a pump? Need ATP?
5. How are transmembrane proteins used in a conduction pathway (second messenger system)?

Sodium Potassium Pump (1:30 min)

1. Active or passive? What does this mean?
2. What ions are transported? Direction?
3. A phosphate binds to the transmembrane protein to change the proteins shape. Where does the phosphate come from? Do you see what molecular work looks like?

Voltage Gated Channels (1:41 min)

1. What is the status of the voltage regulated channels when membrane is in a membrane resting potential?
2. What happens when the membrane is stimulated?
3. Potassium channels wait but then open? What happens when the potassium channels open?
4. Are these channels active or passive?
5. What causes the hyperpolarized state?
6. Is energy required to bring membrane back to its resting membrane potential? How?

Cotransport (1:30 min)

1. How many particles are transported?
2. How are molecules like amino acids and sugar moved up their concentration gradients?
3. What force is used to move solute against their concentration gradient?
4. What do we call the transmembrane protein if both particles move in same direction?
5. What creates the low sodium concentraton inside the cell that allows sodium to continue to diffuse into the cell?
6. What is counter co-transport? Name for this protein?

Second Messengers (1:30 min)

1. Where is the signal molecule (e.g. hormone) located?
2. What will the hydrophilic signal molecule bind to?
3. What happens to the inside of the same transmembrane protein?
4. What is the outcome from this process?
5. In this example, what is the second messenger?

Endocytosis and Exocytosis (1:50 min)

1. What is the function of endocytosis?
2. What are the three types of endocytosis? Purpose for each?
3. What is the function of exocytosis?

Phagocytosis (1:20 min)

1. What is unique about phagocytes? How?
2. What is a phagosome?
3. What organelle fuse with the phagosome? For what purpose? End stage?

How Glycolysis Works (1:42 min)

1. How do cells produce energy?
2. What is the energy currency of the cell?
3. How is energy used to start glycolysis?
4. What two three carbon molecules are formed from glucose?
5. What are the byproducts produced?
6. What happens to the pyruvate if there is no oxygen?
7. What happens to the pyruvate if oxygen is available?

Krebs Cycle (5 min)

1. What are the products of the Krebs cycle?
2. Where is the Krebs cycle located?
3. What is the first step?
4. What are the products of one cycle of the Krebs cycle (one pyruvate makes)?
5. Where will the NADH and FADH go and for what purpose?

Mitochondria (10 min)

1. What is the simplest assigned function for a mitochondria?
2. Do all cells have the same number of mitochondria? Give examples?
3. What is the significance of the endosymbiosis theory?
4. Where do we get all of our mitochondria from?

How Mitochondria Make ATP (1:42 min)

1. What are the two membranes of the mitochondria?
2. What do we call the core of the mitochondria?
3. What do we call the region between the two membranes?
4. What occurs on the inner membrane?
5. What happens to the H of NADH? Creates what?
6. How do the H return to the matrix? Producing what?

Electron Transport Chain (4:52 min)

1. What is the electron transport chain and where is it located?
2. What is passed from one protein to another?
3. What happens to the reduced NADH when it binds to the first protein of the electron transport chain?
4. How is the ATP made?
5. How do we get rid of the protons and electrons passed down ETC?