An Introduction to Membrane Transport

Use the reading package, **MEMBRANE TRANSPORT** to further your understanding of transport processes involved with the cell membrane. Reading packages are accessible via the course website, located in the Homeostasis/Biochemistry unit section. You be checked on Wednesday for completion of all questions. Use your class time wisely😊

1) Describe how protein channels can discriminate between different types of solutes.
2) Why are protein channels located along nerve axons unique?
3) Transporter proteins can be compared to an engine with a “four step cycle”. **SUMMARIZE** these four steps.
4) How are hormones, like insulin, connected to transport proteins?
5) Make a **VENN DIAGRAM** comparing passive and active transport.
6) In chemistry class, you learn that most of the energy released when bonds break is released as heat. How is it different in living cells? Use the example of ATP and its involvement with active transport (p. 2)?
7) How can a membrane act like a battery? What is this used to make?
8) Active transport can be compared to what happens when “monsoon-like” rains come and flood homes. Identify and explain the similarities.
9) Identify three (3) classes of active transporters. Describe how the Na+/K+ pump contributes to the homeostasis of the cell (ie. ion concentrations).
10) What is the core concept associated with how the membrane is involved with endocytosis?
11) Differentiate between phagocytosis and pinocytosis.
12) An amoeba doesn’t eat like us. It doesn’t have a mouth, nor an esophagus, nor a stomach and digestive tract. Make an analogy of what acts like its mouth, what acts like its esophagus, and what acts like its stomach/digestive tract.
13) Receptor-mediated endocytosis is a special type of pinocytosis. What does this method serve to accomplish? What is needed to do the job?
14) How is the concept of “recycling” connected to this process?
15) Cholesterol is a famous example of receptor-mediated endocytosis. Create a **FLOWCHART** of connecting terms using descriptive linking words (like what you would do for a concept map). The terms you will organize and link together are listed below:

   Endosome, Clathrin-coated pit, LDL receptor, cholesterol, low density lipo-protein, lysosome, cell membrane, cytosol, digestive enzymes, bloodstream

16) Describe what exocytosis is. Where are exocytotic vesicles produced from in the cell?
17) Why is exocytosis an “active transport” process?
18) Three cells are listed below that carry out exocytosis. What does exocytosis do in each cell?
   Pancreatic beta cells        Neurons        Killer T-cells
ADDITIONAL REQUIRED REMEDIATION

The questions on the cell membrane were done poorly on the quiz, calling upon a need for more time on this area. Review your powerpoint notes on cell membrane structure and answer the following questions.

1) What are three constituent molecules that make up the plasma membrane? What molecular property of phospholipids results in them forming bilayers in aqueous environments?
2) In one hyphenated word, describe the cell membrane’s permeability.
3) Describe the experiment that illustrated the drifting of membrane proteins.
4) Describe the major idea underlying the fluid mosaic model. Describe some of the characteristics of the membrane associated with this model.
5) What are two different types of proteins found in the plasma membrane? (in terms of their placement)
6) Some proteins are anchored into the cell membrane. Explain how protein structure allows for this.
7) What are six (6) functions that membrane proteins collectively serve?
8) Describe what glycolipids and glycoproteins are. What are the major functions of these molecules?
9) How would you expect the membranes of Arctic fish to be different than their more southern relatives. Explain why.

For additional help, see http://www.arctic.uoguelph.ca/cpl/organisms/fish/adaptations/coldwatchem.htm

“Cystic Fibrosis is a devastating inherited disease that affects 1 in 2500 Canadian children. The disease is characterized by the build-up of mucus in the lungs and other organs, slowly destroying lung tissue. The problem is caused by a faulty membrane protein that should function to transport chloride ion against its gradient out of the cell. Due to the defect, less chloride ion is released than normal. This results in decreased reabsorption of sodium ion, dehydration of the membranes lining the respiratory and digestive passages, and the formation of thick mucus that is sticky and hard to move. The abnormal secretions also have a reduced ability to kill invading bacteria, leaving susceptibility to infection. The median age of survival is 40 years.”