Names: \_\_\_\_\_\_Colin Quinn\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_Bailey Scott\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Week 3: Cell Structure and Function**

**Part 1: Please note that this lab corresponds with the following Connect resources:   
Section 5.2 diffusion:** “diffusion across a selectively permeable membrane,” “effect of density of media on the rate of diffusion,” effect of molecular weight of diffusion in air,”

**Section 5.3 Osmosis:** “osmosis: tonicity in red blood cells”

**Section 5.4 Enzyme activity:** “enzymes and digestion” and “how enzymes work series ( effect of concentration, effect of pH, effect of temperature, and enzyme activity)”

**Part 2: Relevant textbook passages:**Chapter 3 “Cell Structure and Function”, sections 2 “how cells are organized” through section 6 “metabolism and the energy reactions—but stop after the enzyme section. You can also skip section 5 on cell junctions.

**Complete the worksheet using your textbook and Connect. For any questions that you need to Google (marked with an asterick)\*, please do so but provide a link to a CREDIBLE SOURCE. Answers that are not from credible sources will be counted incorrect.**

**Part 1: Connect resources**

**A. Diffusion:**

**1. Watch the video and record any notes here for** “diffusion across a selectively permeable membrane.”

2. **Watch the video and record any notes here for** “effect of density of media on the rate of diffusion.”

3. **Watch the video and record any notes here for** “effect of molecular weight of diffusion in air.”

B. Osmosis:

1. **Watch the video and record any notes here for** “osmosis: tonicity in red blood cells.”

C. **Enzyme activity:**

**1. Watch the video and record any notes here for** “enzymes and digestion.”

2. **Watch the video and record any notes here for** “how enzymes work: effect of concentration.”

3. **Watch the video and record any notes here for** “how enzymes work: effect of pH.”

4. **Watch the video and record any notes here for** “effect of temperature.”

5. **Watch the video and record any notes here for** “enzyme activity.”

**Part 2: Textbook Chapter 3 sections 2, 3, 4, and 6.**

**3.2 How Cells are Organized**

Using figure 5.4 on pg 47, please fill in the following table.

|  |  |
| --- | --- |
| Composition and Function (definition) | Structure/Organelle |
| Stack of membranous saccules; functions in processing, packaging, and distribution of molecules |  |
| Membranous sacs; storage and transport of substances |  |
| Has a double membrane; responsible for cellular respiration and production of ATP molecules |  |
| Particles that carry out protein synthesis |  |
| Outer surface that regulates entrance and exit of molecules |  |
| Region in nucleus that produces subunits of ribosomes |  |
| Central body, having diffuse threads of DNA and protein |  |
| Vesicle that digests macromolecules and even cell parts |  |
| Composed of microtubules, actin filaments, and intermediate filaments; responsible for the shape of the cell and movement of its parts |  |
| Membranous saccules and canals having no ribosomes; synthesizes lipid molecules |  |

**3.3 The Plasma Membrane and How Substances Cross It (section 3.3)**

1. What are the major parts of the plasma membrane of the cell?

2. What is diffusion? Look at the animation on diffusion. Take notes here on anything that you did not already know or write n/a.

3. What is osmosis? Look at the animation on osmosis. Take notes here on anything that you did not already know or write n/a.

4. Based on the fact that red blood cells maintain a concentration of 0.9% NaCl to maintain homeostasis, consider that the cells are submerged in the bloodstream at all times, which is subject to fluctuation. Fill in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Concentration of NaCl in the blood stream** | **Tonicity (hyper/hypo/iso)** | **Effect on Cells** | **Explanation** |
| 0.9% |  |  |  |
| Higher than 0.9% |  |  |  |
| Lower than 0.9% |  |  |  |

5. What is facilitated transport? Look at the animation on facilitated transport. Take notes here on anything that you did not already know or write n/a.

6. What is active transport? Look at the animation on active transport. Take notes here on anything that you did not already know or write n/a.

7. What is endocytosis? Exocytosis? Look at the animation on endocytosis and exocytosis. Take notes here on anything that you did not already know or write n/a.

**3.4 The Nucleus and Endomembrane System (page 53-54, section 3.4)**

Imagine that a cell produces digestive enzymes that are sent to the digestive tract:

1. Which part of the endoplasmic reticulum would produce these enzymes?

2. How would they be transported to another part of the cell?

3. Which organelle would process and package these enzymes for export?

Imagine that a cell produces a sex hormone (a lipid molecule):

1. Which part of the endoplasmic reticulum would produce these lipid molecules?
2. How would they be transported to another part of the cell?
3. Which organelle would process and package these enzymes for export?

The nucleus produces the subunits of ribosomes.

1. Where in the nucleus are the subunits produced?
2. What part of the nuclear envelope allows them to get out of the nucleus?
3. Where do the subunits go and what happens to them?

**3.6 Enzyme Activity (section 3.6 )**

1. Write a statement relating metabolism, reactants, and products. Watch the animation on biochemical pathways and take notes.

2. What is feedback inhibition? Watch the animation on feedback inhibition and take notes.

3. What is an enzyme? What is a generalized formula to describe the reaction between an enzyme, its substrate and its products.

4. What is energy of activation? What does an enzyme do to the energy of activation for a particular reaction?

Review Questions:

1. Which organelle is responsible for protein synthesis?

2. What term is used to describe the movement of molecules from an area of higher concentration to an area of lower concentration?

3. What is the name for the movement of water across a selectively permeable membrane?

4. Is 10% NaCl isotonic, hypertonic or hypotonic to red blood cells?

5. In general, what does the wrong pH do to the shape of an enzyme?

6. Which organelle carries on intracellular digestion?