Tara Coelho - 12/15/15 (Day 4 )

**\*\*\*Important note: My lock down key is in my desk drawer and lockdown procedure sheets are posted right by the door.\*\*\***

Period 1a (7:30-8:11) - study hall.

Period 1b (8:14 – 8:55) - Room 350 AP Biology - Please tell students to use laptop cart located in room 350 to log into schoology. They can go to our AP Bio page for today’s assignment dated 12/16 and complete the assigned questions.

Any extra time can be used to work on their lab.

\*The documents the AP Bio students will need are part of this document. (Attachments have not been very successful). If you could make 43 copies of each activity, that will cover you for the period 4 class as well.

Period 2 – Free

Homeroom - none

Period 3a (lunch 10:39-11:09 - first wave)

Period 3b (11:14 – 12:40 ) Room 350 – Bio 21 - Please tell students their test will be Friday – I apologize. Kelly Smigala and/or Whitney Walker will be getting a movie for this class. They will watch a movie related to DNA because that is our next unit.

Period 4 (12:45-2:10) Room 350 – AP Bio. – **Same as period 1b.**

**Thank you for covering my classes today!!!**

**Neuron Simulation**

Go to <http://phet.colorado.edu/en/simulation/neuron> and click ‘Run now”.

Use this link if you need help: <http://en.wikipedia.org/wiki/Neuron>

By: Karl Matulis

This is a simulation of the axon of a neuron. Let’s figure out how nerve signals travel down the length of the axon.

1. Zoom in on the neuron. What protein structures are imbedded in the membrane?

2. What substance is there more of outside the neuron? What about inside? (Click “Show concentrations” if you are unsure).

3. a. What is the charge of the inside of the cell? (Click “Show charge”

b. What is the charge of the outside of the cell?

c. If K+ and Na+ are both positive, how might a negative charge come about?

4. Zoom out and slow the sim down. Click “Stimulate neuron”. Holy cow! Describe what you saw.

5. a. Which way did Na+ move? Through what did it move to get there?

b. Which way did K+ move? Through what did it move to get there?

c. What was the wave that moved down the neuron?

d. Why did the K+ and Na+ move?

e. Describe what happens to the charge on the inside and outside after the wave passes.

6. Can you stimulate the neuron again right after firing it? Why?

7. Click the button “Potential chart” Stimulate the neuron and draw the resulting graph below.

What does this graph show?

Label “threshold”, “stimulus”, “resting potential” and “undershoot” on your graph. Make the title “Action Potential”

8. Is there a way to make the signal any stronger? Is there a way to make it stronger in an actual neuron?

9. What is the myelin sheath? Does this simulation have one?

10. How would the signal be different if there was a myelin sheath?

11. Pinch yourself. How fast does this process actually go in your neurons?

12. How is this simulation similar to and different from an actual neuron?

13. How does the signal travel from one neuron to the next? (not in simulation)

13. Write a 3-5 sentence summary explaining how a signal travels down a neuron, using the following terms:

Action potential Na+ K+ Channel

Neuron Threshold Myelin sheath

Resting potential

**MC900359511[1]**Cell Communication Web Quest MC900354132[1]

We have now learned how cells can transport chemicals and molecules into and out of their boundaries (cell membrane/wall), as well as changing the molecular construction of the molecules to create new macromolecules that are needed such as like proteins. We have also briefly discussed the transduction of chemical signals between cells. In this web quest you will use the University of Utah genetics website and some Google searching to learn a little more about signal transduction. **PLEASE READ ALL OF THE INSTRUCTIONS!**

PART 1: Cell Communication- The Basics 🡪 Directions: Use [www.google.com](http://www.google.com) to define the following…

1. What is a cell **surface receptor**?

2. What is an **ligand**?

Go to the following website to study: three types of transmembrane receptors and one type of cytoplasmic receptor.

*NOTE- IF YOU HAVE HEADPHONES YOU WILL WANT TO USE THEM HERE!*

<http://media.pearsoncmg.com/bc/bc_campbell_biology_7/media/interactivemedia/activities/load.html?11&B>

|  |
| --- |
| **Directions:** Using the information on this website, answer questions #3-11 below. |

***Click on the G-protein linked receptor in the animation. Then click on the correct signal molecule to activate the G-protein-linked receptor shown. . (FYI*** *-* ***G protein receptors are found in all eukaryontes and are very versatile signaling molecules. They are the largest group of plasms membrane proteins. One example of a signal molecule that is received by a G protein is epinephrine which communicates with many different cells (liver, lungs, heart, etc) initiating a variety of signal transduction pathways in different areas of the body during fight or flight reaction.).***

3. What are the two events that must happen in order for enzyme activity to occur using a G-protein linked receptor?

***Click on the receptor tyrosine kinase in the animation. Then click on the correct signal molecule to activate the receptor tyrosine kinase shown. (FYI - Tyrosine kinases catalyze the transfer of phosphate groups. These receptors are often used to regulate growth factors used to help cells grow and repair tissues.***

4. How does the bonding of the signal molecule to the receptor tyrosine kinase lead to the activation tyrosine-kinase enzymes?

5. How does the activated receptor tyrosine kinase trigger several different effects within the cell?

***Click on the ion channel receptor in the animation. Then click on the correct signal molecule to activate the ion channel receptor shown.***

6. What are ligand gated ion channels?

7. Explain how signal proteins can activate ion channel proteins.

***Click on the intracellular receptor. Then click on the correct signal molecule to activate the intracellular receptor shown.***

8. Where are intracellular receptors located?

9. List two examples of steroid hormones that act on intracellular receptors.

10. Explain why nonpolar molecules are able to pass through the plasma membrane to bind to intracellular receptors.

11. Explain how steroids cause changes inside a cell.

Go to the following website: ***NOTE- YOU NEED HEADPHONES FOR THIS PART!***

<http://media.pearsoncmg.com/bc/bc_campbell_biology_7/media/interactivemedia/activities/load.html?11&C>

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| ***Directions: Using the information on this website, answer questions #12-17 below.*** |

12. What are signal transduction pathways?

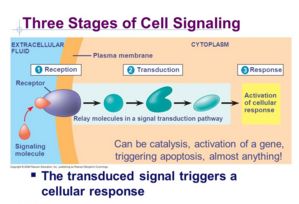
13. List two things signal transduction pathways allow for.

14. What are second messengers?

15. List 2 important second messenger molecules

16. What is a protein kinase?

17. Discuss how protein kinases function to produce signal amplification in a cell.



18. What are three stages of cell signaling?