**![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>

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| **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?