

PUTTING IT ALL TOGETHER... CELL SIGNALING AND HOMEOSTASIS MODELING

PURPOSE: This activity will help you review the process of cell communication and how it helps maintain homeostasis in an organism.

YOUR TASK: You will create an interactive model using cutout pieces of construction paper, clay, play-doh, or another appropriate material to describe the key features/components in a cell signaling pathway system and explain the three stages of cell signaling: reception, transduction, and cellular response. Once completed, you will share your models with your classmates.

PROCEDURE:

- 1) Choose one of these cell signaling pathways:
 - G-protein receptor
 - Ligand-gated ion channels
 - Receptor tyrosine kinases
- 2) Using construction paper, clay, play-doh, or other material, create a model of the cell signaling pathway of your choice.
- 3) To document your modeling and learning, first make a document titled Cell Signaling and Homeostasis Modeling.
- 4) Next, create a model that shows the first step in cell signaling, reception. Take a picture of what you created and paste/insert it in your document under a heading titled RECEPTION. Make sure that your model contains a key so that your classmates and teacher knows what your model represents. Also, describe, in your words, what your model is showing... in other words... TEACH US!
- 5) Now, manipulate and add components to your model that represent the second stage of cell signaling, transduction. Again, take a picture of your model and describe what is happening under the heading titled TRANSDUCTION.
- 6) Finish your model by manipulating your model to show the third stage of cell signaling, cell response. Do like you did before... take a picture of your model and describe what is happening under the heading titled CELL RESPONSE. Make sure you describe specific cell responses that may occur from the particular cell signaling pathway you chose.
- 7) Answer these analysis questions in your document:
 - a) What role does phosphorylation and dephosphorylation play in cell signaling?
 - b) What role do secondary messengers, such as Ca^{+2} and cyclic AMP) play in cell signaling?
 - c) Why are they called secondary messengers?
 - d) What does cell signaling have to do with homeostasis of cells?
 - e) How does what you learned about hormones relate to cell signaling?
 - f) How else, besides cell signaling, do cells do to maintain homeostasis? Be specific!
 - g) Organisms respond to changes in their environment through behavior and physiological mechanisms. Give a specific example of a behavior mechanism and physiological mechanisms of an organism(s).

When you have completed your modeling and document that shows what you created and learned, upload it to the Discussion area created for this learning task. After you have attached your work to your discussion post, summarize what you have learned by doing this activity. Make sure that you open and review other student's work (try to pick a student that chose a different cell signaling pathway) and comment on what you learned and give them some feedback.