**Bozeman Science 032 – Signal Transmission Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Where does adrenaline come from?

What 2 ways do signal transmissions occur?

In what form is glucose found in the liver?

Draw a labeled diagram (or series of diagrams) of the signal transduction pathway as explained in the video.

**Bozeman Science 037 – Cell Communication**

Overview: Copy the introduction concept map below:

*No distance: Immune response example*

a. An antigen is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like bacteria or virus.

b. APC example: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. T-helper cell has to know specifically what the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is.

d. MHC2 is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that brings the surface of that antigen to its surface.

e. CD4 is a protein on the surface of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

f. The activated helper T-cell can then activate:

B Cell so it can make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Killer T cell so it can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Short Distance: local regulator, neuron example*

a. Neurons are not directly connected, neurotransmitters have to cross the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (gap).

b. More important than adding more neurons is adding more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between neurons.

d. After a few hours of exercise, what is released and what does it do?

e. What have humans created that mirror this?

*Long Distance: Growth hormone example*

a. How is a hormone like Facebook?

Summary: Our body cells are like us: You have to know your \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and send a

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Bozeman Science 038 – Signal Transduction Pathways**

Signal Transduction Pathways start with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the form of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ message that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ within the cell.

Two types: a. Protein \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cascade: a phosphate that has \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is passed from one chemical to another until it eventually has an action.

Epinephrine is a **ligand**: a chemical that can’t make its way across a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When epinephrine binds it changes the shape of the G-Protein. What is released?

Adenylyl cyclase is initially an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When the alpha subunit is bound to adenylyl cyclase it converts: \_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_

cAMP is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ messenger

Protein kinase is inactivated when the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ portions are bound.

cAMP binds to the regulatory portions and releases the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The catalytic portions of protein kinase become phosphorylated and are activated; they then can act on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ throughout the cell.

How can this whole process be “amplified”?

Illustrate and label the signal transduction pathway using the examples and terms used in the video.

**Bozeman Science 039 – Effects of Changes in Pathways**

What makes the California newt dangerous?

What actually makes the toxin?

Why is the toxin lethal?

What other organisms make tetrodotoxin?

What is Anthrax?

Why is it bad?

What does the poison in anthrax target? What does it do to the target?

Diabetes Example –

Does insulin go inside of a cell? Explain.

What is “GLUT”?

What is the problem with Type I Diabetes?

What is the problem with Type II Diabetes?