Chapter 7

7.1

1. What is a signal transduction pathway?
2. Distinguish between autocrine and paracrine signals. Give an example of each.

7.2

1. Describe the specificity of receptors. Give examples of receptors and their ligands.
2. Explain the function of
   1. An ion channel receptor
   2. A protein kinase receptor
   3. A G protein-linked receptor
   4. A cytoplasmic receptor

7.3

1. Explain how a signal is amplified. Include an explanation of phosphorylation.
2. Second messengers are often essential to the function of a signal transduction pathway. Describe the role of the following second messengers in a specific signaling pathway: cAMP, Ca2+, NO.
3. Explain how signal transduction is regulated.

7.4

1. Briefly explain the changes caused by signals on cell function.
2. Explain the purpose of direct cell-to-cell communication. Give an animal and plant example.

Prokaryote communication in 26.2

1. How is the use of quorum sensing in bacteria advantageous?
2. How is the use of bioluminescence in bacteria advantageous?

Chapter 41

41.1

1. What are hormones?
2. Hormones can be divided into three chemical groups. What are they?
3. Using the fight-or-flight response, explain how one hormone, epinephrine (adrenaline), can cause multiple and different responses throughout the body.

41.2

1. Why is the pituitary gland so important? How does the pituitary gland serve as the connection between our brain and other endocrine glands?

41.3

1. Explain how the hormones calcitonin, parathyroid hormone, and vitamin D regulate blood calcium levels.
2. Explain how insulin and glucagon regulate blood glucose levels.

Chapter 37

37.1

1. How do plants use hormones, photoreceptors, and signal transduction pathways to help regulate growth and development?
2. Look at Table 37.1. Choose three plant hormones and write down what they do.

37.5

1. Photoreceptors are protein receptors that respond to light. In other words, light is the signal. How is this possible?

Chapter 10 Photosynthesis

10.1

1. What is the literal translation of photosynthesis?
2. What is the chemical equation for photosynthesis?
3. Distinguish between the light (ATP/NADPH producing) reactions and the light-independent (Calvin cycle/carbon fixation) reactions.

10.2

1. What are the dual properties of light?
2. What three things can happen to light/photons when they meet a molecule?
3. What are pigments?
4. What is the difference between an absorption spectrum and an action spectrum?
5. Why are chlorophyll molecules so important for photosynthesis? (Be sure to include the terms light absorption, photosystem, reaction center, and electron donor in your answer.)
6. Statement: Do not worry about differentiating between noncyclic vs. cyclic electron transport. Just understand the electron transport chain depicted in Figure 10.12.
7. What is chemiosmosis? How is a proton (H+) gradient used by ATP synthase enzyme to create ATP?

10.3

1. Statement: Do not get lost in the details of the Calvin cycle. *(Memorization of the steps in the Calvin cycle, the structure of the molecules and the names of the enzymes involved are beyond the scope of the course and the AP exam.)*
2. Using Figure 10.15 as your guide, describe the role of ATP and NADPH in producing carbohydrates in the Calvin cycle.

An additional resource:

Bozeman Science YouTube videos:

* Cell Communication, Evolutionary Significance of Cell Communication, Signal Transduction Pathways, Effects of Changes in Pathways, The Endocrine System
* Photosynthesis, Photosynthesis and Respiration