

Chapter 31: Animal Organization and Homeostasis

1. List the five types of epithelium and identify an example of where each type could be found.
2. Compare and contrast the three major types of connective tissue.
3. Describe the structure and function of skeletal, smooth, and cardiac muscle.
4. Describe the three parts of a neuron, and explain the function of each.
5. Explain how specialization of cells in tissues enhances tissue function.
6. Describe the two main cavities of the human body, and the major organs found in each.
7. List one function of skin that is common to all animals, and one that is unique to a single group.
8. Define homeostasis, and explain why it is an essential feature of all living organisms.
9. Explain how the circulatory, respiratory, and urinary systems specifically contribute to homeostasis.
10. Differentiate between positive and negative feedback mechanisms, and list one specific example of each in animals.

Chapter 32: Circulation and Cardiovascular Systems

1. Identify the general functions of all circulatory systems.
2. Explain how blood differs from hemolymph.
3. Compare and contrast the open circulatory system of an arthropod with the closed system of an annelid.
4. Distinguish the structure and functions of arteries, veins, and capillaries.
5. Compare the path of blood in animals with a one-circuit circulatory pathway vs. a two-circuit pathway.
6. List the major components of the human heart, including the four chambers and four valves.
7. Trace the path of blood through the human heart, lungs, and major vessels leading to the lower leg.
8. Discuss how the SA and AV nodes control the contractions of the heart muscle, and how these electrical charges result in the characteristic patterns seen in an ECG.
9. Explain what specifically causes the sounds of the heartbeat.
10. Discuss why systolic blood pressure is higher than diastolic.
11. List the major types of blood cells and their functions.
12. Compare and contrast the ABO and Rh blood classification systems. Explain why Rh incompatibility is only a problem when a fetus is Rh⁺ and the mother is Rh⁻ but not vice versa.
13. Define capillary exchange, and describe the two major forces involved.

Chapter 33: The Lymphatic and Immune Systems

1. Compare the types of antigens recognized by the innate versus adaptive immune system.
2. Describe the major functions of the lymphatic system.
3. Distinguish between the roles of primary and secondary lymphoid tissues, and list examples of each.
4. List three physical and three chemical barriers of the innate immune system.
5. Describe the four cardinal signs associated with an inflammatory response. How is this response beneficial?
6. Name five cells involved in innate immunity, and the major functions of each.
7. Summarize three specific functions of the complement system.
8. Explain some specific ways that the innate immune system interacts with and influences the adaptive immune system.
9. Compare and contrast the activities of B and T cells.
10. Describe the basic structure of an antibody molecule, and explain the different functions of IgG, IgA, IgM, and IgE.
11. Discuss active and passive immune responses, giving specific examples of each.
12. Discuss the most common immunological mechanisms responsible for allergies, and how these may be treated.
13. Define autoimmune disease, and list several specific examples of these diseases.

2000 Question 2

Feedback mechanisms are used by organisms to maintain the steady-state physiological condition known as homeostasis. Choose three of the following and for each, explain how feedback mechanisms maintain homeostasis.

- Blood glucose concentration
- Calcium ion concentration in blood
- Body temperatures in mammals
- Osmolarity of the blood
- Pulse rate in mammals

2005 Question 4

An important defense against diseases in vertebrate animals is the ability to eliminate, inactivate, or destroy foreign substances and organisms. Explain how the immune system achieves three of the following:

- a) Provides an immediate nonspecific immune response
- b) Activates T and B cells in response to an infection
- c) Responds to a later exposure to the same infectious agent
- d) Distinguishes self from nonself

2007 Form B Question 2

The defenses of the human body to the entry and establishment of a pathogen (disease-causing organism) can be divided into nonspecific responses and specific responses.

- a) Explain how three types of nonspecific defenses can prevent the entry and/or establishment of a pathogen in a person’s body.
- b) Discuss how the immune system responds to an initial pathogenic exposure, and how this initial exposure can lead to a quicker response following a second exposure to the same pathogen.
- c) Explain the biological mechanisms that lead to the rejection of transplanted organs.

2014 Question 2

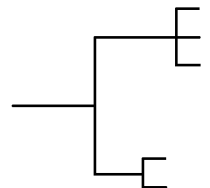
Mammalian milk contains antibodies that are produced by the mother’s immune system and passed to offspring during feeding. Mammalian milk also contains a sugar (lactose) and may contain proteins (protein A, protein B, and casein), as indicated in the table.

MILK COMPONENTS IN DIFFERENT MAMMALS

Character	Cat	Cow	Horse	Human	Pig
Lactose	+	+	+	+	+
Protein A	+	+	+	+	+
Protein B	--	+	+	--	+
Casein	--	+	+	--	+

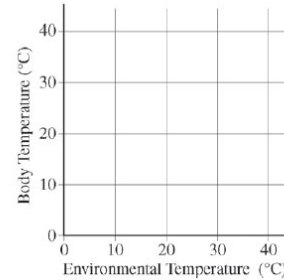
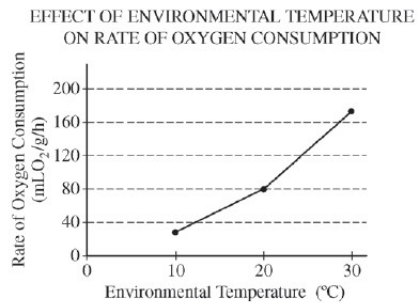
+ indicates the presence of the character, and – indicates the absence of the character

- a. Using the data above, construct a cladogram to indicate the most likely evolutionary relationships among the different mammals. Indicate on the cladogram where each of the characters most likely arose in the evolutionary process, and justify the placement of the characters on the cladogram.
- b. Describe FOUR steps in the activation of the mother’s specific immune response following exposure to a bacterial pathogen. Predict how the mother’s immune response would differ upon a second exposure to the same bacterial pathogen a year later.
- c. Predict the most likely consequence of a nursing infant who is exposed to an intestinal bacterial pathogen (e.g., *Salmonella*) to which the mother was exposed three months earlier. Justify your prediction.



2014 Question 7

- Based on the graph, describe a specific method of thermoregulation used by the species of animal. Provide support for your answer using the data.
- On the labeled axis provided, draw a line to indicate the most likely relationship between body temperature and environmental temperature in the species.



2015 Question 8

An individual has lost the ability to activate B cells and mount a humoral immune response.

- Propose ONE direct consequence of the loss of B-cell activity on the individual's humoral immune response to the initial exposure to a bacterial pathogen.
- Propose ONE direct consequence of the loss of B-cell activity on the speed of the individual's humoral immune response to a second exposure to the bacterial pathogen.
- Describe ONE characteristic of the individual's immune response to the bacterial pathogen that is not affected by the loss of B cells.