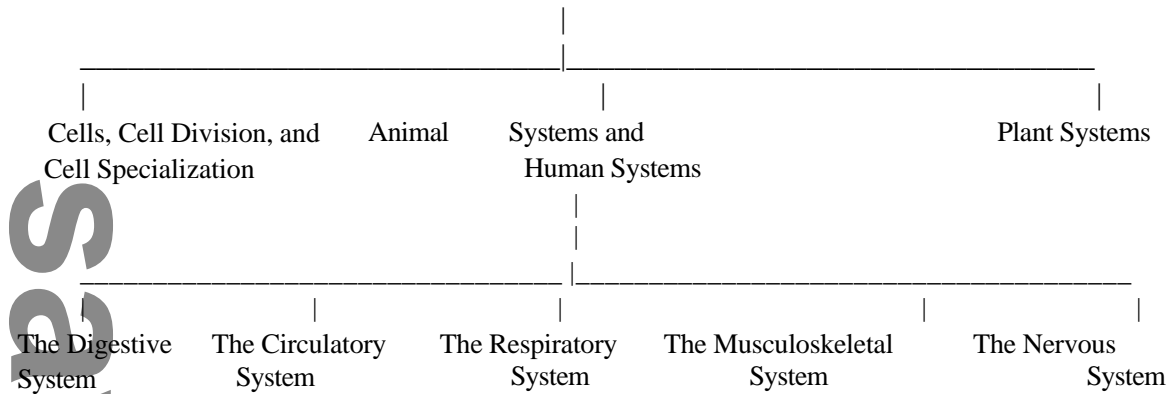


Animal Systems: Interaction of System

Tissues, Organs, and Systems of Living Things



Complex animals are made up of cells, tissues, organs, and organ systems.

Tissues are made up of specialized cells, (i.e. tissue is a group of cells with similar structure and function.).

Organs are structures made up of two or more different types of tissues that work together to do a specific task.

An **organ system** is a group of organs that are co-ordinated to work together to perform a specific body function. Organ systems are made up of groups of organs.

Cell → tissue → organ → organ system → the animal as a whole
 e.g. heart cell muscle heart circulatory system

All animals are made of specialized cells, tissues, and organs that are organized into systems.

Organ systems perform certain functions:

The digestive system takes in and breaks down food into nutrients that cells can use, and rids the body of solid waste.

The circulatory system transports oxygen, carbon dioxide, nutrients, and waste throughout the body. The circulatory system helps to maintain blood pressure, heart rate, and controls temperature, fluid balance and acidity.

The respiratory system controls breathing and supplies oxygen that the cells need and removes carbon dioxide from the blood.

The skeletal system provides a framework for muscles to attach to, protects the soft organs, makes blood cells and stores minerals such as calcium.

The muscular system moves body parts, (such as arms) and organs (such as the stomach), and maintains posture.

The nervous system gathers and interprets sensory information from outside and inside the body, and coordinates all the functions of the organ system. It controls breathing, appetite, and heart rate directly, and waste removal, body temperature, and water levels indirectly.

The urinary system removes wastes from all other systems, (—the circulatory system delivers the wastes to be removed), and helps to control fluid balance and acidity.

Each organ system interacts with at least one other organ system.

Organ systems do not work independently; organ systems interact with each other to keep the organism functioning.

The systems of the body are interdependent. The jobs that one system carries out depends on and influences jobs carried out by other systems.

For example:

1. The digestive system relies on the circulatory system to deliver the nutrients to the entire body of the organism.

The respiratory system provides oxygen to the circulatory system.

The circulatory system delivers this oxygen and the nutrients to body cells.

Carbon dioxide from cells is delivered from the circulatory system back to the respiratory system so it can exit the body.

The circulatory system carries the waste from throughout the organism to the urinary system, which takes care of excreting the waste from the organism.

2. The circulatory system and the respiratory system interact to deliver oxygen to and to remove carbon dioxide from cells.

3. The nervous and the musculoskeletal systems interact to coordinate movement.

Systems of the Human Body

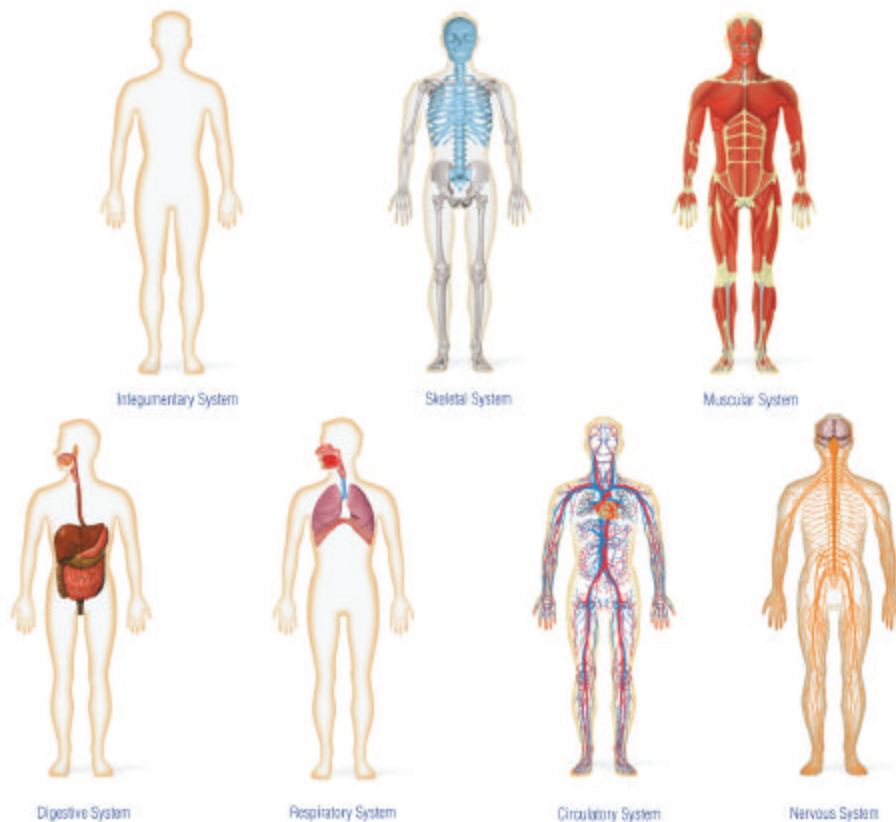


Figure 2.16 The 11 organ systems in the human body

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Fill in the following table:

Organ System Interactions

	Nervous system	Circulatory system	Digestive system	Respiratory System	Musculoskeletal system
Nervous system controls ...		heartbeat	muscle contraction	breathing	muscle stimulation
Circulatory system supplies ...					
Digestive system supplies ...					
Respiratory System supplies ...					
Musculoskeletal system supplies ...					

The circulatory system interacts with all organ systems in the body delivering oxygen and nutrients and removing carbon dioxide and wastes.

One system can supply the necessary materials to all other systems, without these materials the other organ systems could not function— i.e. this interaction is necessary because all cells of the body require nutrients and oxygen, which the blood delivers.

Because the systems influence each other, problems in one system may lead to problems in another. For example, heart disease could affect organs in systems outside the circulatory system. Heart disease may affect the excretory system or respiratory system because these systems work closely with the circulatory system.

For example, eating does not just involve the digestive system, it also involves the circulatory system and the nervous system. The food eaten is used for growth and repair of all body systems.

Assignment

- What function do the circulatory and the respiratory systems work together to perform?
 - Identify two other examples of two or more organ systems working together to perform a certain function.
- Explain how the digestive system works with the circulatory system to provide nutrients to the cells.
- Your body is said to be in “homeostasis” when there is a healthy balance in its internal conditions and processes (body temperature, blood pressure, heart rate, breathing rate). Explain how the circulatory, respiratory, digestive, and nervous systems contribute to homeostasis.
- Single-celled organisms do not need organ systems. Why not?
- Which organ system interacts with most other systems in the body?
 - Explain why it is advantageous for the system named in (a) to be integrated with so many other systems.
- Use a diagram and words to explain how the digestive and circulatory systems work together.
- Plants and animals, including humans, are made of specialized cells, tissues, and organs that are organized into systems. How can heart disease affect organs in other systems?
- Consider a human-made system, for example a computer network, a sewage system, a post office, or a train station. Compare the human-made system chosen by you to an organ system in the human body and explain the basic functions in each.
- Match the Vocabulary word with the description:

Word	Description
1. capillary	a. location of respiration
2. intestines	b. the largest organ of the body
3. skin	c. thin-walled blood vessel
4. stomach	d. two pumps in one organ
5. heart	e. area of chemical digestion and absorption of nutrients
6. lungs	f. churns food and mixes it with enzymes for digestion

- Match the body system with its function:

System	Function
1. nervous system	a. transportation of nutrients, dissolved gases, and wastes to and from the body
2. respiratory system	b. response to the environment and control of body activities
3. excretory system	c. chemical and physical breakdown of food into molecules small enough to pass into cells.
4. digestive system	d. exchange of oxygen and carbon dioxide.
5. circulatory system	e. removal of waste