

Homework 28.1: Levels of Organization

KEY CONCEPT The human body has five levels of organization.

Humans, like all multicellular organisms, are made up of specialized cells that work together. These cells arise from a single cell, the zygote, which divides to form embryonic stem cells. Stem cells can become any one of more than 200 different types of cells. Cell specialization involves determination and differentiation.

Determination occurs when stem cells commit to become only one type of cell, such as a muscle cell. Committed cells still retain all the genetic information needed to build an entire organism.

Differentiation is the process by which committed cells acquire the structures and functions of highly specialized cells. For example, a skeletal muscle cell acquires a nucleus and a long body. Programmed cell death, or apoptosis, is also an important part of developing individual structures such as individual fingers or toes.

The human body has five levels of organization.

- Specialized **cells** are characterized by their specific structures and functions.
- A **tissue** is a group of similar cells that work together to perform a specialized function. Four tissue types are epithelial, connective, muscle, and nervous tissue.
- An **organ** is a structure composed of different types of tissues that function together.
- An **organ system** is two or more organs working together in a coordinated way.
- An **organism** is made up of all the organ systems that work together to support life. What affects one organ or organ system can affect all organs or organ systems. The human body is made up of 11 organ systems.

1. Which kind of cells can become any type of cell in the body?

2. What is the difference between determination and differentiation?

3. Label each item in the list below according to its level of organization.

Item	Level of Organization
lungs	
heart and blood vessels	
red blood cells	
skeletal muscle	
human being	

Section Quiz 28.1: Levels of Organization

Choose the letter of the best answer.

- _____ 1. Which of the following processes results in cells losing their potential to become any type of cell?
- specialization
 - determination
 - differentiation
 - apoptosis
- _____ 2. Which cells are produced during the first few divisions of the zygote?
- epithelial cells
 - cardiac muscle cells
 - bone cells
 - embryonic stem cells
- _____ 3. Which of the following is the most complex level of organization in a multicellular structure?
- organ systems
 - cells
 - organs
 - tissues
- _____ 4. The major organ system that eliminates waste products is the
- endocrine system.
 - excretory system.
 - reproductive system
 - integumentary system.
- _____ 5. Apoptosis is a normal part of
- determination.
 - development.
 - systems.
 - tissues.