

7-4 Notes – Diversity of Cellular Life

The differences among living things arise from the ways in which cells are specialized to perform certain tasks and the ways in which cells associate with one another to form multicellular organisms.

Unicellular Organisms

- Unicellular organisms are made up of only one cell.
- Unicellular organisms dominate life on Earth.

Multicellular Organisms

Organisms that are made up of many cells are called multicellular.

There is a great variety among multicellular organisms.

Specialization



Cells throughout an organism can develop in different ways to perform different tasks.

This process is called **cell specialization**.

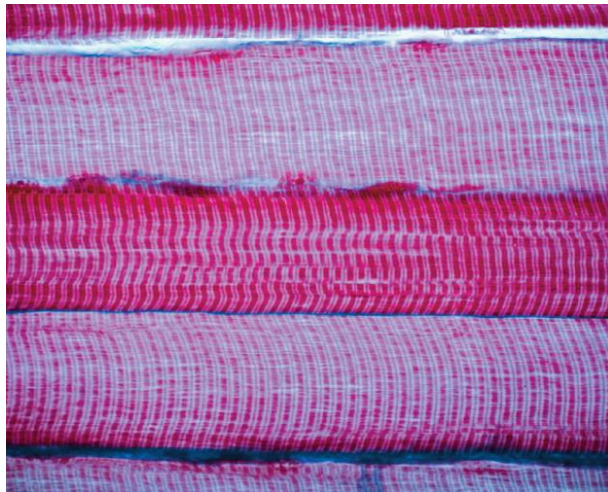
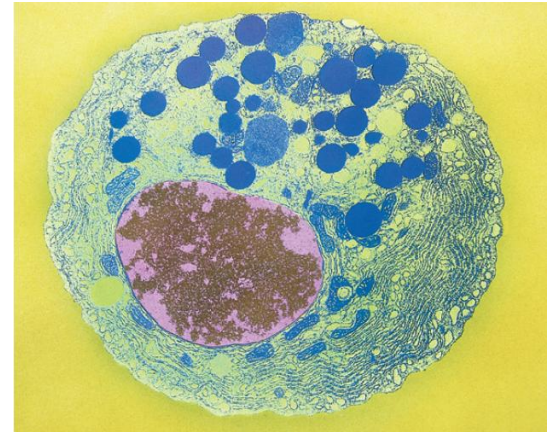
Specialized Animal Cells

- Animal cells are specialized in many ways.

- **Red blood cells transport**
- **oxygen.**



Cells in the pancreas produce proteins



Muscle cells allow movement.

Specialized Plant Cells

Plants exchange carbon dioxide, oxygen, water vapor, and other gases through tiny openings called stomata on the undersides of leaves.

Highly specialized cells, known as guard cells, regulate this exchange.

Stomata enclosed by guard cells.



What are the four levels of organization in multicellular organisms?

Levels of Organization

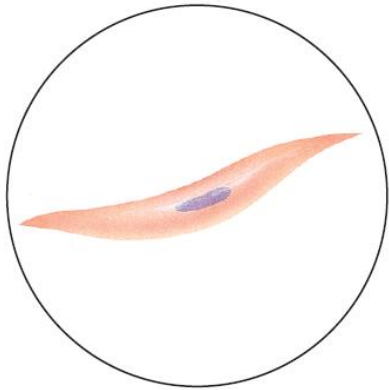


The levels of organization in a multicellular organism are:

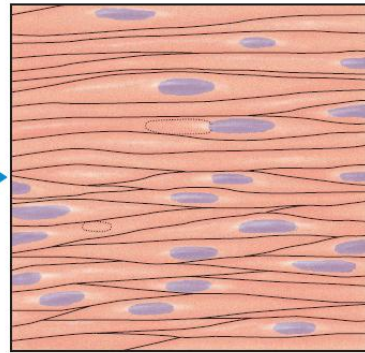
- **individual cells**
- **tissues**
- **organs**
- **organ systems**

Levels of Organization

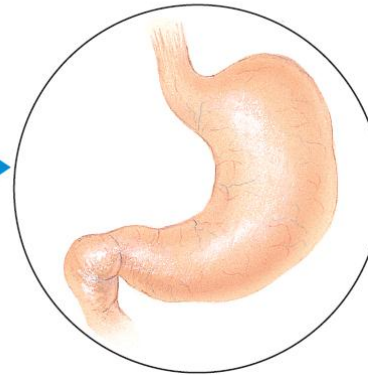
Muscle cell



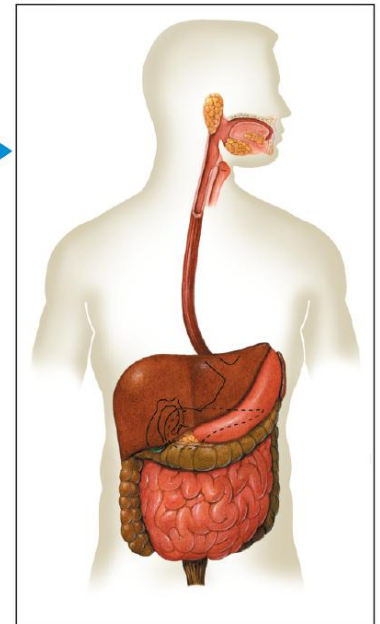
Smooth muscle tissue



Stomach

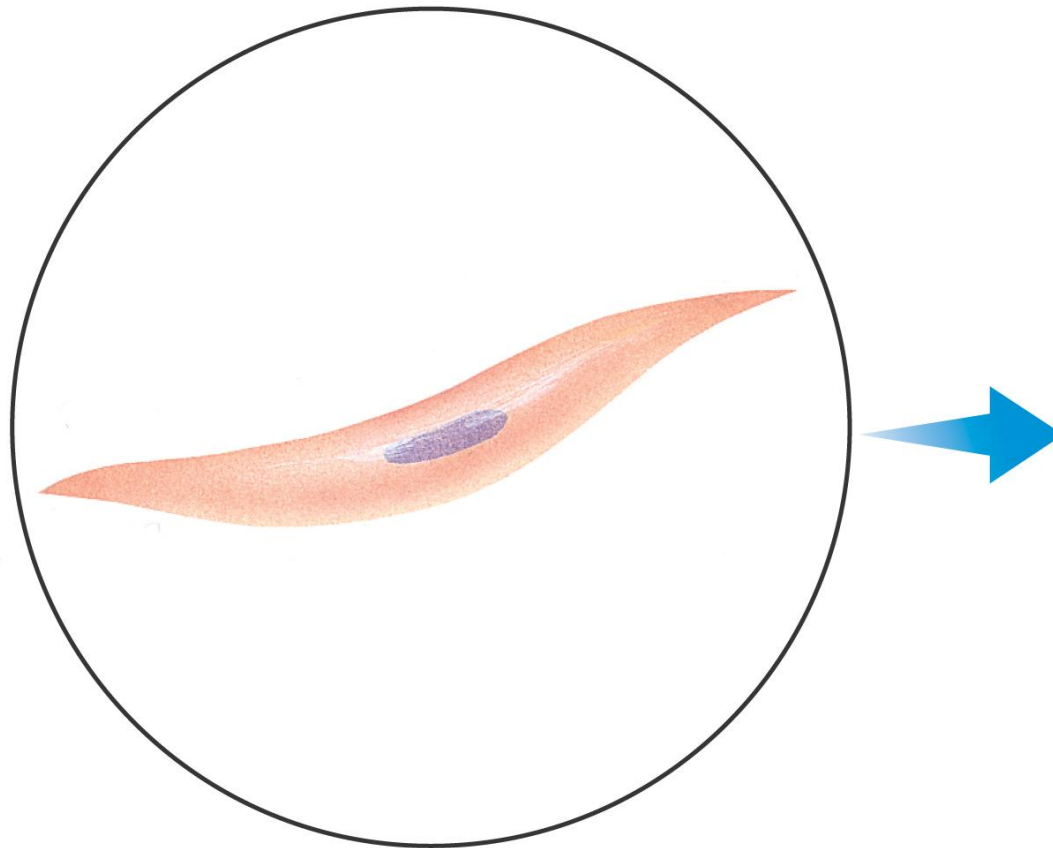


Digestive system



In multicellular organisms, cells are the first level of organization.

Muscle cell

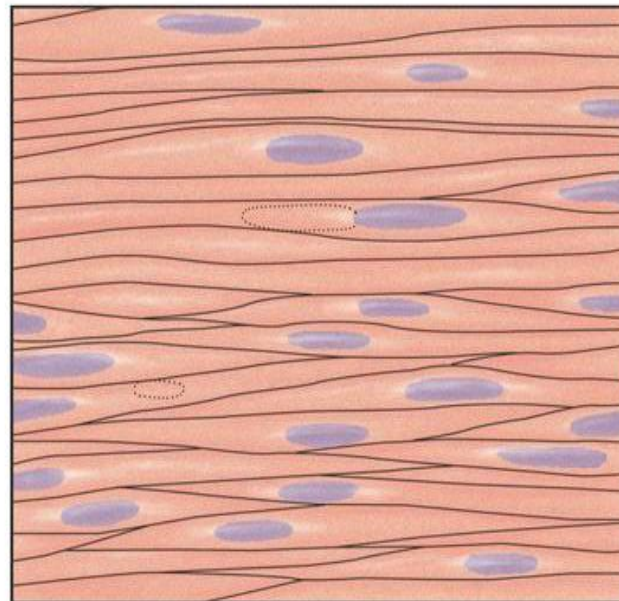


Tissues

Similar cells are grouped into units called tissues.

A **tissue** is a group of similar cells that perform a particular function.

Smooth muscle tissue

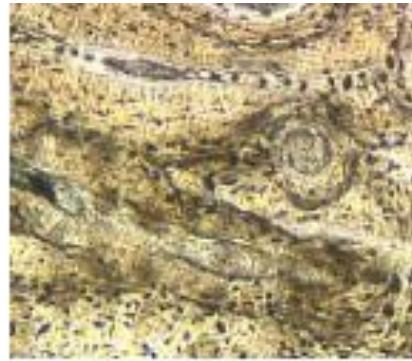


Most animals have four main types of tissue:

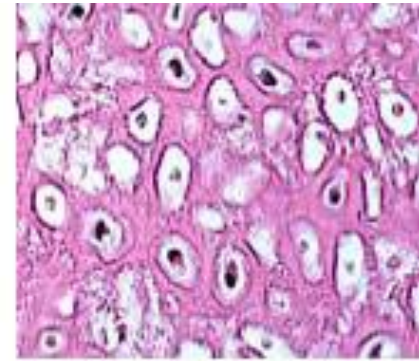
- muscle
- epithelial
- nervous
- connective

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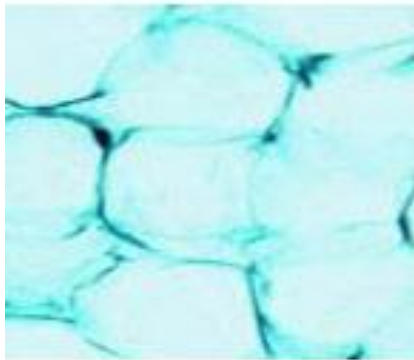
Histological images
of various tissues
in the body



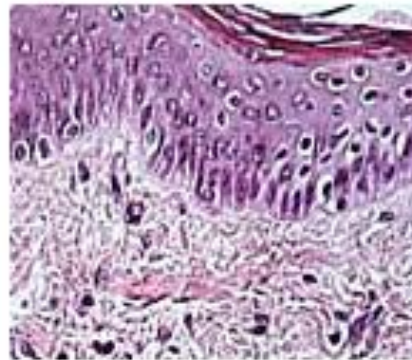
Bone



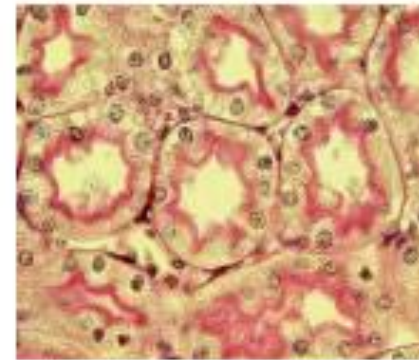
Cartilage



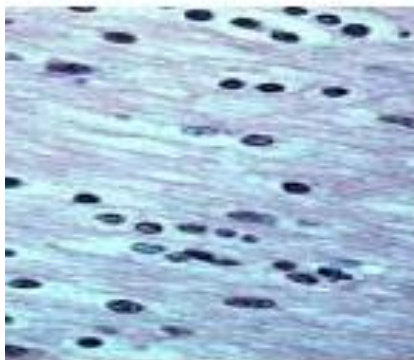
Adipose Tissue



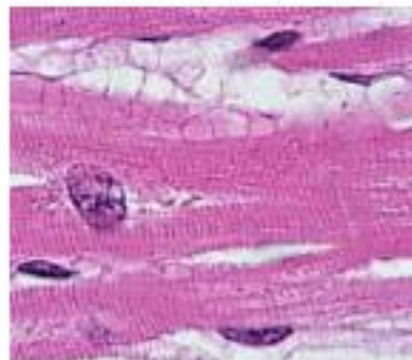
Skin



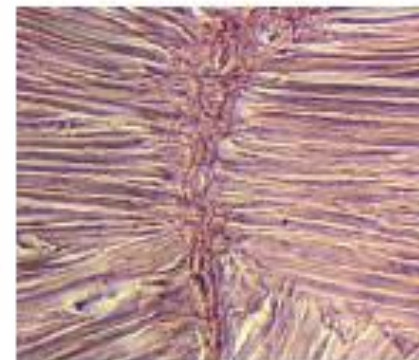
Intestinal Villi



Neural Tissue

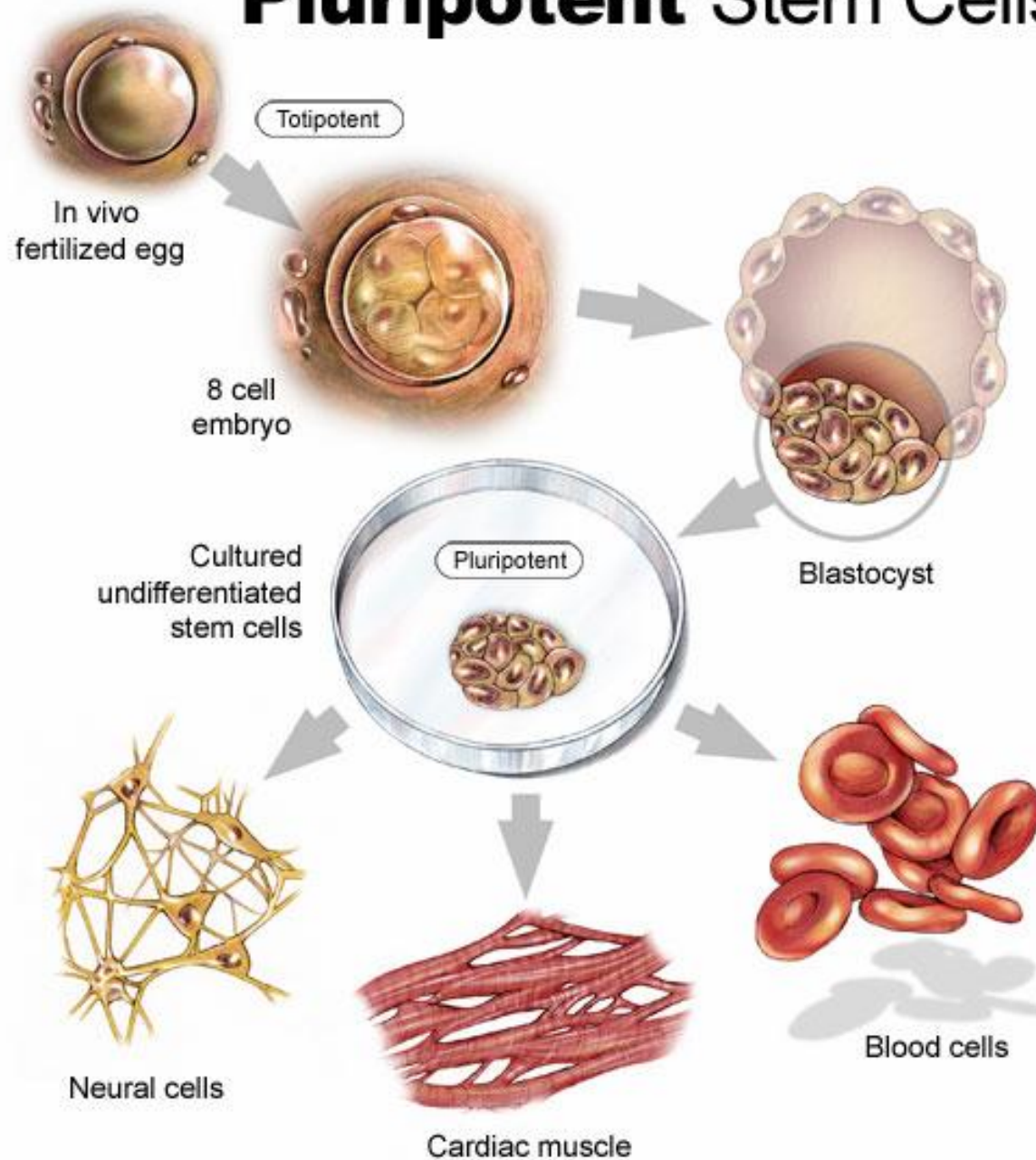


Cardiac Muscle



Skeletal Muscle

Pluripotent Stem Cells

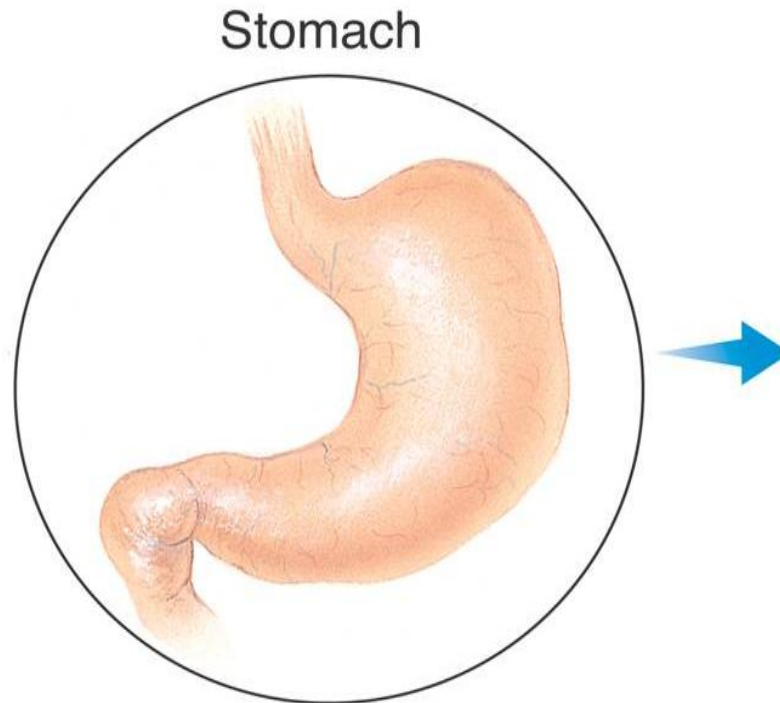


News from Oct. 6th

http://www.sciencenews.org/view/generic/id/335029/title/Stem_cell_advance_uses_cloning

Organs

Organs are groups of tissues that work together to perform a specific function.

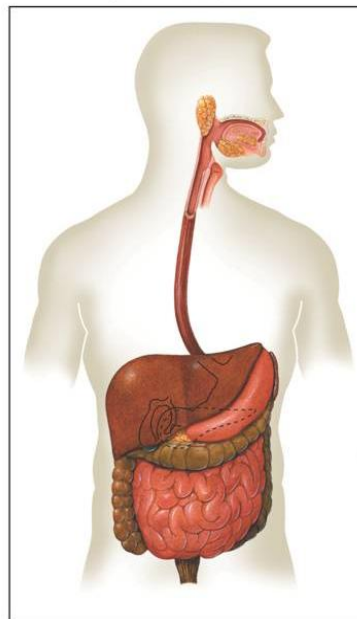


Organ Systems

In most cases, an organ completes a series of specialized tasks.

A group of organs that work together to perform a specific function is called an **organ system**.

Digestive system



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7-4 Section QUIZ

1 Cell specialization is characteristic of

- a. bacteria.
- b. all unicellular organisms.
- c. yeasts.
- d. multicellular organisms.

2 Which of the following cells is specialized for contraction?

a. muscle cell

b. red blood cell

c. pancreatic cell

d. nerve cell

7-4 Section QUIZ

3 The stomach is an example of a(an)

a. tissue.

b. organ.

c. organ system.

d. organism.

7-4 Section QUIZ

4 Which of the following shows the levels of organization in an organism from the simplest to the most complex?

- a. organ system, organ, cell, tissue
- b. tissue, cell, organ, organ system
- c. cell, tissue, organ, organ system
- d. cell, organ, tissue, organ system

7-4 Section QUIZ

5 Which of the following would probably contain the greatest variety of specialized cells?

- a. an organ system
- b. a tissue
- c. an organ
- d. a multicellular organism