

SNC2D BIOLOGY

TISSUES, ORGANS & SYSTEMS OF ...
☛ Specialized Cells
(P.40-41)

Specialized Cells

You begin life as a single fertilized egg cell, which quickly divided and produced two daughter cells. After about 10 days and many cell divisions, some of the cells started to differentiate, or become different from each other. By day 22, the cells that became your heart muscle began to beat. Other cells became bone, nerve, and skin cells.



Specialized Cells


*Cells that have differentiated from each other are called specialized cells. A **specialized cell** has a special structure so that it can perform a specific function. Specialized cells come from non-specialized cells in a process called **cellular differentiation** or **cellular specialization** (although all cells have the same DNA information, they are not all alike). And, like other cells, they can be damaged, preventing them from performing their specific function.*

SPECIALIZED CELL

- ❖ cell that has unique features so that it can perform a specific function
- ❖ come from non-specialized cells

Specialized Cells


NOTE!
You could think of your body as being similar to PECEI. The building takes in and uses energy. It has special rooms just for physical education, music, and science. The office is the control centre. While PECEI may have about 20 specialized classrooms controlled by the office, your body contains more than 200 different kinds of specialized cells controlled by your brain.



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Activity: Specialized Animal Cells

INTRODUCTION
Animal cells show a wide variety of specializations. They differ internally as well as externally. Cells such as muscle cells that use a lot of energy, for example, have a lot of mitochondria. Similarly, cells that help keep dirt out of the lungs by secreting mucus (i.e. goblet cells) have many Golgi bodies.



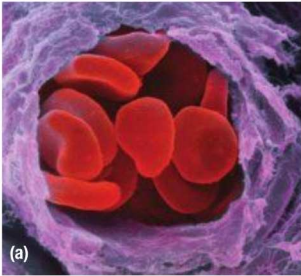
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Activity: Specialized Animal Cells

INSTRUCTIONS
A. Look at the following photos and try to determine (i) the type of cell and (ii) its function.

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Activity: Specialized Animal Cells

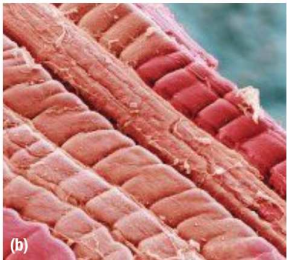


(a)

Red blood cells contain hemoglobin that carries oxygen in blood. The cells are smooth so that they can easily pass through the blood vessels.

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Activity: Specialized Animal Cells




(b)

Muscle cells are arranged in bundles called muscle fibres. Muscle cells can contract, which makes the fibre shorter and causes bones to move.

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Activity: Specialized Animal Cells

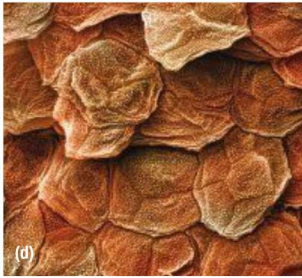


(c)

Fat cells have a large vacuole in which to store fat molecules. This is how the cell stores chemical energy.

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Activity: Specialized Animal Cells

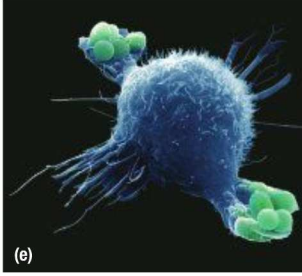


(d)

Layers of skin cells fit together tightly, covering the outside of the body to protect the cells inside and to reduce water loss.

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Activity: Specialized Animal Cells

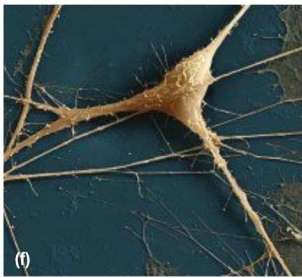


(e)

White blood cells can move like an amoeba to engulf bacteria and fight infection.

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Activity: Specialized Animal Cells

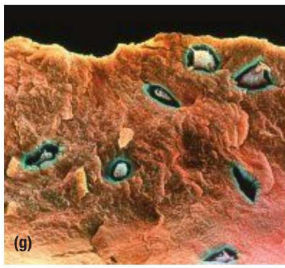


(f)

Nerve cells are long, thin, and have many branches. They conduct electrical impulses to coordinate body activity.

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Activity: Specialized Animal Cells



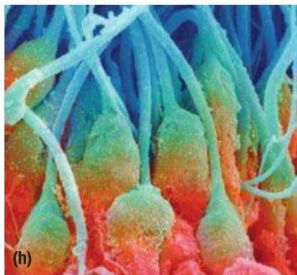
Bone cells collect calcium from food and allow the growth and repair of bones. They build up bone around themselves, creating the body's skeleton.

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Activity: Specialized Animal Cells



Sperm cells are able to move independently, carrying DNA from the male parent to join with an egg cell from the female parent.

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Activity: Specialized Animal Cells



Some animals that are active mainly at night, and others that live deep in the ocean, have cells that can emit light. These cells are called photophores.

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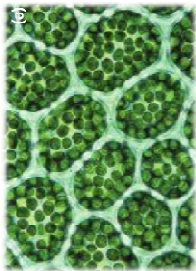
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Activity: Specialized Plant Cells

INTRODUCTION

Plants also have specialized cells that enable them to carry out specific functions. Chloroplasts are specialized cells that perform photosynthesis just below the surface of leaves, whereas other cells are specialized to absorb water. Just as in animals, these specialized cells develop from unspecialized cells during the process of cellular differentiation.



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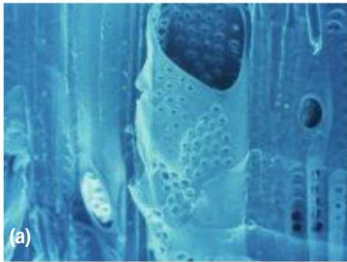
Activity: Specialized Plant Cells

INSTRUCTIONS

A. Look at the following photos and try to determine (i) the type of cell and (ii) its function.

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Activity: Specialized Plant Cells

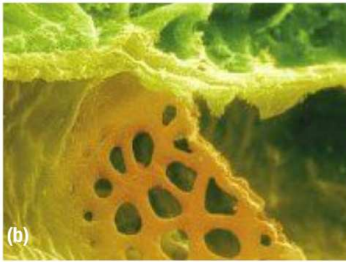


(a)

Some plant cells transport water and dissolved minerals throughout the plant.

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Activity: Specialized Plant Cells

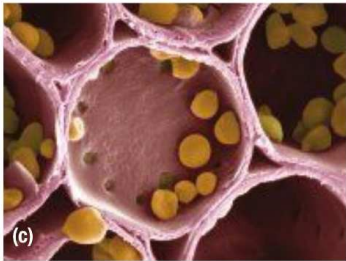


(b)

Other cells transport dissolved sugars around the plant.

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Activity: Specialized Plant Cells

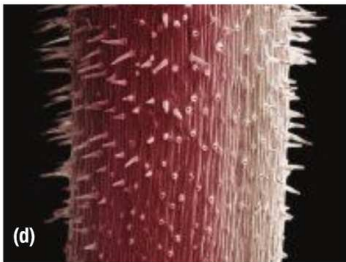


(c)

Storage cells contain special structures that store starch, a source of energy for the plant.

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Activity: Specialized Plant Cells




(d)

Epidermal cells on young roots have hairs that absorb water from the soil.

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 **Activity: Specialized Plant Cells**



(f)

Guard cells in the surface of leaves control water loss.


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 **✓ Check Your Learning**

1. Why are our bodies made up of specialized cells?

the cells of our body cannot do everything – the tasks are shared between specialized cells

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 **✓ Check Your Learning**

2. What are some advantages and disadvantages of cell specialization?

advantages
- perform one job very efficiently and effectively

disadvantages
- specialized cells can be damaged and thus cannot do their job

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✓ Check Your Learning

3. Identify at least two kinds of cells that a personal fitness trainer would be concerned about in a client.

muscle and fat cells
