


Module 3: Cell Biology - Structure and Function

Topic 3 Content: Cell Differences Notes

Introduction

Cell Differences	Click each of the terms to investigate the differences between plant and animal cells.
Select a difference:	
Cell Wall	
Vacuoles	
Chloroplasts	
Centrioles	
Shape	
Size	
Nucleus	
Lysosomes	



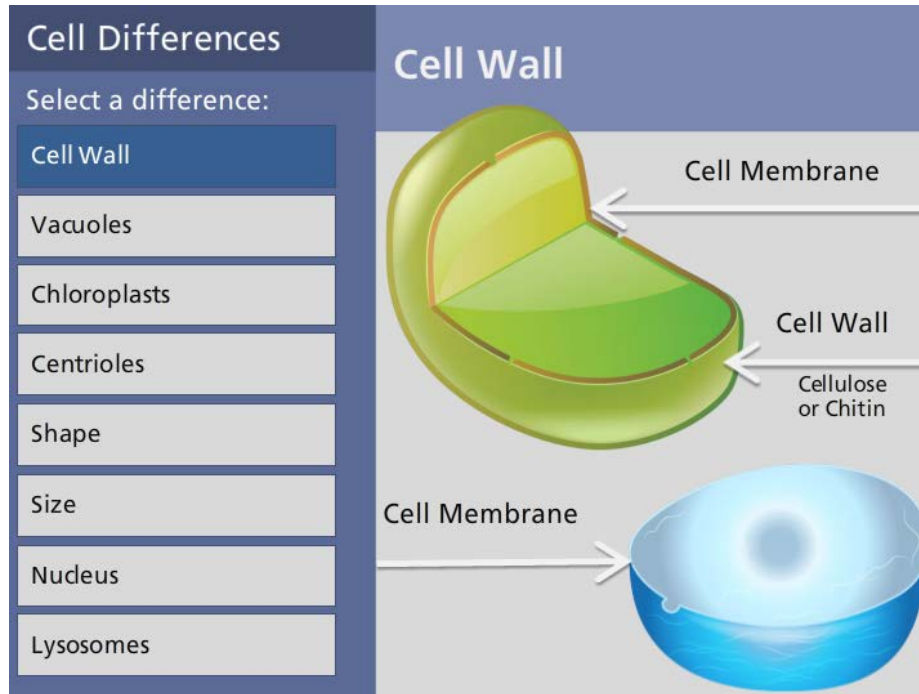
The diagram illustrates the structural differences between a plant cell and an animal cell. The plant cell (top) is rectangular with a thick cell wall, a large central vacuole, and green chloroplasts. The animal cell (bottom) is rounded and lacks a cell wall and large central vacuole, but contains a prominent nucleus and various organelles like mitochondria and lysosomes. The 'whro EDUCATION' logo is visible in the bottom right corner of the diagram area.

There are several differences between plant and animal cells. Click each of the terms to investigate these differences.

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Cell Wall

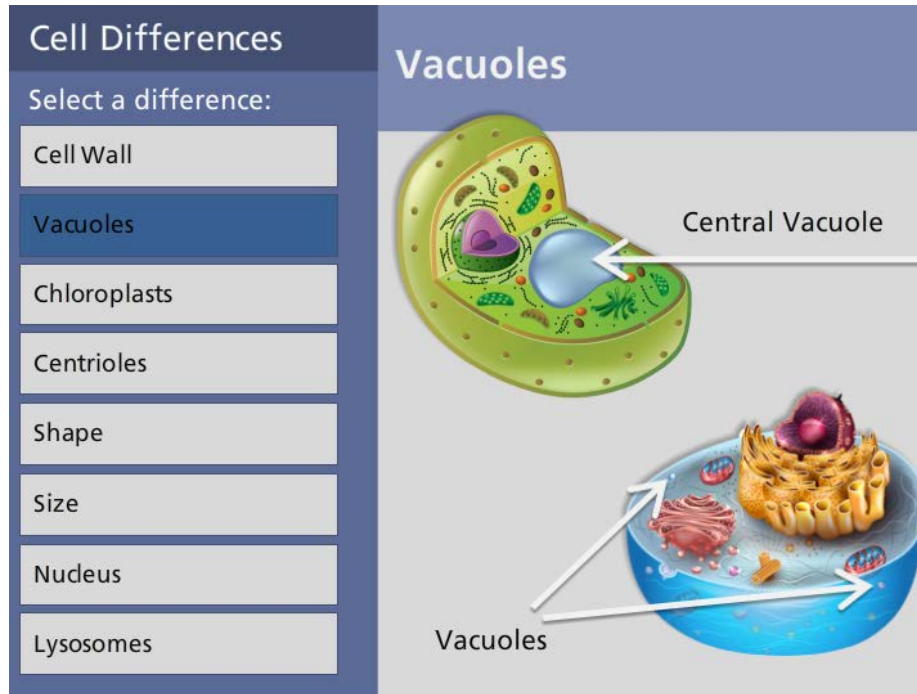


If you look at both a plant and animal cell without the organelles, you will observe a very noticeable difference. Plant cells have an extra surrounding layer called a cell wall. Animal cells do not contain this rigid barrier. In plants, the purpose of the cell wall is to provide protection and structure. The cell wall is composed of cellulose in plants and chitin in fungi. Both plant and animal cells contain a semipermeable layer surrounding the cytoplasm called the cell membrane.

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Vacuoles



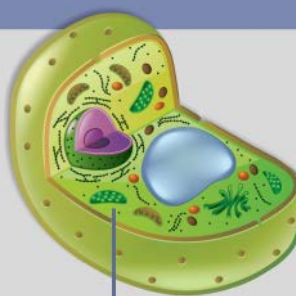
Plant cells contain one large central vacuole, while animal cells contain several smaller vacuoles. Vacuoles provide storage for water and other nutrients. In plant cells, the larger central vacuole is useful in providing structure for the cell.

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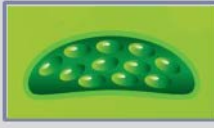
Topic 3 Content: Cell Differences Notes

Chloroplasts

Cell Differences	Chloroplasts
Select a difference:	
Cell Wall	
Vacuoles	
Chloroplasts	
Centrioles	
Shape	
Size	
Nucleus	
Lysosomes	



Plants are autotrophic, meaning they produce their own food.



Chloroplasts contain chlorophyll, giving the plants green color and the ability to undergo photosynthesis.

Plant cells are autotrophic, while animal cells are not. This means that plant cells are capable of producing chemical energy from light energy in a process called photosynthesis. This process happens in a special structure called a chloroplast. It occurs in plant cells, some protists (like algae), and bacteria. The chloroplast contains a pigment called chlorophyll, which traps the energy from sunlight. The chlorophyll gives the leaves and stems of a plant the green color.

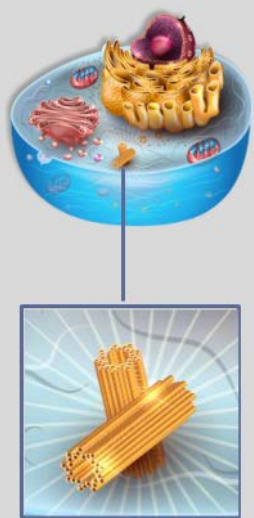
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Centrioles

Cell Differences	Centrioles
Select a difference:	
Cell Wall	
Vacuoles	
Chloroplasts	
Centrioles	
Shape	
Size	
Nucleus	
Lysosomes	

Centrioles function during cell division by organizing spindle fibers and are only found in animal cells.

The diagram shows a cross-section of an animal cell with various organelles. A centriole is highlighted in yellow. A blue line connects this centriole to a magnified inset below it, which shows two cylindrical structures made of microtubules arranged in a 9x3 grid pattern.


Animal cells, and some protists cells, contain centrioles. Centrioles are formed from microtubules, and are organelles that function during cell division by organizing spindle fibers. They are in the cytoplasm of the cells, usually near the nucleus. Centrioles do not exist in plant cells.

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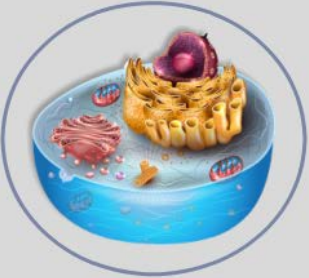
Topic 3 Content: Cell Differences Notes

Shape

Cell Differences	Shape
Select a difference:	
Cell Wall	
Vacuoles	
Chloroplasts	
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Plant cells are square in shape.



Animal cells are round in shape.


Animal cells are round and irregular in shape while plant cells have fixed rectangular shapes.

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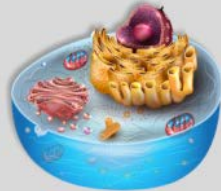
Topic 3 Content: Cell Differences Notes

Size

Cell Differences	Size
Select a difference:	
Cell Wall	
Vacuoles	
Chloroplasts	
Centrioles	
Shape	
Size	
Nucleus	
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Plant cells are 10 to 100 micrometers.



Animal cells are 10 to 30 micrometers.

Plant cells are usually larger than animal cells. Plant cells can range from 10 to 100 micrometers. The smaller animal cells range from 10 to 30 micrometers.

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Nucleus

Cell Differences	Nucleus
Select a difference:	
Cell Wall	
Vacuoles	
Chloroplasts	
Centrioles	
Shape	
Size	
Nucleus	
Lysosomes	

Nucleus is off to one side.

Nucleus is located in the center.

The nucleus lies in the center of animal cells. In plant cells, the nucleus lies toward one side in the cytoplasm.

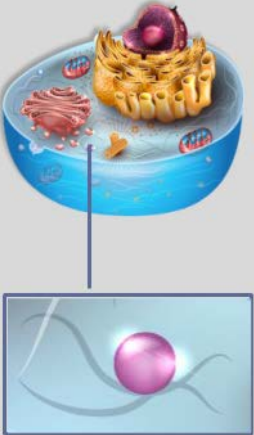
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Lysosomes

Cell Differences	Lysosomes
Select a difference:	
Cell Wall	
Vacuoles	
Chloroplasts	
Centrioles	
Shape	
Size	
Nucleus	
Lysosomes	

Lysosomes are found in animal cells and rarely found in plant cells.



The diagram shows a cross-section of an animal cell with various organelles. A lysosome is highlighted in pink. A line connects this lysosome to a magnified inset below, which shows a single lysosome as a small, spherical, pink organelle with a darker pink core.

Lysosomes are found in animal cells and are rarely evident in plants cells. It is suggested that a plant's central vacuole is performing the function of the lysosome, which contains digestive enzymes.