

Main Topic: Cell Structures

Learning Objectives/Outcomes: describe the structures and functions of cell organelles.

| Topic 1: plasma membrane | Topic 2: cytoplasm | Topic 3: organelles |
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| <p><u>Ideas</u></p> <p>Where is the plasma membrane located?</p> <ul style="list-style-type: none">- The plasma membrane surrounds the cell to contain its fluids (cytoplasm) and organelles <p>Describe plasma membrane.</p> <ul style="list-style-type: none">- The border around “Cell City” – openings within the border allow for the movement of people, materials, and messages <p>Describe the function of plasma membrane within the cell.</p> <ul style="list-style-type: none">- The plasma membrane regulates interactions between the cell and the environment; allowing nutrients to enter and wastes to exit <p>How do plasma membranes work?</p> <ul style="list-style-type: none">- The hydrophilic heads attract water into the membrane and are then propelled away by the hydrophobic tails. Lastly the water is pulled across the membrane by the 2nd hydrophilic head. | <p><u>Ideas</u></p> <p>What is cytoplasm?</p> <ul style="list-style-type: none">- Refers to the contents inside cells <p>What does cytoplasm consist of?</p> <ul style="list-style-type: none">- Consists of three things: cytosol, cytoskeleton, and organelles. <p>What is cytosol?</p> <ul style="list-style-type: none">- Gel-like fluid that fills the cell, holds organelles in place, and aids in waste break down and energy transformation (metabolism). <p>What is cytoskeleton?</p> <ul style="list-style-type: none">- A vast network of proteins (“microtubules”) that support the cell’s shape like a skeleton | <p><u>Ideas</u></p> <p>What is an organelle?</p> <ul style="list-style-type: none">- Specialized subunits within cells that perform specific functions- “little organs” <p>Describe a cell nucleus.</p> <ul style="list-style-type: none">- A spherical membrane-bound organelle that holds the cell’s genetic material (DNA)- The cell’s “brain” <p>What is the function of the nucleus?</p> <ul style="list-style-type: none">- It contains the cells genetic information which tells the rest of the cell how to function and what to do. <p>What is found inside the nucleus?</p> <ul style="list-style-type: none">- DNA (genetic information)- Chromatin- Every human cell has 6 feet of DNA! |

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| <p>What is the plasma membrane made up of?</p> <ul style="list-style-type: none"> - The plasma membrane is made of a phospholipid bilayer. A single phospholipid has a hydrophilic head and a hydrophobic tail. <p>What does it mean to be hydrophilic?</p> <ul style="list-style-type: none"> - Hydrophilic means water loving and attracts water molecules. <p>What does it mean to be hydrophobic?</p> <ul style="list-style-type: none"> - Hydrophobic means water fearing and pushes water molecules away. | <p>List 3 functions of the cytosol and cytoskeleton.</p> <ul style="list-style-type: none"> - Serves as roads for organelles and vesicles to travel along - Support the cell's shape like a skeleton - Aids in waste break down and energy transformation (metabolism). <p>What are organelles?</p> <ul style="list-style-type: none"> - Specialized subunits within cells that perform specific functions - "Little Organs" | <p>What is chromatin?</p> <ul style="list-style-type: none"> - Chromatin - a mass of genetic material composed of DNA and proteins that condense to form chromosomes <p>What surrounds the nucleus?</p> <ul style="list-style-type: none"> - The <u>nuclear envelope</u> is a membrane that envelops the nucleus that isolates and protects the cell's DNA <p>Describe the function of the nucleolus in the nucleus.</p> <ul style="list-style-type: none"> - Dense, protein-rich region in the nucleus - Produces subunits which form ribosomes - Visibly darker than the rest of the nucleus <p>Describe the function of ribosomes.</p> <ul style="list-style-type: none"> - Non-membrane bound structures which receive directions from the nucleus on how, when, and in what order to make specific proteins - Free floating in the cytosol or bound to the Endoplasmic Reticulum |
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| | | <p>Describe endoplasmic reticulum.</p> <ul style="list-style-type: none">- A series of folded membranes which process proteins and sends them to the cell membrane to be exported <p>What are the two types of endoplasmic reticulum?</p> <ul style="list-style-type: none">- Two types:- Smooth ER –has no ribosomes- Rough ER – is studded with ribosomes <p>What is the function of smooth ER?</p> <ul style="list-style-type: none">- Smooth ER processes substances like lipids <p>What is the function of rough ER?</p> <ul style="list-style-type: none">- Rough ER –located next to the nucleus proteins created here are pushed into the sacs for processing <p>What is the Golgi apparatus?</p> <ul style="list-style-type: none">- Also called <i>Golgi Body</i> or <i>Golgi Complex</i>- Stacked, flattened membranes which process and modify proteins that are then packaged into vesicles. |
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| | | <p>What is the role of vesicles?</p> <ul style="list-style-type: none">- Vesicle: small membrane-bound sacs that carry products across the cell <p>What is the function of mitochondria?</p> <ul style="list-style-type: none">- Oval-shaped structures with folded internal sides giving them a large internal surface area- The site of respiration – conversion of chemical energy stored in food (primarily glucose) into ATP (the cell's energy source), CO₂, and H₂O <p>What is the function of lysosomes?</p> <ul style="list-style-type: none">- Fluid-filled 'bags', containing digestive chemicals for breaking down food molecules, cell wastes, and worn-out cell parts- Some materials are recycled and reused by the cell others are removed from the cell- Also defend against infection |
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Key Vocabulary

plasma membrane
phospholipid bilayer
hydrophilic
hydrophobic

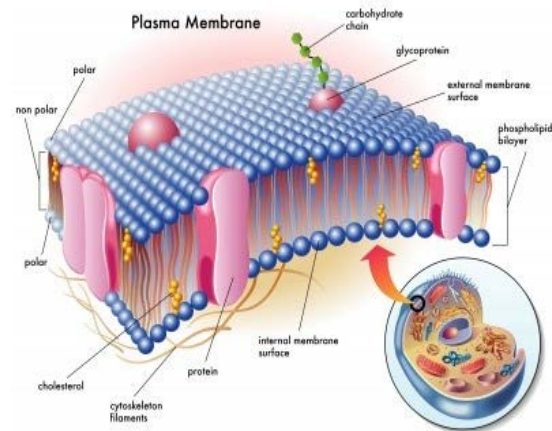
Key Vocabulary

cytoplasm
cytosol
cytoskeleton
organelles

Key Vocabulary

nucleus
chromatin
nuclear envelope
nucleolus
ribosome
endoplasmic reticulum
smooth ER
rough ER
Golgi apparatus
vesicle
mitochondria
lysosome

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