Chapter 1 and 2 Review

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Cell Organelles

Specialized parts of the cell which perform specific functions:

- Cell membrane: semi-permeable barrier holds the cell together.
- Cytoplasm: jelly-like clear material suspending the organelles.
- Nucleus: the control center of a cell. Contains cell's genetic material (DNA).
- Nuclear membrane: envelope that surrounds the nucleus; regulates movement of materials.
- Nucleolus: inside the nucleus; makes ribosomes.
- Ribosome: site of protein synthesis.
- Endoplasmic reticulum: transports materials within the cell.
- Mitochondria: converts sugars into energy (ATP)
- Golgi bodies: store and transport cell products, package and ship proteins
- Vacuole: storage reservoirs
- Lysosome: breaks down cell materials with digestive enzymes
- Cell wall, chloroplast, centriole...

Genetic Material

- DNA: genetic instructions used for development of cells.
- Chromatin: strands of DNA inside nucleus.
- Chromatid: a pair of two identical copies of DNA, joined at centromeres.

Animal cell

No chloroplasts. Shape is less rigid due to lack of cell wall.

Plant cell

Contains unique organelles: cell wall, chloroplast

Cell Composition

All cells are made of organelles which reside in the cytoplasm.

Eukaryotes

Complex cells with a nucleus.

Prokaryotes

Simple cells that lack a nucleus, most often unicellular organisms.

Cell cycles

A cell goes through various stages of life. Cell division is to grow, repair, and reproduce.

Cells

Interphase

Longest phase of cell cycle. The DNA is replicated.

Mitosis

First stage of cell devision. Controlled by nucleus. All animal and plant cells (except sex cells) made by mitosis.

Prophase

Chromatin turn into chromosomes then become chromatids. Nuclear membrane disintegrates. Centrioles move to opposite poles. Spindle fibres begin to attach to chromatids.

Metaphase

The spindle fibres pull the chromatids to the equatorial plane of the cell.

Anaphase

Spindle fibres contract and shorten. The centromere is pulled apart which breaks the chromatids into sister chromosomes, which migrate to opposite ends of the cell.

Telophase

Full set of chromosomes at each pole of cell. Spindle fibres disintegrate. Nuclear membrane reforms around each new set of chromosomes. Nucleolus appears in each new nucleus.

Cytokinesis

Second stage of cell devision. Cell completely divides, forming two new cells. In plants, cell plate develops.

Cell Theory

- All living organisms are composed of cells.
- The cell is the basic unit of life.
- Cells arise from pre-existing cells.

System hierarchy

Many differentiated cells can be organized into a hierarchy.

Organism ⇒ Organ system ⇒ Organs ⇒ Tissue ⇒ Cells

Organ systems

Each organ system has a specific function and corresponding specialized structures. All organ systems work together to keep the organism running.

Human organ systems: Circulatory, digestive, endocrine, integumentary, muscular, nervous, reproductive, respiratory, skeletal, urinary

Tissues

A group of cells that function together to perform specific tasks.

Animal tissues: epithelial, connective, muscle, nervous

Uncontrolled Growth

Cancer is a class of diseases in which cells grow uncontrollably because of a mutation in cell DNA. This is caused by mutagens and carcinogens.

Benign tumor

Does not affect the surrounding cells.

Malignant tumor

Interferes with functioning of surronding cells.