ST.LAWRENCE HIGH SCHOOL

JESUIT MINORITY INSTITUTION

CLASS 6 **SUB: GENERAL SCIENCE**

STUDY MATERIALS **DATE: 07.05.2020**

The Premises of cell theory:

(1) All living things are made up of **cells**

(2) **Cells** are the smallest units (or most basic building blocks) of life, and

(**3**) All **cells** come from preexisting **cells** through the process of **cell** division.

Cell Definition

"A cell is defined as the smallest, basic unit of life that is responsible for all of life's processes."

Characteristics of Cells

Following are the various essential characteristics of cells:

- Cells provide structure and support to the body of an organism.
- The cell interior is organised into different individual organelles surrounded by a separate membrane.
- The nucleus(major organelle) holds genetic information necessary for reproduction and cell growth.
- Every cell has one nucleus and membrane-bound organelles in the cytoplasm.
- Mitochondria, a double membrane-bound organelle is mainly responsible for the energy transactions vital for the survival of the cell.
- Lysosomes digest unwanted materials in the cell.
- Endoplasmic reticulum plays a significant role in the internal organisation of the cell by synthesising selective molecules and processing, directing and sorting them to their appropriate locations.

Types of Cells

Cells are similar to factories with different labourers and departments that work towards a common objective. Various types of cells perform different functions. Based on cellular structure, there are two types of cells:

- Prokaryotes
- Eukaryotes

Prokaryotic Cells

1. Prokaryotic cells have no nucleus. Instead, some prokaryotes such as bacteria have a region within the cell where the genetic material is freely suspended. This region is called the nucleoid.
2. They all are single-celled microorganisms. Examples include archaea, bacteria, and cyanobacteria.
3. The cell size ranges from 0.1 to 0.5 μm in diameter.
4. The hereditary material can either be DNA or RNA.
5. Prokaryotes reproduce by binary fission, a form of sexual reproduction.

Eukaryotic Cells

1. Eukaryotic cells are characterised by a true nucleus.
2. The size of the cells ranges between 10–100 μm in diameter.
3. This broad category involves plants, fungi, protozoans, and animals.
4. The plasma membrane is responsible for monitoring the transport of nutrients and electrolytes in and out of the cells. It is also responsible for cell to cell communication.
5. They reproduce sexually as well as asexually.
6. There are some contrasting features between plant and animal cells. For eg., the plant cell contains chloroplast, central vacuoles, and other plastids, whereas the animal cells do not.

Possible Questions:

1. What is a Cell?

A cell is defined as the fundamental, structural and functional unit of all life.

2. State the characteristics of cells.

- Cells provide the necessary structural support for an organism.
- The genetic information necessary for reproduction is present within the nucleus.
- Structurally, the cell has cell organelles which are suspended in the cytoplasm.
- Mitochondria is the organelle responsible for fulfilling the cell's energy requirements
- Lysosomes digest metabolic wastes and foreign particles in the cell.

- Endoplasmic reticulum synthesises selective molecules and processes them, eventually directing them to their appropriate locations.

3. **Highlight the cell structure and its components.**

- Cell membrane
- Cell wall
- Cell organelles
    - Nucleolus
    - Nuclear membrane
    - Endoplasmic reticulum
    - Golgi Bodies
    - Ribosome
    - Mitochondria
    - Lysosomes
    - Chloroplast
    - Vacuoles

4. State the types of cells.

Cells are primarily classified into two types, namely

- Prokaryotic cells
- Eukaryotic cells

5. Elaborate Cell Theory.

Cell Theory was proposed by Matthias Schleiden, Theodor Schwann, and Rudolf Virchow, who were German scientists. The cell theory states that:

- All living species on Earth are composed of cells.
- A cell is the basic unit of life.
- All cells arise from pre-existing cells.

6. What is the function of mitochondria in the cells?

Mitochondria are known as the powerhouse of the cells. Their primary function is to produce the energy currency of the cells, ATP. It also regulates cellular metabolism.

7. What are the functions of the cell?

The essential functions of the cell include:

- The cell provides support and structure to the body.
- Facilitates growth by mitosis
- Helps in reproduction
- Provides energy and allows the transport of substances.

8. What is the function of Golgi bodies?

Golgi bodies package, and sort the proteins for secretion. It creates lysosomes and transports lipids around the cells.

9. Who discovered cell and how?

Robert Hooke discovered cells in 1665. He observed a piece of cork under a compound microscope and noticed minute structures reminiscent of small rooms. Consequently, he named his discovery “cells.”

10. Name the cell organelle that contains hydrolytic enzymes capable of breaking down organic matter.

Lysosomes

11. Which cellular structure regulates the entry and exit of molecules to and from the cell?

Cell membrane. It is a selectively permeable structure that controls the exit and entry of molecules into the cell.

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