

## 8. Cell: Structure and Functions

### Check point 1

#### 1. Question

The arrangement of cells is comparable to bricks of building. Why?

#### Answer

Although cells are living structures and bricks are non-living, the arrangement of cells is comparable to bricks of building because like buildings made of same bricks have different shapes, sizes and designs, similarly organisms are made up of same cells but are different from each other. Organism made of single cell are called unicellular organisms whereas, organisms made up of more than 1 cell are called multicellular organisms.

#### 2. Question

Robert Hooke observed cell by viewing which structure?

#### Answer

Robert Hooke observed cell by viewing thin slices of cork. He observed that the cork was made up of tiny hollow compartments separated from each other by wall or partition. He gave these compartment the name "cell". Robert Hooke was actually observing dead plant's cell wall and empty spaces.

#### 3. Question

Cell theory was refined in 1855. Name the scientist who is credited for it.

#### Answer

Rudolf Virchow in 1855 refined the cell theory. He added the 3<sup>rd</sup> part to cell theory which stated that all cells come from existing cells. This statement is presently known as the "Biogenic Law".

### Check point 2

#### 1. Question

Are cells living or non-living?

#### Answer

Cells are living. All living beings are made up of cell. It is a membrane covered structure containing all the material needed for life. Cells are the basic unit of life.

## **2. Question**

One cell performs all life activities in unicellular organisms. State yes or no.

### **Answer**

Yes, one cell performs all life activities in unicellular organisms. Unicellular organisms (prokaryotes and eukaryote) are made up of just one cell and all the things needed for the survival of the organism takes place in that one cell. Thus, one cell carries out all the functions in unicellular organisms.

## **3. Question**

Give the organisation of a multicellular organism.

### **Answer**

The organisation of a multicellular organism is as follows- Cells-Tissues-Organ-Organ System-Organism.

Cell are the smallest unit of life that carry out all the functions of living beings. Group of cells of the same type form tissue that perform specific function in the organism. Several types of tissue form organ which carry out particular functions. Several organs together form organ system which work together to perform a function. All the organ systems together form a multicellular organism.

## **4. Question**

Is there any relation between size of organism and number of cells?

### **Answer**

In multicellular organisms, there is no relation between size of organism and number of cells. In unicellular organisms, since there is a single cell, the size of the organism will be equally big as the size of the single cell.

## **Check point 3**

### **1. Question**

Do all organism have a cell membrane?

### **Answer**

Yes, all organisms have a cell membrane. It is one of the basic component of cell that encloses the other basic components-cytoplasm and nucleus. The cell membrane separates the cells from one another and controls the

movement of materials in and out of the cell. Both plant and animals have cell membrane. In plants it is inside the cell wall and in animals it is the outer layer of the cell.

## **2. Question**

Name an additional feature of a plant cell.

### **Answer**

Few additional features of plant cell are that they possess cell wall and have chloroplast, which are not found in animal cells. Both, animal and plant cells have nucleus, cytoplasm, plasma membrane, Golgi apparatus, mitochondria, endoplasmic reticulum and ribosomes.

## **3. Question**

In which part of cell, most of the chemical reactions take place?

### **Answer**

Most of the chemical reactions in a cell take place in the cytoplasm. It is a jelly-like substance enclosed by the cell membrane. It consists of all the organelles that carry out specific functions and all the chemical reactions take place here in cytoplasm.

## **4. Question**

Where are chromosomes found in a cell?

### **Answer**

Chromosomes are found in the nucleus of eukaryotic cell. These are rod like structures made up of condensed chromatin. The genes and DNA which carry the genetic information are found on these chromosomes.

## **Check point 4**

### **1. Question**

Give an example of an organisms with well-defined nucleus.

### **Answer**

Eukaryotic cells have a well-defined nucleus. The nucleus contains chromosomes and is surrounded by nuclear membrane. Plant and animal cells are eukaryotic cell. Yeast, paramecia, amoeba are also examples of eukaryotes.

### **2. Question**

Name the green coloured plastid, essential for plants.

## **Answer**

The green coloured plastid essential for plants is chloroplast. These plastids are double membrane structures found only in plants. Chloroplast is essential for plant since it contains chlorophyll which is required for photosynthesis by plants.

### **3. Question**

An organelle provides energy to the cell. Give its name and location.

## **Answer**

Mitochondria is the organelle that provides energy to the cell. It is a tiny oval shaped organelle found in the cytoplasm of eukaryotic cells and is not found in prokaryotic cells. Aerobic respiration occurs in mitochondria that generates energy for the cell. Energy is generated in the form of ATP.

## **Chapter Test**

### **1. Question**

A group of cells performing similar functions are known by a specific term. What is it?

## **Answer**

Group of cells of the same type that perform specific function in the organism are known as tissue.

### **2. Question**

The fundamental unit of life is cell. Comment.

## **Answer**

All living beings are made up of cell which is the basic unit of life. Cell carries out all the functions necessary for living beings, like nutrition, excretion, respiration, reproduction and transportation. A Cell also exists independently in unicellular organism and supports life. Thus, cell is called the fundamental unit of life.

### **3. Question**

*Amoeba* can attain the shape of *Paramecium*. Can *Paramecium* attain the shape of *Amoeba*?

## **Answer**

No, paramecium cannot attain the shape of Amoeba. Amoeba has no definite shape, so it can obtain the shape of paramecium since its shape changes as it moves. Paramecium already has a slipper like shape.

#### **4. Question**

The largest floating body is generally in the centre of a cell. Give its name.

#### **Answer**

Nucleus is the largest floating body generally in the centre of a cell. It is the control centre of the cell and is a membrane bound organelle found in eukaryotic cell. The nucleus contains DNA with histones that form the chromosome.

#### **5. Question**

Which is the largest cell in human body?

#### **Answer**

The largest cell in human body is the female ovum or egg with a diameter of 1000 micrometres. Ovum is the female reproductive cell and is found in the ovaries.

#### **6. Question**

Write functions of cell membrane.

#### **Answer**

Cell membrane is the thin outermost layer of cells. Its functions to keep the cytoplasm and organelles inside the cell. Since it is semi permeable, it regulates the entry and exit of water, soluble molecules and other materials. Cell membrane also helps in communicating with other cells & provides protection and support to the cell.

#### **7. Question**

Write the name of control centre of cell.

#### **Answer**

Nucleus is the control centre of the cell. It is the largest floating body found in the cell. Nucleus controls and regulates all the cell activities. The DNA of the cell is found here in nucleus.

#### **8. Question**

Why does a red blood cell not reproduce?

#### **Answer**

Red blood cells do not reproduce because they do not contain nucleus, thus they do not have DNA which is the genetic material needed for reproduction.

#### **9. Question**

Mention the size of an ostrich egg. Is it a single cell of a group of cells?

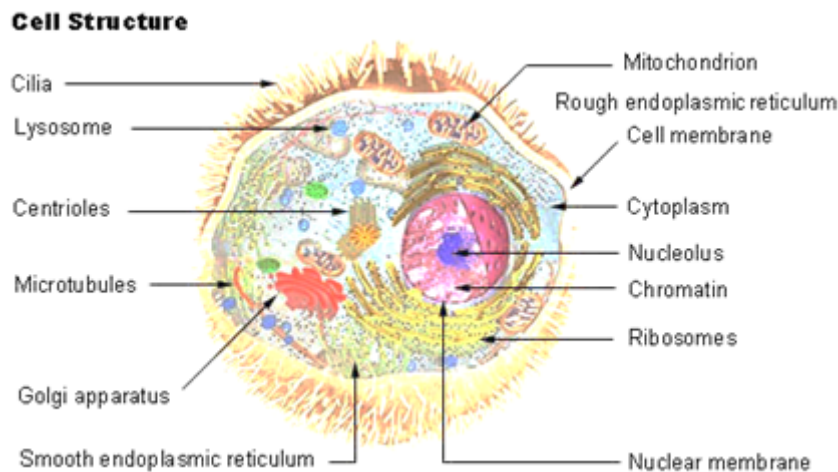
**Answer**

An ostrich's egg is 15 centimetres in length and 13 centimetres wide. The weight of this egg is about 1.5 kg and it is single cell which is believed to be the largest existing single cell today.

**10. Question**

Draw a labelled diagram to show the general structure of a cell.

**Answer**



**11. Question**

Plant and animal specimens are usually stained with dyes before observing them. Give reasons and name one dye used of the purpose.

**Answer**

Plant and animal specimens are usually stained with dyes before observing them because they are transparent and will not be visible to naked eye. Hence, they are stained and then observed under a microscope, staining makes them clearly visible. Animal cells are stained with methylene blue and plant cells are stained with iodine.

**12. Question**

In the organisation of multicellular organisms, what are the lower levels of organisation?

**Answer**

The lower levels of organisation in multicellular organism are cells, tissues and organs. Cell are the smallest unit of life that carry out all the functions of living beings. Group of cells of the same type together form tissue that perform specific function in the organism. Several types of tissue form organ

which carry out particular functions. Organ system and finally organism are the levels followed after these 3 lower levels.

### 13. Question

Write the difference between plant cell and animal cell.

#### Answer

PLANT CELL	ANIMAL CELL
Cell wall is present and is made of cellulose.	They lack cell wall.
Usually lack lysosomes and peroxisomes.	Lysosomes and peroxisomes are present.
They have one large central vacuole.	Many small vacuoles are found.
Chloroplast is present which helps plant in photosynthesis.	Chloroplast is absent.

### 14. Question

Write the importance of flagella.

#### Answer

Flagella is a whip like structure that allows a cell to move. Flagella is important because it helps in locomotion by allowing microtubules to slide against one another and thereby producing a bending motion. A cell is able to move or swim across the cell surface due to the organization of flagella.

### 15. Question

Chloroplasts are found only in plant cell. Explain.

**Answer**

Chloroplast are double membrane structures found only in plants. They are found only in plants because they contain chlorophyll which is required for photosynthesis by plants. Chloroplast is a plastid which is found in plants only and not in animal cells.

**16. Question**

With the help of examples, show the variation in size and shape.

**Answer**

Different cells perform different functions and they have different shapes and sizes.

For example, nerve cells have fibres that may be more than one meter long.

Muscle cells are long and thin. This helps the muscle cells in expansion and contraction. White blood cells can change their shape, and this helps them to destroy germs. Plant cells located on the outer part of the stem have thick walls for support. Some cells in plants are used to store food, and these cells are larger than other cells.

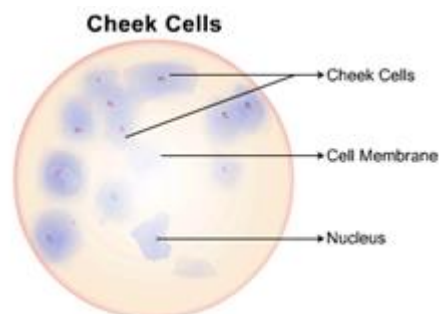
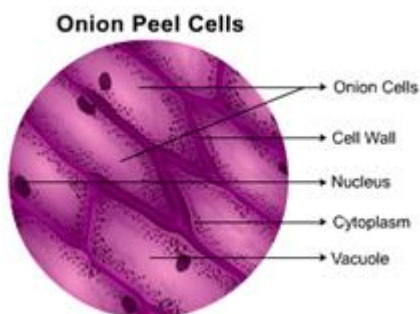
**17. Question**

Tabulate differences between plant and animal cell with diagram of onion peel cells and cheek cells.

**Answer**



PLANT CELL	ANIMAL CELL
Cell wall is present.	Cell wall is absent.
Larger in size.	Smaller in size.
They have one large central vacuole.	Many small vacuoles are found.
Chloroplast is present which helps plant in photosynthesis.	Chloroplast is absent.



### 18. Question

How can you differentiate prokaryotes from eukaryotes?

**Answer**

PROKARYOTES	EUKARYOTES
They do not have a nucleus.	They have a nucleus.
They do not contain membrane bound organelle.	Membrane bound organelle are present.
Prokaryotes are single celled.	Eukaryotes are multicellular usually, protists are unicellular.
Divide by binary fission and budding.	Divide either through mitosis or meiosis followed by cytokinesis.
Monera are prokaryotes.	Fungi, plant, animal and protists are eukaryotes.

### 169. Question

Define cell and tissue.

### Answer

Cells are the basic unit of life. It is a membrane covered structure containing all the material needed for life. Cells are the smallest unit of life that carry out all the functions of living beings.

Tissue is a group of cells of the same type that perform specific function in the organism.

## 20. Question

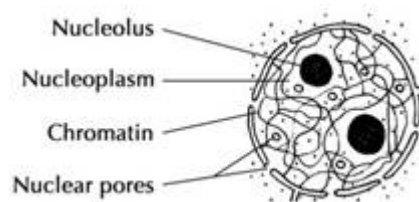
Explain the structure and function of the nucleons.

### Answer

The nucleus is a cell organelle found in eukaryotic cells. It is bound by the membrane and contains the cell's hereditary information i.e. it contains the information that will be passed on.

### Structure:

- The nucleus is surrounded by a membrane known as the nuclear membrane.
- The nuclear envelope has pores through which the RNA and proteins pass through.
- The nucleus contains DNA and RNA which form chromatin.
- When chromatin condenses, it forms chromosomes.
- There is another structure called nucleolus present inside of the nucleus.
- The nucleolus is made up of RNA and proteins.
- There is another substance present inside the nucleus. It is known as the nucleoplasm. It is a gel like substance.



### Function:

- Nucleus is like the brain of the cell.
- Nucleus stores the genetic information in the form of DNA.
- It is the DNA that contains all the information regarding how the cell would work.
- The nucleus also aids in cell division.
- It is the nucleus that makes RNA which is then made into proteins.