



“बेटी बचाओ, बेटी पढ़ाओ”

# JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Government of Rajasthan established  
Through ACT No. 17 of 2008 as per UGC ACT 1956  
NAAC Accredited University

## Department of Yoga & Naturopathy

### (Faculty of Ayurveda Science)

**Faculty Name-** JV'n Anushka Tyagi (Assistant Professor)

**Program-** BNYS-IIInd Year

**Course Name** – Microbiology

**Session No. & Name** – 1.4.1 (Cell Theory)

#### Program Outcome-

- Students should be able to recognize the health needs of the community, and carry out professional obligations ethically and keeping with the objectives of the national health policies.
- Students should be skilled in most of the competencies, and trainings required to deliver the Yoga and Naturopathy health care system.
- Students should be aware and updated with the contemporary advances and developments in the system of Yoga and Naturopathy.

#### Course Outcome-

1. Apply the knowledge to understand the microbial physiology and to identify the microorganisms.
2. Understand the regulation of biochemical pathway and possible process modifications for improved control over microorganisms for microbial product synthesis.

#### Academic Day starts with –

- Greeting with saying '**Namaste**' by joining Hands together following by 2-3 Minutes Happy session, Celebrating birthday of any student of respective class and **National Anthem**.
- Topic to be discussed today- Today We will discuss about the Cell Theory and cell types.

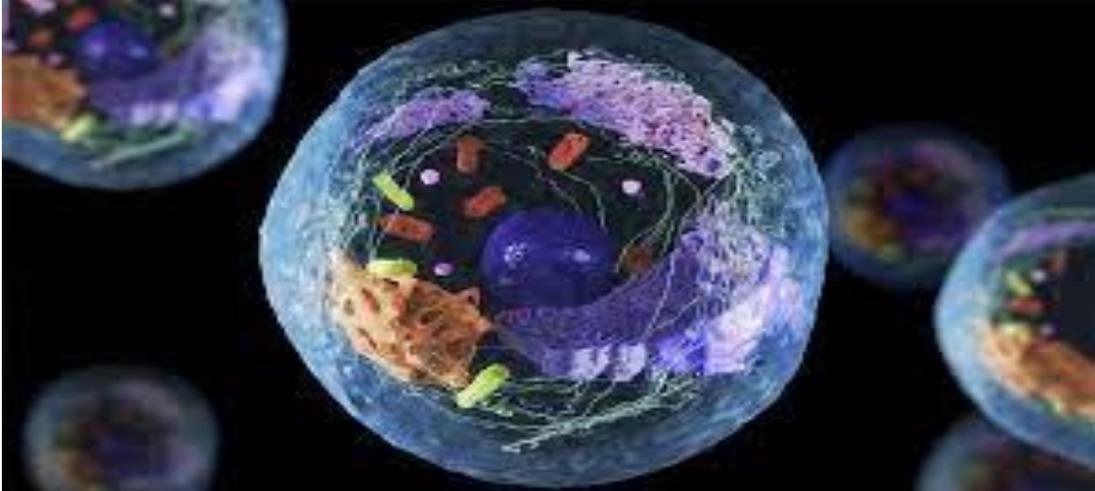
## Introduction & Brief Discussion About The Topic

# Cell Theory

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## INTRODUCTION

- ❑ A cell is defined **as the smallest, basic unit of life that is responsible for all of life's processes.**
- ❑ **Cells are the structural, functional, and biological units of all living beings.** A cell can replicate itself independently. Hence, they are known as the building blocks of life.
- ❑ Each cell contains a fluid called the cytoplasm, which is enclosed by a membrane. Also present in the cytoplasm are several biomolecules like proteins, nucleic acids and lipids.
- ❑ Moreover, cellular structures called cell organelles are suspended in the cytoplasm.
- ❑ Cell is the structural and fundamental unit of life. The study of cells from its basic structure to the functions of every cell organelle is called Cell Biology. **Robert Hooke** was the first Biologist who discovered cells.
- ❑ All organisms are made up of cells. They may be made up of a **single cell (unicellular)**, or **many cells (multicellular)**. **Mycoplasmas** are the smallest known cells. **Cells are the building blocks of all living beings.** They provide structure to the body and convert the nutrients taken from the food into energy.
- ❑ Cells are complex and their components perform various functions in an organism. They are of different shapes and sizes, pretty much like bricks of the buildings. Our body is made up of cells of different shapes and sizes.
- ❑ Cells are the lowest level of organisation in every life form. From organism to organism, the count of cells may vary.
- ❑ Humans have the number of cells compared to that of **bacteria**.
- ❑ Cells comprise several cell organelles that perform specialised functions to carry out life processes. Every organelle has a specific structure. The hereditary material of the organisms is also present in the cells.



## Discovery of Cells

- Discovery of cells is one of the remarkable advancements in the field of science. It helps us know that all the organisms are made up of cells, and these cells help in carrying out various life processes. The structure and functions of cells helped us to understand life in a better way.
- Robert Hooke discovered the cell in 1665. Robert Hooke observed a piece of bottle cork under a compound microscope and noticed minuscule structures that reminded him of small rooms. Consequently, he named these “rooms” as cells. However, his compound microscope had limited magnification, and hence, he could not see any details in the structure. Owing to this limitation, Hooke concluded that these were non-living entities.

## 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 organized 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.

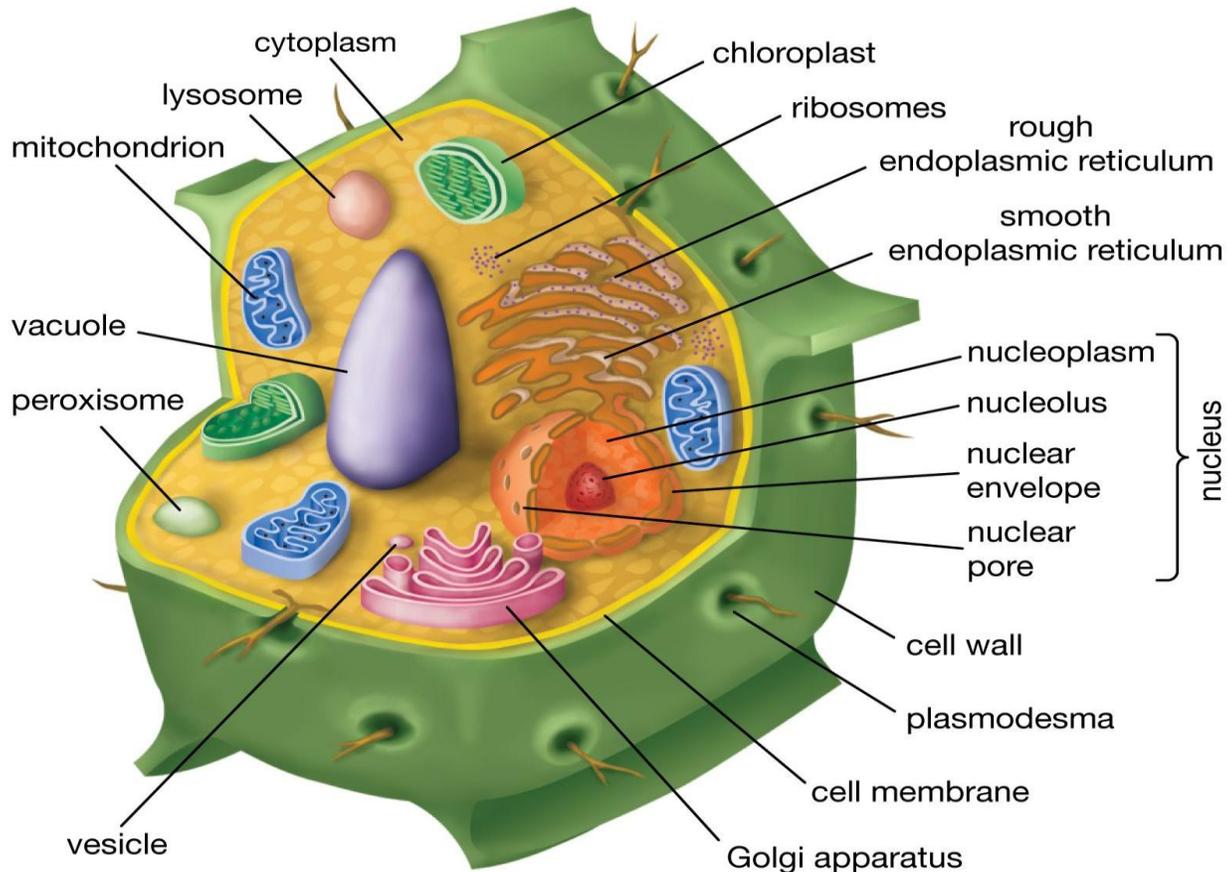
- Endoplasmic reticulum plays a significant role in the internal organisation of the cell by synthesising selective molecules and processing, directing and sorting them to their appropriate locations.

## ➤ **Plant cell**

Plant cell, the basic unit of all plants. Plant cells, like animal cells, are eukaryotic, meaning they have a membrane-bound nucleus and organelles.

- Unlike animal cells, plant cells have a cell wall surrounding the cell membrane.
- Plant cell walls are composed of cellulose, which sets them apart from other organisms with cell walls, such as bacteria (peptidoglycan) and fungi (chitin).
- Plant cells can be distinguished from most other cells by the presence of chloroplasts, which are also found in certain algae. A chloroplast is a type of plastid (a saclike organelle with a double membrane) that serves as the site of photosynthesis, the process by which energy from the Sun is converted into chemical energy for growth. Chloroplasts contain the pigment chlorophyll to absorb light energy.

## Plant cell



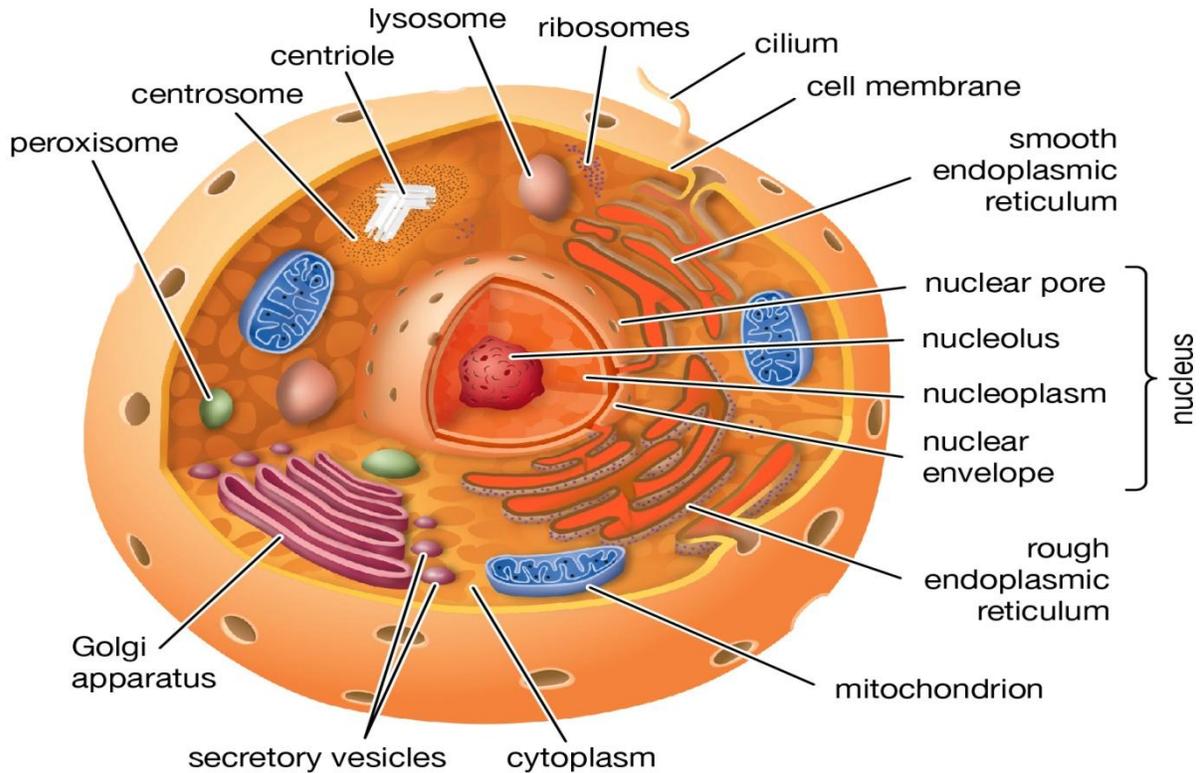
- In plants, these essential organelles occur in all green tissues, though they are concentrated particularly in the parenchyma cells of leaves.
- Another important characteristic of many plant cells is the presence of one or more large vacuoles.
- Vacuoles are storage organelles, and those in plant cells enable them to attain a large size without accumulating the bulk that would make metabolism difficult.
- Within the vacuole is the cell sap, a water solution of salts and sugars kept at high concentration by the active transport of ions through the vacuole membrane.

## ➤ Animal Cell

- An animal cell is a type of eukaryotic cell that lacks a cell wall and has a true, membrane-bound nucleus along with other cellular organelles.”
- Animal cells range in size from a few microscopic microns to a few millimetres. The largest known animal cell is the ostrich egg, which can stretch over 5.1 inches across and weighs about 1.4 kilograms. This is in stark contrast to the neuron in the human body, which is just 100 microns across.

- The shape of animal cells also varies, with some being flat, others oval or rod-shaped. There are also more intriguing shapes such as curved, spherical, concave and rectangular. Most of the cells are microscopic in size and can only be seen under the microscope.
- As stated before, animal cells are eukaryotic cells with a membrane-bound nucleus. Furthermore, these cells exhibit the presence of DNA inside the nucleus. They also comprise other membrane-bound organelles and cellular structures which carry out specific functions necessary for a cell to function properly.

### Animal cell



- University Library Reference-
  - Textbook of Microbiology-CP Baveja
  - Textbook of Microbiology-Anantnarayan
- Online Reference -<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4353839/> Suggestions to secure good marks to answer in exam-
  - Explain answer with key point answers
  - Explain answer with well labelled diagram.
- Questions to check understanding level of students-
  1. What is cell?
  2. What are the differences between plant and animal cell?

❖ **Exercise for students –**

**Prepare an project of Plant cell & Animal Cell (BNYS 2<sup>nd</sup> Year students)**

- Academic Day ends with-  
**National song' Vande Mataram'**