YAKEEN NEET 2.0

2026

Cell - The Unit of Life

Botany | Lecture - 01

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Topics to be covered

1. Introduction part
2. Ramachandran sir
3. Cell & cell Theory.
4.

जिन घरों में खाने के लिए रोटी नहीं होती, वहाँ घरों में Motivational Video नहीं देखा जाता !

By – Rupesh Sir

Roadmap

- ★ Basic concept start
- ★ Best NOTES.
- ★ Introduction & summary Complete.
- ★ NCERT READ & Based Question solve.
- ★ Question: PDF Form मे देंगा → PRINT OUT FILE ARRANGE.
- ★ Handwritten NOTES (daily Basis) provide
- ★ Chapter complete: all PYQ Discuss & 200 Question] → PDF form देंगा.

Important (आप नहीकर रहे हो !

Week: 3 days

X: Question paper: (PDF) with answer key. (20-25 Question) & 45 Question)

Y:

Z:

- ★ 10-15 minute Room मे LOCK
- ★ Table & chair
- ★ H_2O Bottle
- ★ Watch
- ★ खेला भाई/बहन Parents: distub.

* साल Discipline
* Teaches की बातो को follow
* Honesty
* Daily study.
* No class (skip)
* Test (No skip)
* Week में 3 Test देने हैं,
  Paper: provide.
* spamming X
* positivity

⇒ distract (NO).
⇒ WRONG PATHWAY.
⇒ Test marks कम आये (Low feel X).

Biology is the study of living organisms. The detailed description of their form and appearance only brought out their diversity. It is the cell theory that emphasised the unity underlying this diversity of forms, i.e., the cellular organisation of all life forms. A description of cell structure and cell growth by division is given in the chapters comprising this unit. Cell theory also created a sense of mystery around living phenomena, i.e., physiological and behavioural processes. This mystery was the requirement of integrity of cellular organisation for living phenomena to be demonstrated or observed. In studying and understanding the physiological and behavioural processes, one can take a physico-chemical approach and use cell-free systems to investigate. This approach enables us to describe the various processes in molecular terms. The approach is established by analysis of living tissues for elements and compounds.

Test Tube

It will tell us what types of organic compounds are present in living organisms. In the next stage, one can ask the question: What are these compounds doing inside a cell? And, in what way they carry out gross physiological processes like digestion, excretion, memory, defense, recognition, etc. In other words we answer the question, what is the molecular basis of all physiological processes? It can also explain the abnormal processes that occur during any diseased condition. This physico-chemical approach to study and understand living organisms is called 'Reductionist Biology'. The concepts and techniques of physics and chemistry are applied to understand biology. In Chapter 9 of this unit, a brief description of biomolecules is provided.

Carbo, protein, lipid

Physics Chemistry

(Plant, animal)

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→ STRUCTURE → PROTEIN, CARBOHYDRATE

G.N. RAMACHANDRAN, an outstanding figure in the field of protein structure, was the founder of the 'Madras school' of conformational analysis of biopolymers. His discovery of the triple helical structure of collagen published in *Nature* in 1954 and his analysis of the allowed conformations of proteins through the use of the 'Ramachandran plot' rank among the most outstanding contributions in structural biology. He was born on October 8, 1922, in a small town, not far from Cochin on the southwestern coast of India. His father was a professor of mathematics at a local college and thus had considerable influence in shaping Ramachandran's interest in mathematics.

PROTEIN (ANIMAL) → THREE CHAIN OF AMINO ACID (POLYPEPTIDE)

C(α) — N

C(α) - C

Phi & Psi angle

Use protein structure study

G.N. Ramachandran
(1922 – 2001)

After completing his school years, Ramachandran graduated in 1942 as the top-ranking student in the B.Sc. (Honors) Physics course of the University of Madras. He received a Ph.D. from Cambridge University in 1949. While at Cambridge, Ramachandran met Linus Pauling and was deeply influenced by his publications on models of the α-helix and β-sheet structures that directed his attention to solving the structure of collagen. He passed away at the age of 78, on April 7, 2001.

PROTEIN

STRUCTURE OF PROTEIN

CELL: FUNDAMENTAL(BASIC), STRUCTURAL, FUNCTIONAL UNIT IN All LIVING ORGANISM.

DISCOVERY

① FIRST DISCOVERED: ROBERT HOOKE, CORK(PLANTCELL), DEAD. PROTOPLASM ABSENT (NUCLEUS+CYTOPLASM)

NUCLEUS+CYTOPLASM+CELLMEMBRANE → PROTOPLAST (CELL WITHOUT CELL WALL).

② FIRST LIVING CELL: ANTON VON LEEUWENHOEK → BACTERIA

③ NUCLEUS: ROBERT BROWN IN ORCHID PLANT.

④ DISCOVERY OF ELECTRON MICROSCOPE: EASY: STUDY: CELL & ITS STRUCTURE

⑤ INANIMATE (NON-LIVING): TABLE, CHAIR: CELL ABSENT
ANIMATE (LIVING): CELL PRESENT.

⑥ All LIVING ORGANISM COMPOSED OF CELL

NOTE: ANYTHING LESS THAN SINGLE CELL DO NOT HAVE INDEPENDENT EXISTENCE.

UNICELLULAR
(SINGLE CELL)
eg: Bacteria, amoeba

① INDEPENDENT EXISTENCE

② BECAUSE THEY CAN PERFORM ESSENTIAL FUNCTION OF LIFE (NUTRITION, REPRODUCTION, RESPIRATION)

MULTICELLULAR (mostly)
(many cells)
eg: Plants, animal, most of fungi

CELL THEORY.

★ FORMULATED BY.

① MATTHIAS SCHLEIDEN :

1838, GERMAN BOTANIST → STUDY → PLANT, All PLANTS COMPOSED OF CELLS WHICH FORM TISSUE.

② THEODORE SCHWANN

1839, GERMAN ZOOLOGIST → STUDY → ANIMALS. → COVERED BY THIN LAYER : PLASMA MEMBRANE

→ PRESENSE OF CELL WALL : ONIQUE CHARACIER : PLANT CELL

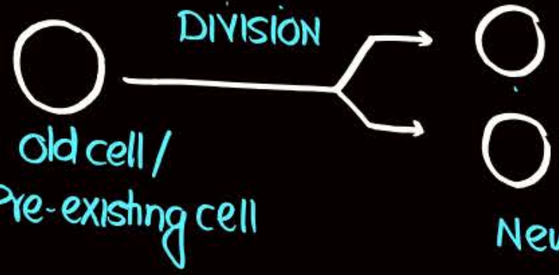
→ HYPOTHESIS : PLANTS & ANIMAL COMPOSED OF CELL & ITS PRODUCT

DRAWBACK **NOT EXPLAINED:** HOW NEW CELLS WERE FORMED ?

↓

EXPLAINED BY
RUDOIF VIRCHOW, 1855
(FINAL SHAPE TO CELL THEORY)

① OMNIS CELLULA E CELLULA (LATIN WORD)



NEW CELLS ARE FORMED BY DIVISION OF PRE-EXISTING CELL.

② All LIVING ORGANISM COMPOSED OF CELL & ITS PRODUCT.

EXCEPTION : VIRUS (PROTOPLASM ABSENT)
(NON-CELLULAR STRUCTURE)

When you look around, you see both living and non-living things. You must have wondered and asked yourself – 'what is it that makes an organism living, or what is it that an inanimate thing does not have which a living thing has' ? The answer to this is the presence of the basic unit of life – the cell in all living organisms.

All organisms are composed of cells. Some are composed of a single cell and are called unicellular organisms while others, like us, composed of many cells, are called multicellular organisms.

Q1

Correct

(A) Inanimate have cell

(B) Inanimate do not have cell & Inanimate means living

(C) living thing has cell which is basic unit of life in most of organism

(D) All are incorrect

Q2

Correct

(A) most of organisms composed of single cell

(B) All organism not composed of cell

(C) most organism made up of many cell : multicellular organism eg bacteria

(D) Fungi, plants & animals : Multicellular

8.1 What is a Cell?

Unicellular organisms are capable of (i) independent existence and (ii) performing the essential functions of life. Anything less than a complete structure of a cell does not ensure independent living. Hence, cell is the fundamental structural and functional unit of all living organisms.

Basic

3) How many statements are correct

(a) unicellular organisms have dependent existence

(b) unicellular organism can't perform essential function of life

(c) cell is fundamental but not structural unit

(d) Cell is functional unit in all organism

Option

(A) 0 (B) 1 (C) 2 (D) 3

Assertion (A) : Anything less than complete structure of cell doesn't ensure independent living

Reason (R) : Cell is fundamental structural & functional unit of most (all) living organism

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is NOT the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Anton Von Leeuwenhoek first saw and described a live cell. Robert Brown later discovered the nucleus. The invention of the microscope and its improvement leading to the electron microscope revealed all the structural details of the cell.

5 Correct

(A) Anton Von Leeuwenhoek first saw & described dead cell

(B) Brawn discovered Nucleus (diff. scient)

(C) invention of light microscope reveal all structural detail of cell

(D) All are incorrect

6 Robert Hooke

(A) he discovered living cell

(B) he discovered dead cell having cytoplasm

(C) he discovered Cork cell in animal plant

(D) cell was first discovered by Robert hook

8.2 Cell Theory

In 1838, Matthias Schleiden, a German botanist, examined a large number of plants and observed that all plants are composed of different kinds of cells which form the tissues of the plant. At about the same time, Theodore Schwann (1839), a German Zoologist, studied different types of animal cells and reported that cells had a thin outer layer which is today known as the 'plasma membrane'.

Statement-1 : 1838 Matthias Schleiden, German botanist study large no of plants

Statement-2 : According to schleiden all animals composed of different kind of cells which form tissue of animal

(A) both statements are correct

(B) both statements are Incorrect

(C) statements 1 is correct and 2 is incorrect

(D) None

Correct

(A) Schwann, German zoologist studied animal cell

(B) cell had thick outer layer called plasma membrane

(C) He also studies plant tissue and said presence of cell wall is unique character of animal

(D) Schleiden proposed hypothesis body of animal & plant composed of cells & product of cell

He also concluded, based on his studies on plant tissues, that the presence of cell wall is a unique character of the plant cells. On the basis of this, Schwann proposed the hypothesis that the bodies of animals and plants are composed of cells and products of cells.

Schleiden and Schwann together formulated the cell theory. This theory however, did not explain as to how new cells were formed. Rudolf Virchow (1855) first explained that cells divided and new cells are formed from pre-existing cells (*Omnis cellula-e cellula*). He modified the hypothesis of Schleiden and Schwann to give the cell theory a final shape. Cell theory as understood today is:

(i) all living organisms are composed of cells and products of cells.

(ii) all cells arise from pre-existing cells.

Correct

(A) Rudolf Virchow formulated cell theory

(B) cell theory explain how new cells are formed

(C) omnis cellula e cellula is Latin statement.

(D) new cell arise by division of pre existing nucleus

Incorrect

(A) Final shape to cell theory by Virchow

(B) all cells arise from pre-existing cell

(C) all living cell composed of cells & product of cells

(D) virus is not exception to cell theory

THANK YOU