SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr M.G.R Medical University, Chennai

DEPARTMENT OF CARDIAC TECHNOLOGY

COURSE NAME: BIOCHEMISTRY

UNIT : 1

TOPIC : BIOMOLECULES OF THE CELLS

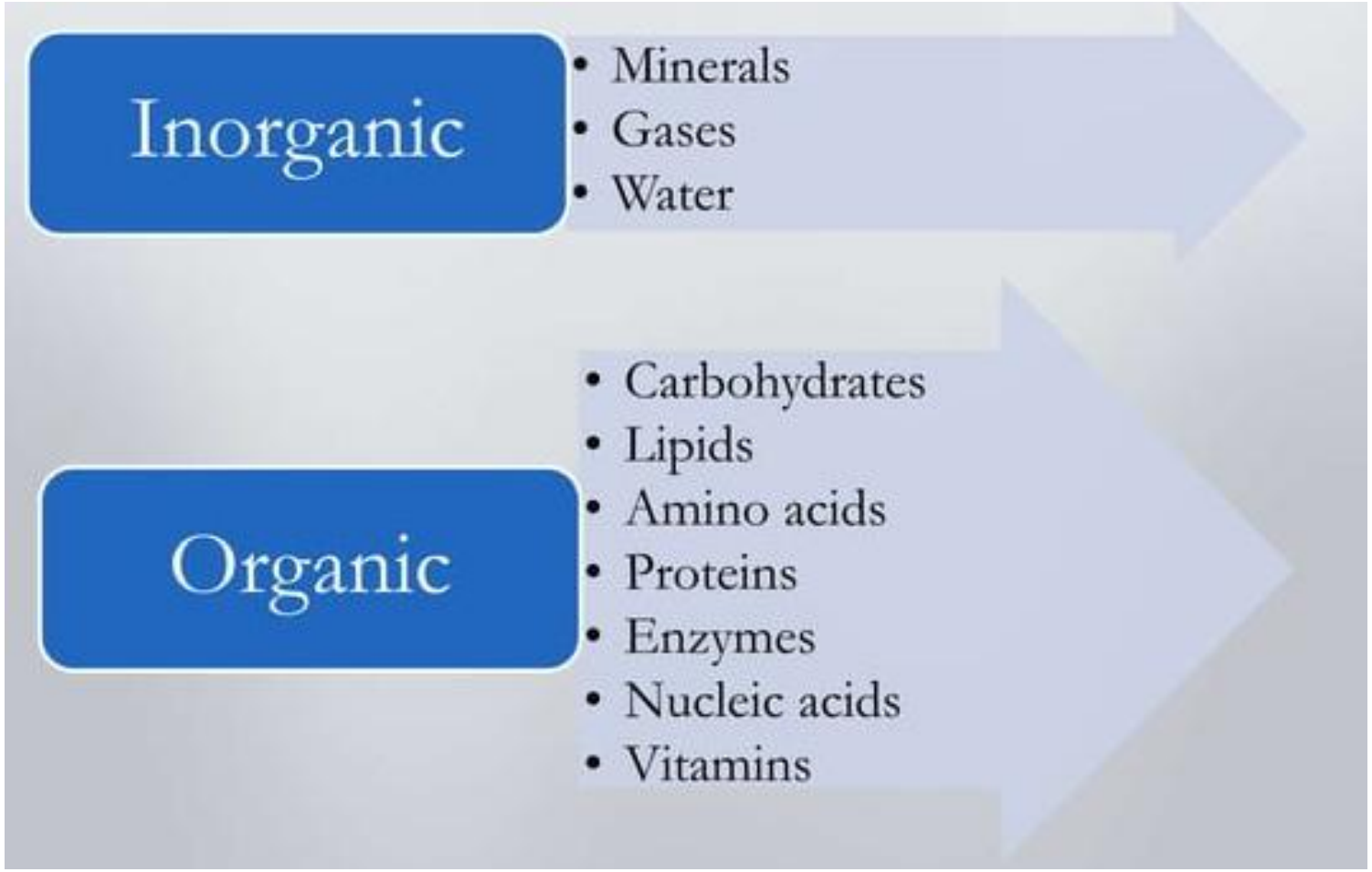
FACULTY NAME: MITHRA V

BIOMOLECULES (DEFINE)

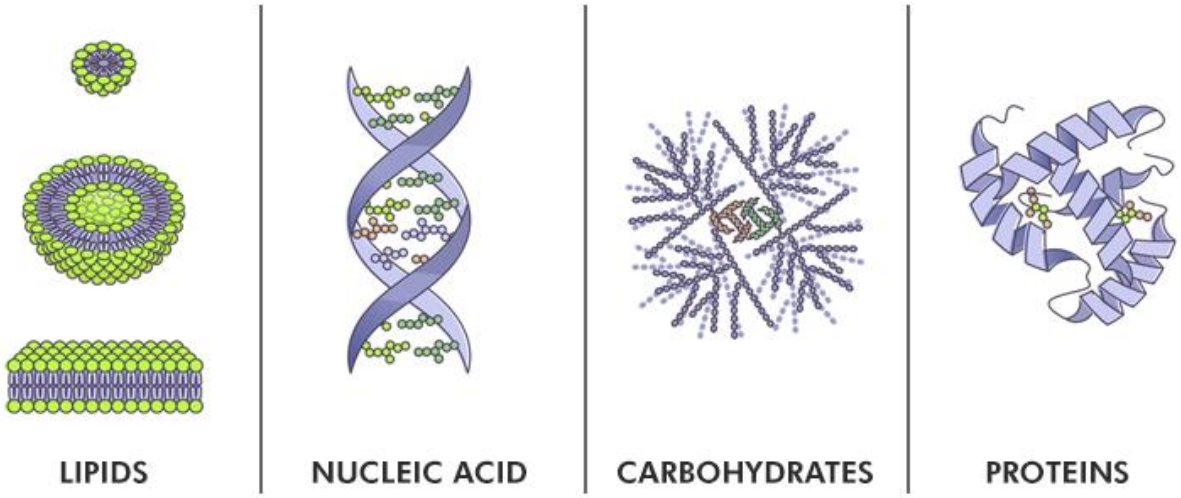
- Cells are building blocks of tissues likewise molecules are building blocks of cells.
- Chemicals or molecules present in living organisms
- Cellular pool - The sum total of different types of biomolecules, compounds and ions present in a cell.
- Animal & plant cells contain ~ 10,000 kinds of molecules
- Water constitutes 50-95% of cells content by weight.

BIOMOLECULES - CLASSIFICATION

A. On the basis of chemical constituents



B. On the basis of size



Macromolecules

- Large sized, High Mol. Wt. Above 10000 Daltons
- Found in the acid insoluble pool
- Carbohydrates
- Lipids
- Proteins
- Nucleic acids

Micromolecules

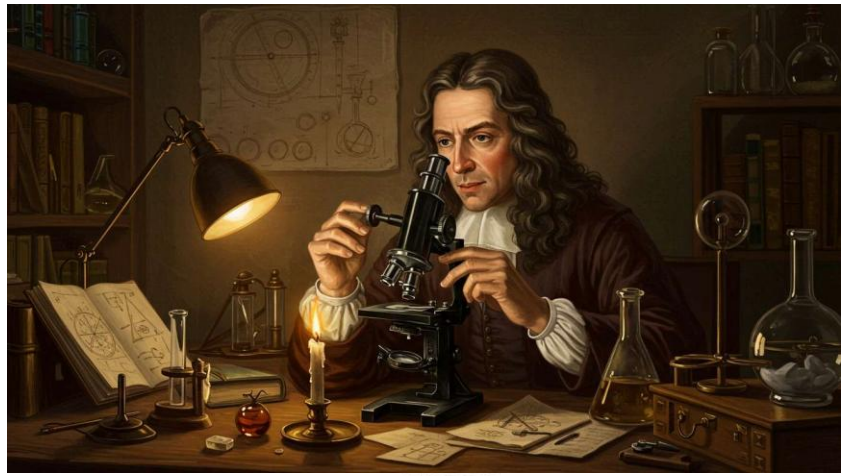
- Small sized, Low Mol. Wt. Between 18 and 800 Daltons
- Found in the acid soluble pool
- Minerals
- Gases
- Water
- Sugars
- Amino acids
- Nucleotides

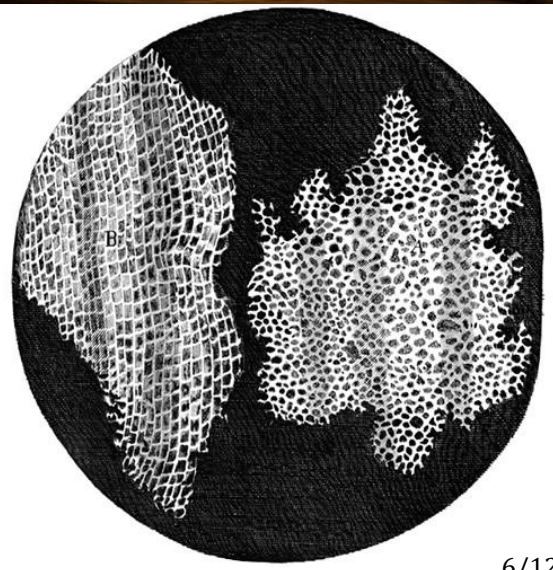
BIOCHEMICAL - FUNCTIONS

Biomolecule	Building block	Major functions
Polysaccharides	Monosaccharides	Storage form of energy
Protein	Amino acid	Basic structure and function of cell
Lipids	Fatty acids & glycerol	Storage form of energy to meet long term demands
DNA	Deoxyribonucleotide	Hereditary information
RNA	Ribonucleotide	Protein synthesis

CELL - AS A BASIC UNIT

- The cell is the basic building block of life, structural and functional unit of life or living organism.
- It was discovered by **Robert Hooke**
- Some organisms, such as most bacteria, are unicellular (consist of a single cell).
- Other organisms, such as humans are multicellular.
- Humans have about 100 trillion cells;





TYPES OF CELLS

- **Prokaryotes** (Greek: pro- before; karyon- nucleus):

–Lack a well defined nucleus and possess relatively simple structure.

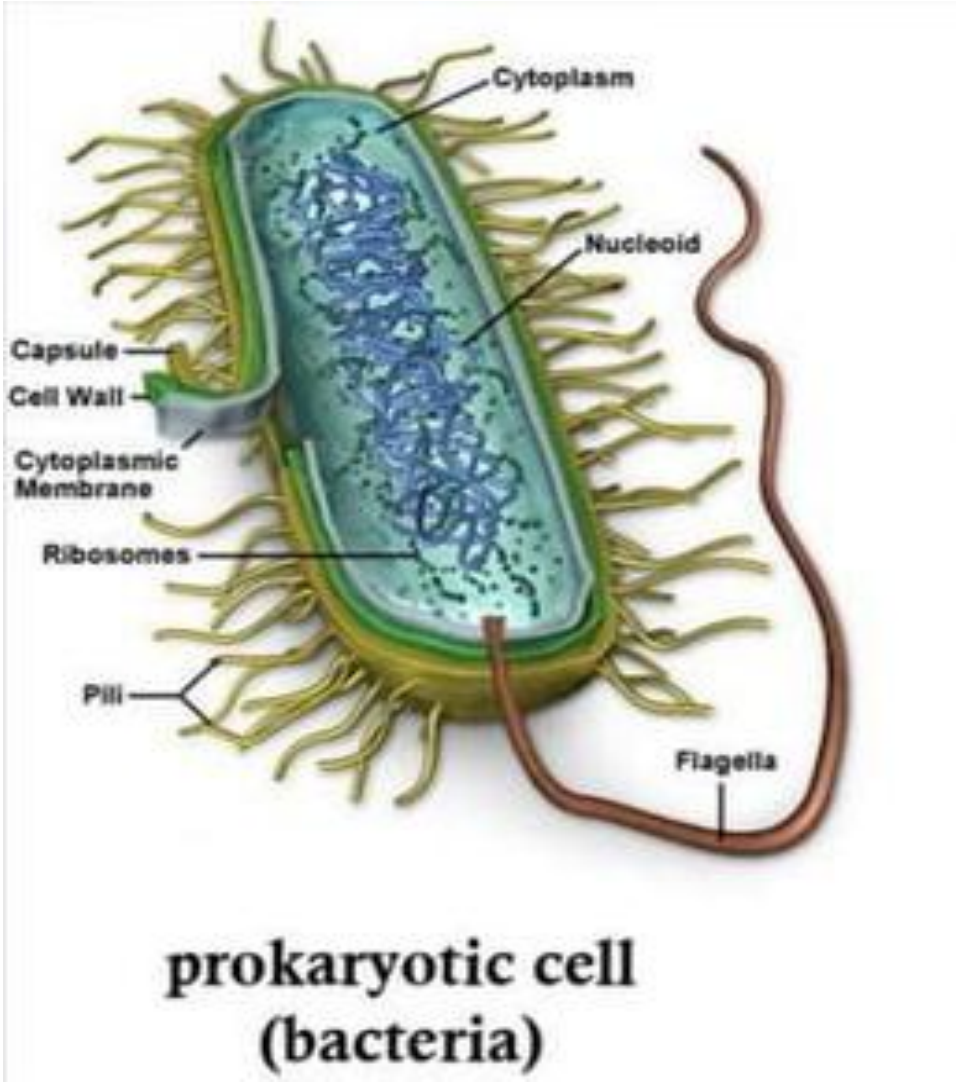
–These include various bacteria.

- **Eukaryotes** (Greek: eu- true; karyon- nucleus):

–Possess a well defined nucleus and are more complex in their structure and function.

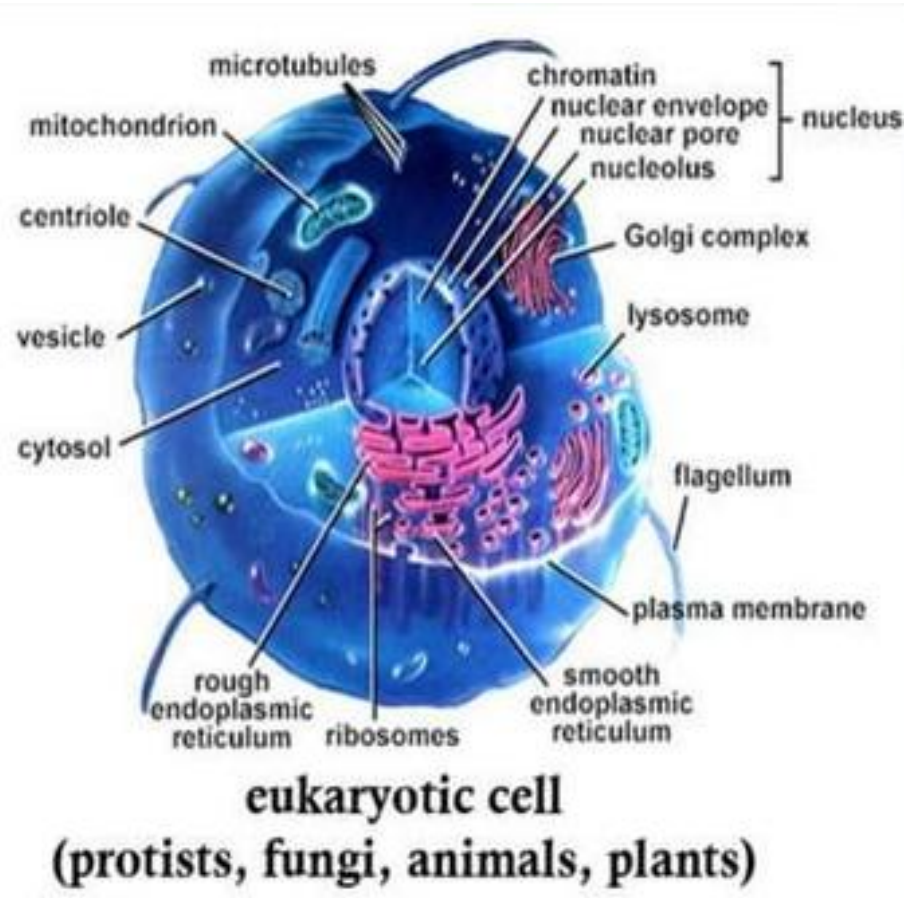
–The higher organisms (animals and plants) are composed of eukaryotic cells.

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



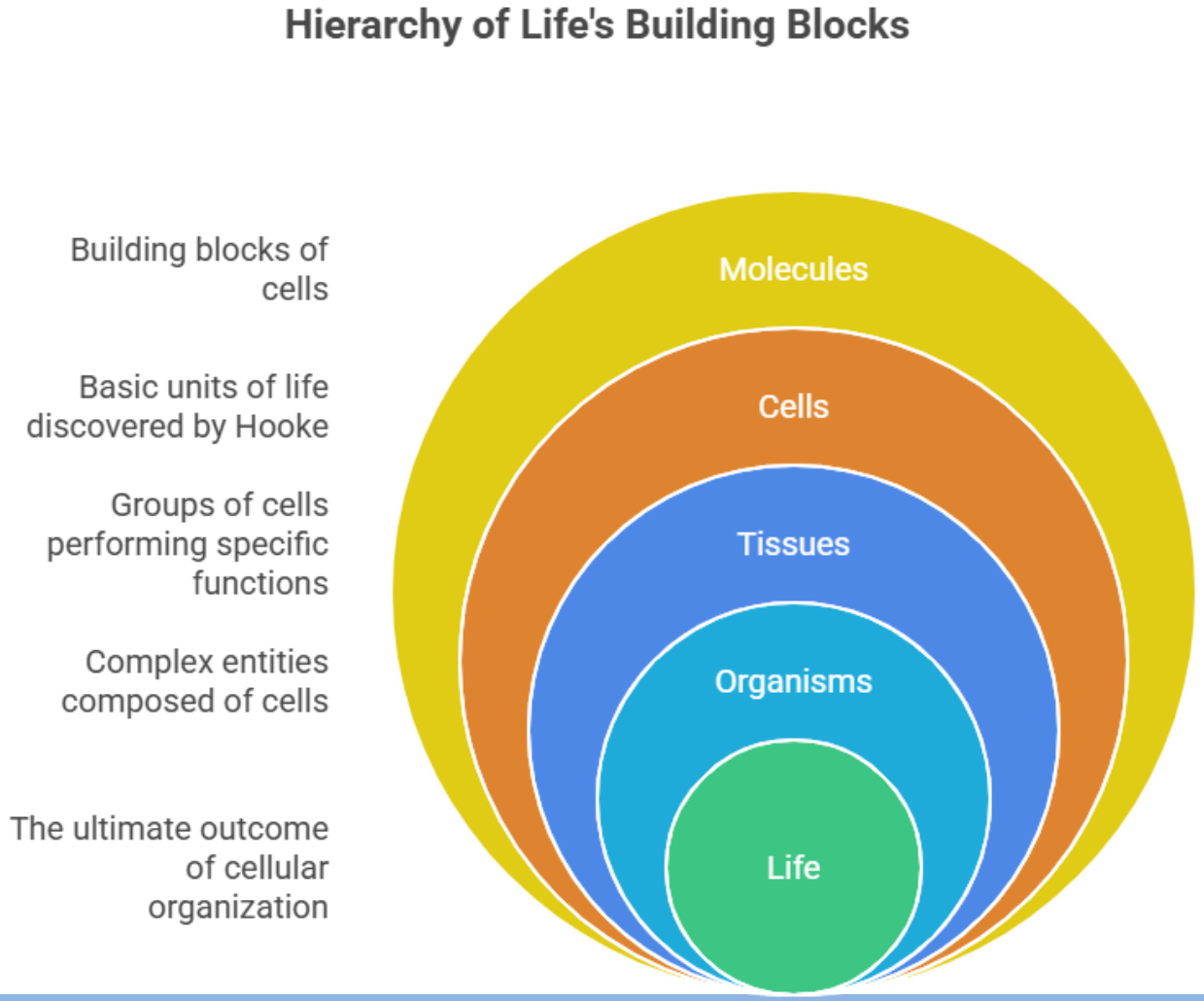
prokaryotic cell (bacteria)

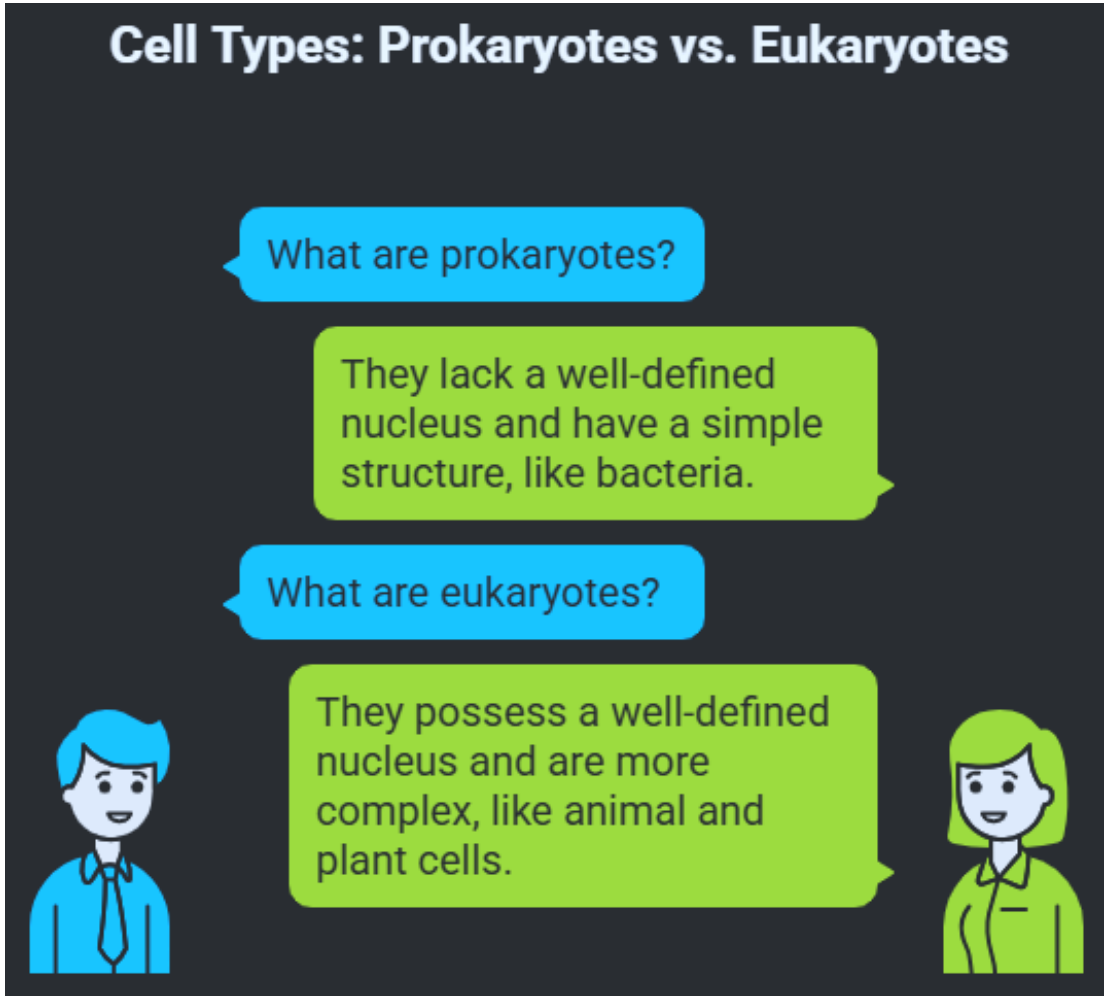
- Eukaryotic cells are characterised by a true nucleus.
- Size of cells ranges between 10–100 µm in diameter.
- This broad category involves plants, fungi, protozoans, and animals.
- The plasma membrane is responsible for monitoring transport of nutrients & electrolytes in & out of cells.
- It is also responsible for cell to cell communication.
- They reproduce sexually as well as asexually.



eukaryotic cell
(protists, fungi, animals, plants)

SUMMARY


Hierarchy of Life's Building Blocks
Building blocks of cells
Basic units of life discovered by Hooke
Groups of cells performing specific functions
Complex entities composed of cells
The ultimate outcome of cellular organization
Molecules
Cells
Tissues
Organisms
Life


Cell Types: Prokaryotes vs. Eukaryotes
What are prokaryotes?
They lack a well-defined nucleus and have a simple structure, like bacteria.
What are eukaryotes?
They possess a well-defined nucleus and are more complex, like animal and plant cells.

REFERENCES

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THANK YOU