DIVERSITY OF CELL SIZE AND CELL SHAPE OF PROKARYOTIC CELL

SUBMITTED BY-

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DIVERSITY OF CELL SIZE AND SHAPE OF PROKARYOTIC CELL

SYNOPSIS

- > INTRODUCTION
- > HISTORY
- > DEFINATION
- > TYPES OF CELL
  - * PROKARYOTIC CELL
  - * EUKARYOTIC CELL
- > DIVERSITY OF PROKARYOTIC CELL
- > MICROBIAL CLASSIFICATION OF PROKARYOTIC CELL
- > EXAMPLE OF PROKARYOTIC CELL
  - CYANOBACTERIA
- > SUMMARY
- > CONCLUSION
- > REFERANCES

DIVERSITY OF CELL SIZE AND SHAPE OF PROKARYOTIC CELL

INTRODUCTION

> Cell is a structural & functional unit of life.

> The cell is the basic unit of organisation or structure of all living matter.

> Cell is divided into form
Unicellular
Multicellular

> The body of all living organism except virus has cellular organization and may contain one or many cells.

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HISTORY & DEFINATION

ROBERT HOOKE	1665
A.G. LOEWY & P. SICKEVITZ	1963

1st discovered of cell / cellula.

A unit of biological activity delimited by a semipermeable membrane & capable of self reproduction in medium free of other living system.

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HISTORY&DEFINATION

HISTORY AND DEFINATION

WILSON & MORRISON	1966	An integrated and continuosly chaning system.
JOHN POUL	1970	The simplest integrated organization in living systems capable of independent survival

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TYPE OF CELL

- Prokaryotic cell

- The prokaryotic (pro- primitive or karyon- nucleus) are small, simple and primitive cell
- The prokaryotic cell are the most primitive cells from the morphologically point of view
- A prokaryotic cell is essentially a one envelope system organized in depth.
- It consist of central nuclear components (DNA molecules, RNA molecules, nuclear protein) surrounded by cytoplasmic ground substance with the whole envelope by a plasma membrane.

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EUKARYOTIC CELL

TYPES OF CELL

- The eukaryotic cell are essentially two envelope system and they are very much large than prokaryotic cell.
- The eukaryotic cell are the true cell which occur in the plant and animal cell.
- The eukaryotic cell have different shape size and physiology.
- All the cell are typically composed of plasma membrane, cytoplasm, and its organelles eg – mitochondria , endoplasmic reticulam, ribosome, golgi apparatus.

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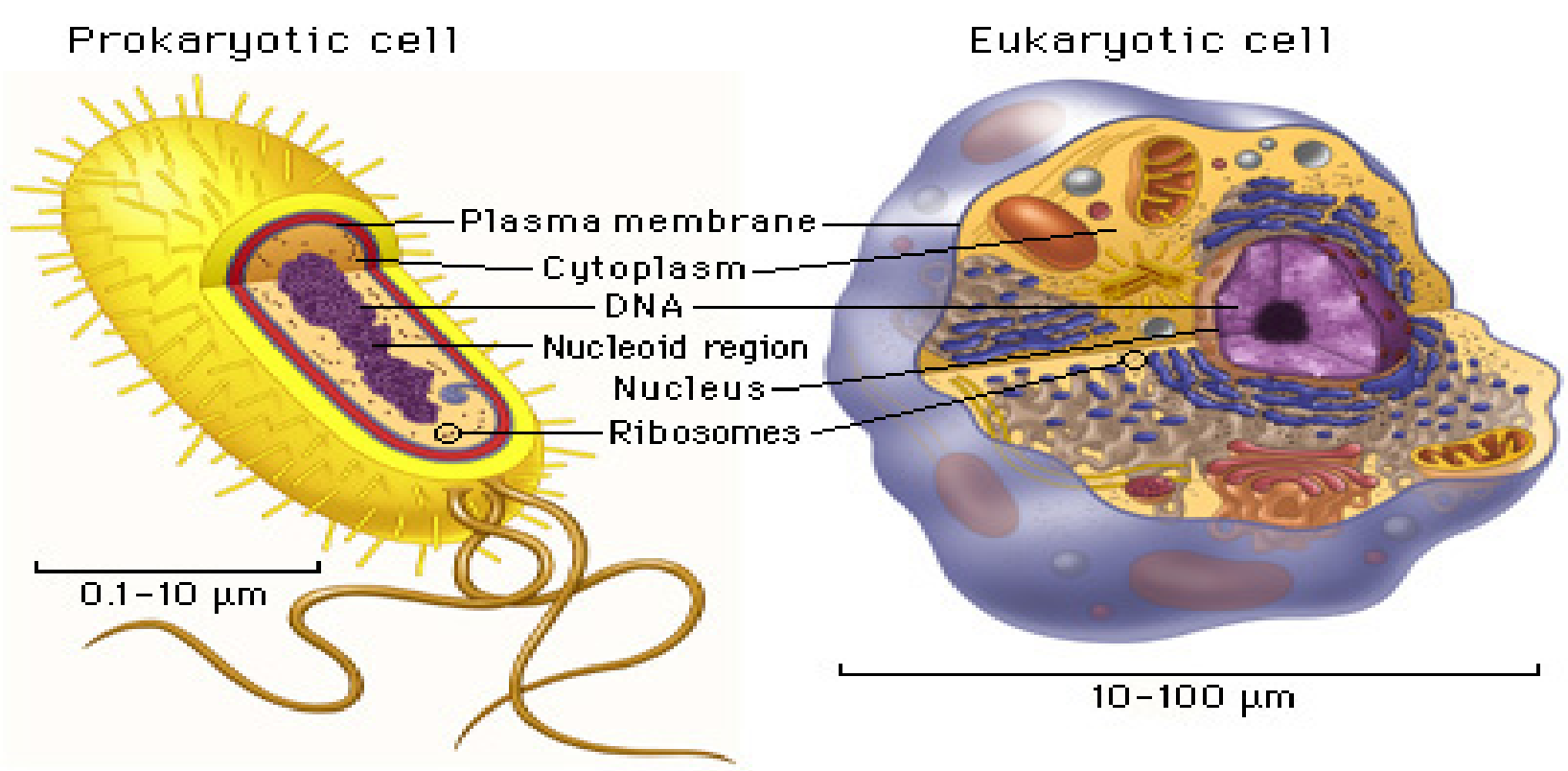

FIG- 1 PROKARYOTIC CELL

FIG- 2 EUKARYOTIC CELL

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CLASSIFICATION OF PROKARYOTIC CELL

1 EUBACTERIA
Bacteria

2 ARCHAEA
a. Methanogenes
b.Halophiles
c.Thermoacetophiles

1. EUBACTERIA- BACTERIA

- The bacteria are amongst the smallest organism
- They are most primitive , simple , unicellular, prokaryotic and microscopic organisms
- Bacteria occur almost every where in air water soil and inside other organisms.

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Bacteria have a high ratio of surface area of volume of because of their small size.

SIZE OF BACTERIA

- Typically bacteria range between 1µm-3µm, so they are barely visible under the light microscope.
- The smallest bacteria is Dialister pneumosintes (0.15-0.3µm in length
- The largest bacteria in spirillum volutans(13-15µm in length).

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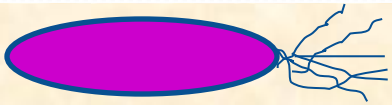
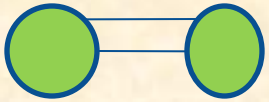
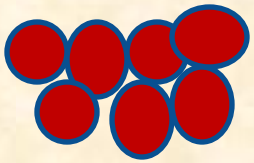
COCCI

FORMS OF BACTERIA

SINGULAR COCCUS	Spherical & Round	
MONOCOCCUS	Singly	
DIPLOCOCCUS	In pair	
TETRACOCCUS	Group of Four	
STAPHILOCOCCUS	Cubical Arrangement	

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FORMS OF BACTERIA

STREPTOCOCCUS — Bead like Chain

2.BACILLI

SINGULAR BACILLI — Rod like Bacteria

DIPLOBACILLI — Found in pair

STREPYOBACILLI — CHAIN FORM

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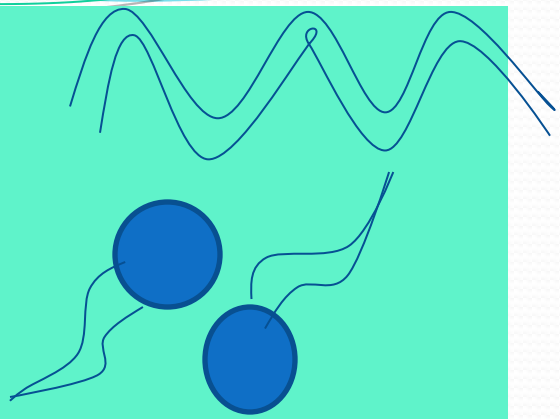
FORMS

3 SPIRILLA Spiral shaped &motile bacteria

4 VIBRIOS Comma shaped or Bent rod like Bacteria



GRAMPOSSITVE

- Gram positive bacteria have simple thick cell call.
- Their cell wall are composed of a relativelly layer amount of peptidoglycon
- Gram negative bacteria have less peptidoglycon & are more complex.

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GRAM NEGATIVE BACTERIA

They have a peptidoglycan layer surrounded by the plasma membrane & outer membranes.

Gram negative bacteria are typically more resistant to host immune defence & antibiotics.

The two types of bacteria can be stained to determine which is gram negative(pink) & gram positive(purple) using a gram stains.

D. STRUCTURE OF BACTERIA

- A Typically bacteria cell has the following components

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STRUCTUREOFBACTERIA

PLASMA MEMBRANE -

- The bacterial protoplast is bound by a living ultrathin (6-8nmthick) & dynamic plasma membrane.
- The plasma membrane chemically comprise molecules of lipid & protein are arranged in fluid mosaic pattern .
- This function is ion exchange

MESOSOME –

- Mesosome tend to increase the plasma membrane surface & in turn also increase their enzymatic contents.

CELL WALL –

The plasma membrane is covered with a strong & rigid cell wall that renders mechanical protection & provides the bacteria their characteristic shape.

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STRUCTURE OF BACTERIA

CAPSULE

- In some bacteria the cell wall is surrounded by an additional slime or gel layer called capsule.

RIBOSOME –

- Function of protein synthesis.

FLAGELLUM –

- Many bacteria are motile and contain more flagella for the cellular locomotion (summing).
- -The flagellum is attached at its base by a short flexible hook that is rotated like a propeller of ship by the flagella rotatory motor"

.

STRUCTUREOFBACTERIA

PILLI-

Pilli help in conjugation in the attachment of pathogenic bacteria to their host cells & in acting as specific sites of attachment for the bacteriophages.

-Pilli are known to be by the genes of the plasmid.

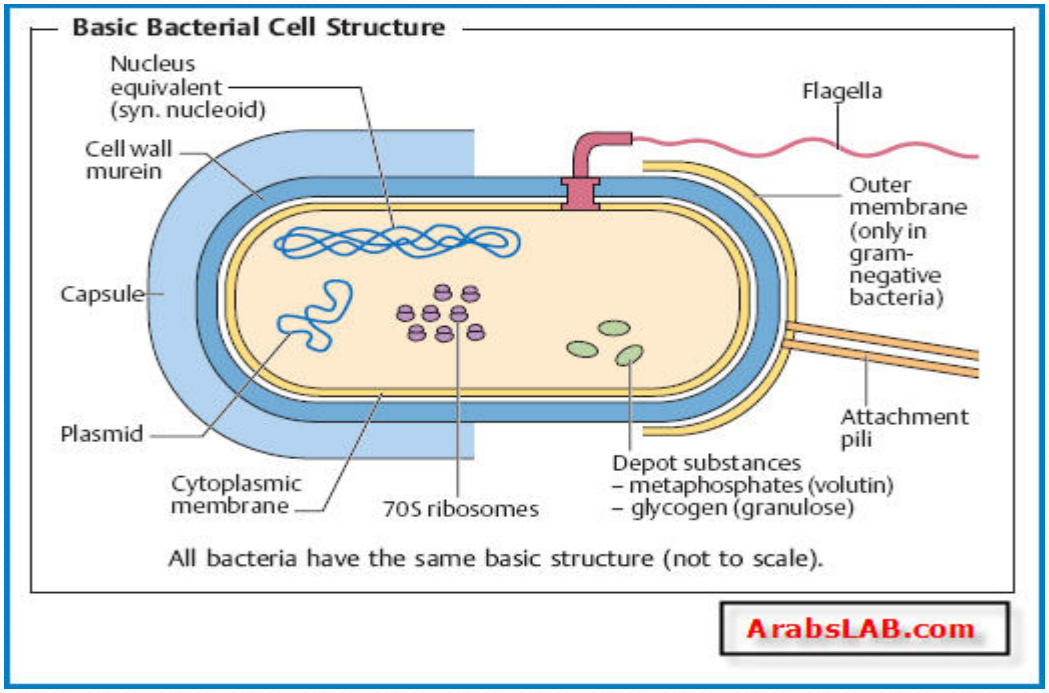

FIG 3 ;- STRUCTURE OF BACTERIA

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EX. OF PROKARYOTIC CELL

- CYANOBACTERIA;-

- The gram – negative Cyanobacteria or oxy-photo-bacteria are one of the most successful and primitive groups of organisms on earth.
- They even inhabit the steaming hot springs and the undersides of icebergs.
- Cyanobacteria form another group of prokaryotes which include a bout 1500 species.
- Cyanobacteria occur as individual cell, as small cluster or colonies of cells or as long, filamentous chains.
- They lack flagella but are able to perform movement by rotatory motion or gliding over a gelatinous layer secreted through the cell surface.

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EXAMPLOF PROKARYOTICCELL

- Caynobacteria also contain a variety of inclusion in its cytoplasm.
- Membrane bound inclusions are the gas vacuoles & the carboxysomes.
- Gas vacuoles are gas filled cavities which are located in the inner part of chromoplast.
- They occur commonly in planktonic species such as Nostoc etc.
- Gas vacuoles server the function of flotation or buoyancy.
- Carboxysome contain enzyme involved in carbon dioxide fixation.
- Many Cyanobacteria (about 20 species) tend to fix atmospheric nitrogen as ammonia ex- Nostoc.

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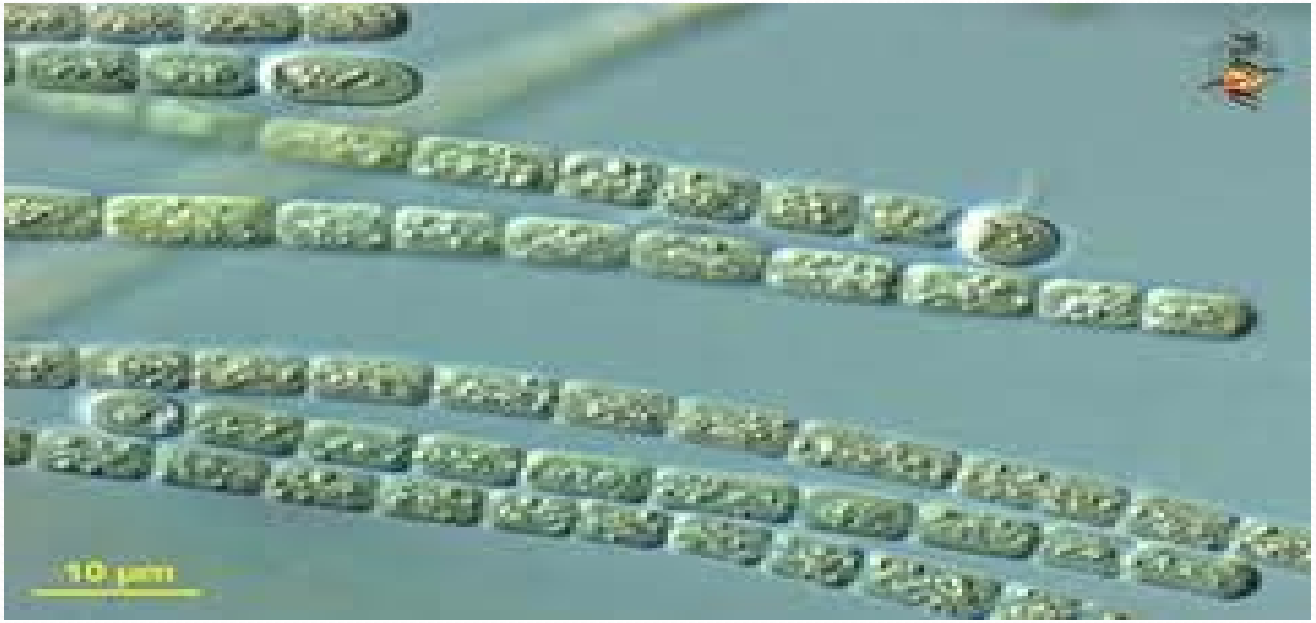

FIG - 4 CYANOBACTERIA

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ARCHAEA

Methanogens ;- The methanogenesis can be found in the anaerobic envoirnment rich in organic matter .
- It is also responsible for production of methane in biological plant.

Halophiles ;- Halophiles are highly saline environments harbor large population of a small and distinctive group of bacteria .
Eg ;- immotile cocci and polarly flagellated rods.

Thermoacidophiles ;- The thermoacidophiles are a heterogeneous group define by their ability to grow at high temperature and low ph . Eg ;- thermoplasma , sulfolobus .

SUMMRY

The plant body is compose of cell and their product.

All plant cell are surrounded by a rigid cell wall that is product by the cell , inside the cell membrane . Which selectively regulates the movements of material into and out of the cell.

CONCLUSION ;-

- A unit of biological activity delimited by a semipermeable membrane and capable of self reproduction in a medium of other living system.

- The cell as integrated and continuously changing system

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