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CHAPTER : PROKARYOTES

Prokaryotes :-

- Pro : before and karyon : nucleus
- 1st bacteria was discovered by Anton-Von-Leunhook
- smallest bacteria / bacteria without cell wall is Mycoplasma
- Largest bacteria :- Euplophisium fischelsoni

→ Gram +ive and Gram -ive Bacteria:

Gram +ive	Gram -ive
) retain its colour.	1) can't retain its colour.
) cell wall composition ↓ peptidoglycame	2) lipopolysaccharide + pipstidoglycan (cell wall composition)
) cell wall → 1 layer	3) cell wall → 2 layers
) Thick	4) Threk thin
show less resistance	5) more resistance.
) antibiotics	

Q On what bacis Gram +ive and Gram -ive are divided ?

On the basis of cell wall by Sir Hans Christian Gram.

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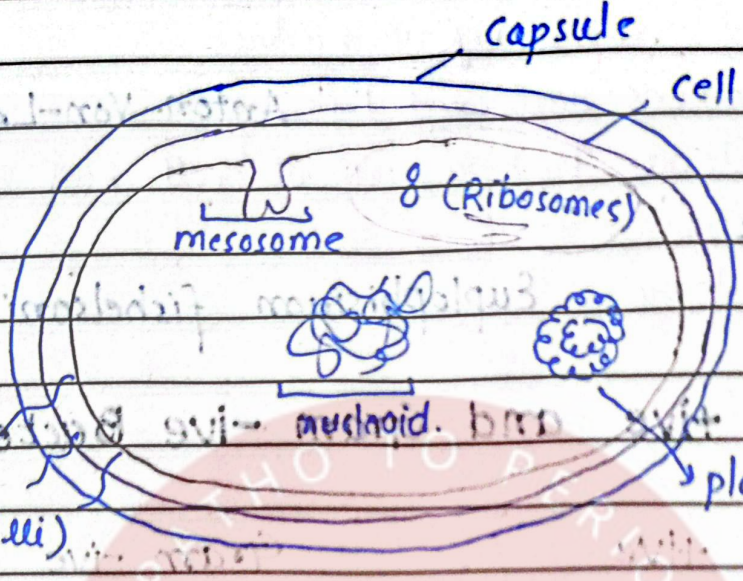
→Structure of Bacteria:



1) Capsule :

→ not present in all bacteria
→ when present then → capsulated bacteria
→ composed of polysaccharide + proteins
→ ~~prevents dehydration~~.

MCQ : Glycocalyx. when the capsule is loosely attach to the cell wall, the structure is called glycocalyx.

2) Cell wall :-

~~Composition :-~~
- murein
- peptidoglycan (chemical name)
- sacculus

→ when polysaccharide link with short sequence / chain of amino acids forms a complex structure called sacculus.

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Function:-

1) protection 2) definite shape 3) pathogenocity.

3) Flagella :

Classification on the basis of Number of flagella;

(A) Atricous : no flagella
e.g cocci (non-motile bacteria)

(B) Monotricous:- one flagella.

(C) lophotriocous : group of flagella at one end

(D) Amphitricous : group of flagella at both the ends

(E) Peritricous : flagello present all over the body.

4) Nucleoid : The region where the bacterial chromosomes + DNA are located.

→ 1 chromosome + 1 DNA

→ Bacteria is haploid by nature.

5) Pilli :

→ made up of pilin protein

→ function is the attachment to host surface

→ forms the conjugation tube called sex-pilli

→ No role in locomotion.

→ characteristic of gram -ive bacteria.

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6) Mesosome:

→ prokaryotic mitochondria (here cellular respiration and photosynthesis occure)

→ plays a role in cell division and DNA replication.

→ It is the invagination of plasma membrane into the cytoplasm and forms a pocket-like structure

7) Ribosomes:

→ 70s ribosomes are present.

8) Plasmid:

→ extra chromosomal DNA

- cloning vectors
- Antibiotic resistant genes

9) Plasma Membrane:

→ composition (from PM in chap: 01)

→ cholesterol is absent

Classification of Bacteria On the Basis of Shape:-

1) cocci (spherical shape)

(diplococci) (tetrad)

(streptococci)

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(staphylococci)

grow in clusters pairs and occasionally in short chains.

(SARCINA)

↳ a gram +ive bacterium

↳ cocci are arranged in cuboidal manner.

2) BACILLUS: (rod shape)

(diplobacilli) (streptobacilli)

3) SPIROCHETES (Spiral shaped)

4) COMMA SHAPE (9) eg vibrio cholera which causes cholera.

* NUTRITION IN BACTERIA:-

- Autotroph
  - photo-autotroph → photosynthesis
  - chemo-autotroph → chemical oxidation of ammonia
- Heterotroph
  - parasitic → Host
  - saprophytic → dead organic matter
  - symbiotic → living together
    - mutualism
    - commensalism

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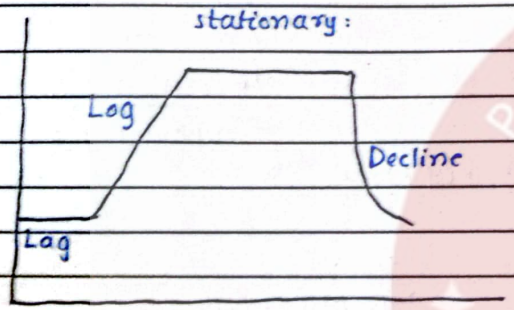
GROWTH IN BACTERIA:

(increase in number of bacteria not the size of bacteria).

Lag → log → Stationary → Decline



Lag: 1) no reproduction
2) only adaptation to the environmental conditions

Log: 1) exponential growth (2, 4, 6, 8, 16, 32)
2) symptoms of the disease appear.

Stationary: No of death = No of production.

Decline: No of death > No of production.

MCQs:

1) Exospore:
→ produced by

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2) Endospore are produced by some gram +ive bacteria during unfavourable conditions.

3) Exotoxins are produced by living bacteria.

4) Endotoxins are produced by dead bacteria.

5) Four main importance of bacteria:
1) research technology 2) role in ecology
3) nutrient recyclers (decomposition)
4) spoilage of food.

6) Ultra high temperature, short time pasteurization for milk is _____
● 140°C for 3 seconds then all bacteria will be dead.

7) High temperature, short time pasteurization for milk is _____.
● 72°C for 15 seconds.

8) Among halogens, _____ is used to disinfect drinking water (chlorine) (chemical

9) Antiseptics are used for living tissues e.g iodine pyodine, alcohol. from bacteria.

10) Disinfectants are used to clean non-living material from bacteria e.g chlorine.

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(12) Radiations used against bacteria are ;
1) Ionization radiations 2) UV radiations
3) Microwave radiations (IUM)
→ these radiations are used to clean bacteria.
(physical control of bacteria)

(13) Heat sensitive materials like vaccines, enzymes antibiotics are treated for removal of bacteria by _____.
Ans : filteration

(13) Number of bacteria in oral cavity are ~~more~~ greater than the number of mammals in the world.

CONTROL OF HARMFUL BACTERIA

Physical Control	Chemical Control
→ heat treatment	→ Halogens (Cl_2 is used as disinfectant in water)
↳ Dry	→ Glutaraldehyde is used to clean the surgical instrument
↳ Wet (steam)	→ Iodine : used for living tissues (antiseptic)
→ refrigeration	→ formalin (9% water)
→ low temp treatment	3% formalin in a ~~con~~ for preservation of biological specimen.
↓ Bacteriostatic effect	
→ radiation (IUM)	
ionization UV microwave	
→ filtration use → Harmone, Enzyme	
→ Osmotic pressure (↑ in solute level ; bacterial growth stops)	

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→ Bacteriostatic : slowing down the growth of bacteria i.e. by stoping their reproduction.
→ Bacteriocidal : killing of bacteria by heat treatment.

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→ dessication (removal of H_2O molecule from bacterial cell wall).
→ Ethylene oxide (requires 4-18 hrs exposure) and kills the endospore.


endospore formation.

Exospore : formed outside the body of bacteria
Endospores : formed within the bacterial cell during unfavourable conditions.

→ Bacteria Vs Cyanobacteria

$CO_2 + H_2S \rightarrow$ glucose + H_2S | 1) $CO_2 + H_2O \rightarrow$ glucose + O_2

uses H_2S | 2) uses H_2O

S released (↑) | 3) Oxygen ↑ (released)

Only PS-I | 4) Both PS-I and PS-II

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