Introduction

Microbiology : is the science that dealing with the study of microorganisms .

Types of biological relationships in the environment:

Mutualism : one organism get all benefits from the relationship ,the other organism get nothing with no harm (Commensalism).

Symbiosis : both organisms get benefits from the relationship .

Parasitism : all the benefits go to one party , the harm would go to other organism

Living organisms :

Prokaryotes	Eukaryotes
1-Relatively small cell size (1 µm in diameter). 2-Absence of nuclear membrane. 3- Almost (in bacteria) have circular DNA (1mm in length). 4-The region of condensed DNA is called nucleoid. 5- The genetic material containing genes almost responsible for the : a-Energy generation b-Cellular replication c-Molecular synthesis 6- Prokaryotes include: A-Bacteria (Eubacteria) B-Archaebacteria (primitive bacteria) , include: -Halophiles -Thermoacidophiles -Methanogenes	1-Relatively large cell size. 2-Presence of nuclear membrane. 3-Have linear DNA . 4- Including: a-Algae b-Protozoa c-Fungi d-Slime molds

Evolution of microbiology:

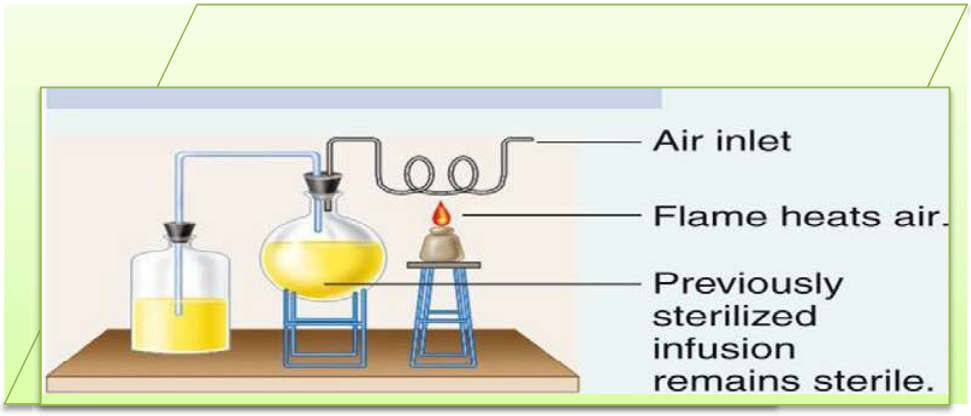
1-Van leevenhock (1677) : First observations.

2-Redi: Spontaneous Generation.

3-Spallazani(1729-1799) : Sterile Culture Medium : Meat infusion -→

→Boiled→Sealed→Remain Clear For A Long Time

4-Schwan(1837):



5-Schroder and van dusch: Introduce the use of cotton plug which is still used up to day.

6-Louis Pasture(1822-1895): Used swan-Neck flask.

7-John tyndall(1877): The problem of spores (could not achieve sterility in his lab by boiling).

8-Ferdinand Cohn (1877): Discovered the spores in *Bacillus subtilis*, and the invention of autoclave .

9-Winogradsky and Beijerinck :

⇒ Development of Soil Microbiology.

⇒ The Biochemical Role of Soil Microorganisms in Demineralization Of Organic Matter

Organic C → CO_2

Organic N → NH_3 or NO_3^-

Organic S → SO_4^{-2} or S^{-2}

10-Robert koch (1843-1910):

- The discovery of Anthrax bacteria (***Bacillus anthracis***).
- Development of the solid culturing methods .
- The use of staining techniques .
- The Identification of Tubercle bacillus in 1882 (***Mycobacterium tuberculosis***)

The Development of Koch´s Postulates:

1.The organism is found in the lesions of a disease.

2.The organism can be isolated in a pure culture.

3.Introducing the pure culture in an experiment organism (Animal) , will produce similar disease lesions and symptoms.

4. The mo. can be isolated from the lesions in a pure culture.

11-The golden era of medical bacteriology (1879-1889) when various members of the german school isolated :

1.The Cholera Vibrio (*Vibrio cholerae*)

2.The Typhoid Bacillus (*Salmonella typhi*)

3.The Diphtheria Bacillus (*Corynebacterium diphtheriae*)

4.The Pneumococcus (*Diplococcus pneumoniae*)

5.Boil Causing Bacteria (*Staphylococcus aureus*)

6.The Streptococci (*Streptococcus pyogenes)*

7.The Meningococci (*Neisseria meningitidis*)

8.Gonococci (*N. gonorrhoeae).*

8.The Tetanus Bacillus (*Clostridium tetani*).

-Lewis Pasteur and microbiology :

1-In 1857 his work on alcoholic fermentation and lactic fermentation

2-His work about microbial metabolism : the discovery of anaerobic microorganisms and the fact that "life is possible without air".

3-Fermentation is much less efficient than respiration in terms of growth rate (yield)/ unit substrate consumed .

4-The development of selective cultivation .

5-The development of pasteurization.

6-The development of vaccination.

Bacterial cell groupings (arrangement)

1-cocci

1.1.Chains : *Streptococcus pyogenes*

1.2.Pairs : *Diplococcus pneumoniae*

1.3.Cubical bundles :*Sarcina leutea*

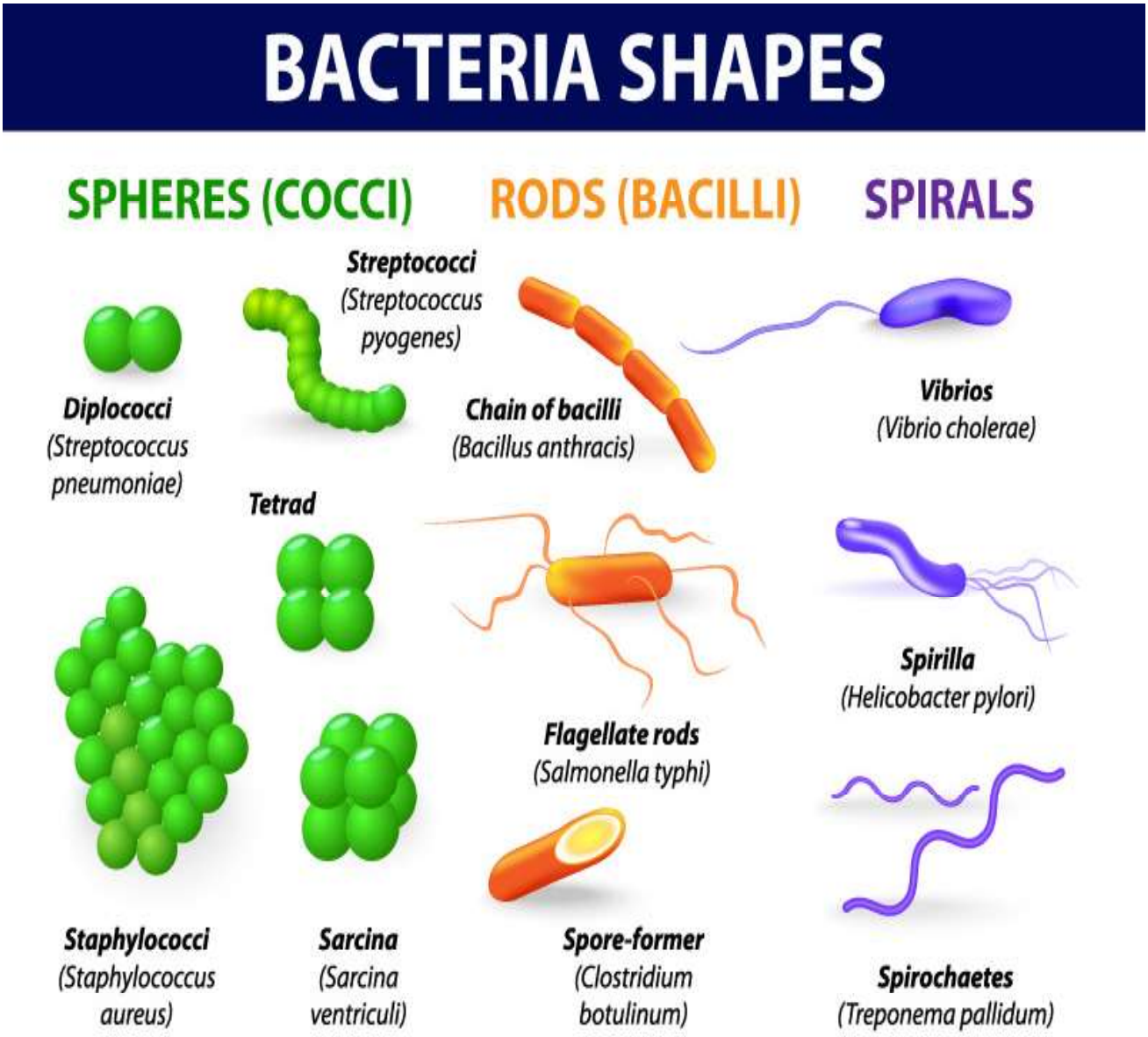
1.4.: Clusters : *Staphylococcus aureus*

2-Rods (bacilli) :

1.1.Pairs : *Bacillus*

1.2.Chains : *Streptobacillus ; Streptomyces*

3-Spiral –form : *Treponema pallidum*


BACTERIA SHAPES
SPHERES (COCCI)
RODS (BACILLI)
SPIRALS
Streptococci
(Streptococcus pyogenes)
Diplococci
(Streptococcus pneumoniae)
Chain of bacilli
(Bacillus anthracis)
Vibrios
(Vibrio cholerae)
Tetrad
Spirilla
(Helicobacter pylori)
Flagellate rods
(Salmonella typhi)
Staphylococci
(Staphylococcus aureus)
Sarcina
(Sarcina ventriculi)
Spore-former
(Clostridium botulinum)
Spirochaetes
(Treponema pallidum)