Chapter 3 : Bact. Growth

++ size

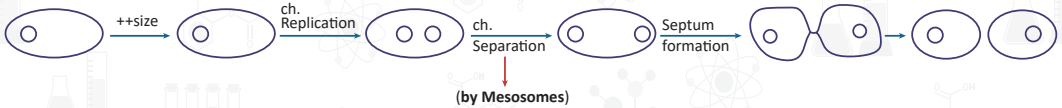
++ number

In Lab.

Solid medium → Colonies

Fluid medium → Turbidity

Bact. Reproduction (simple binary fission)



Generation Time: (G / doubling time)

- Time Taken by bact. to divide
  - **13 min.** in V. Cholera
  - **24 hrs** in T.B.

Growth curve XXXXX

هام جدا جدا جدا

	Strict (obligate) aerobe	obligate anaerobe	Facultative anaerobe	Microaerophile	Aerotolerant anaerobic
O_2	Grow	Die	Grow (better)	require reduced O_2 level (15:16%)	can tolerate O_2
No O_2	Die	Grow	able to grow	Die	Grow
E.g.	Pseudomonas aeruginosa	Bacteroides fragilis	Staphylococci, E.coli	Campylobacter, Helicobacter	Clostridium perfringens
SOD & Catalase	Present	Absent (so can't grow in O_2)	Present	little amount of enzymes	Contain SOD
T.T.					

Growth Requirements

1 Nutrients

Autotrophs (can make its food)

- Simple inorganic → complex organic molecules
- Of No medical imporatance

Heterotrophs

- Require organic molecules as they can't
- Of medical imporatance

2 CO_2

Most bact.

- Minute amounts of CO_2 is sufficient

Few species require higher conc. 5-10%

→ **Capnophilic**

E.g: * Neisseria
* Brucella abortus

3 Temperature

Mesophiles 20-40°C

→ Optimum 37°C

→ Pathogens

Psychrophiles

→ Refrigeration Temp. 0-8°C

→ Flavobacterium

Thermophiles >60°C

→ Bacillus Stearothermophilus

4 PH

Most M.Os of medical imp.

→ PH=7.2

Some

→ alkaline PH (8-9)

→ V.cholera

Others

→ acidic PH (≤4)

→ Lactobacilli

5 O_2

N.B

Cellular Respiration = Glucose Catabolism

Aerobic

- Final e^- acceptor → O_2
- Produce 38 ATP
- $O_2^{\bullet}$ + H_2O_2 formed → highly toxic

To cope with this → SOD and Catalase detoxify these molecules

Anaerobic

- Inorganic molecule (SO_4^{-2} , NO_3^-)
- Less ATP
- Not formed

Facultative anaerobe grow in medium that dosen't contain suitable final inorganic e^- acceptor

Fermentation

- Anaerobic process
- Least method for generating E