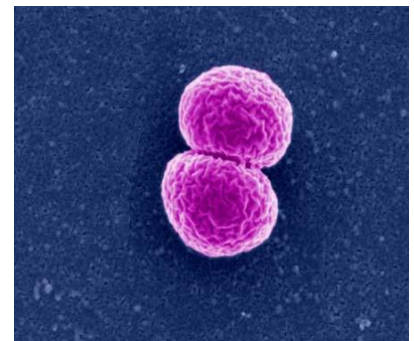


→ Objectives:

- we are going to talk about 5 types of MO:
 1. Neisseria
 2. Hemophilus
 3. Diphtheroids
 4. Bacillus
 5. Clostridium

1. **Neisseria:**

- it can be isolated from the throat or sputum
- gram negative diplococci
- remind the pneumonia:
 - diplococci
 - gram +
- positive oxidase test
- characterized by that it's **fastidious** in growth requirements:
 - culture it on chocolate agar "hemolysis of RBCs after boiling resulting in brown / chocolate color"
 - incubation under increased CO₂ level
- 2 important pathogens of neisseria that are concerned with:
 1. **Neisseria gonorrhoeae**
 2. **Neisseria meningitidis**



→ Neisseria gonorrhoeae:

- it's classification based on the antigenic variations of the capsular polysaccharides, and according to that, it can be divided into 4 groups:
 - group A
 - group B
 - group C
 - group D

- positive oxidase test
- it can ferment the glucose and maltose

2. **Hemophilus:**

- it's usually isolated from the CSF
- gram negative coccubucilli
- also characterized by that it's fastidious in growth requirements: "needs 2 factors"
 1. X-factor: - it takes it from Hemin of RBCs
 - heat resistant
 2. V-factor: - it's a coenzyme that gets outside from RBCs when boiled at 70 degree
- the agar of choice where these 2 factors exist is the chocolate agar, how?



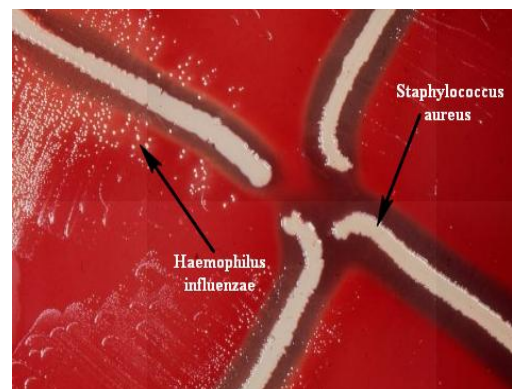
- blood contains hemin that is heat resistant so X- factor is available
- chocolate agar results from boiling of blood at 70 degree so V-factor is also available

** **Note:**

- we can culture it on BLOOD agar in one case; when culturing it with **STAPHYLOCOCCUS AUREUS**; because the staph. can give it the V-factor, and the X-factor is already found in the blood "hemin"
- in this case, the presence of both the staph. aureus and the hemphillus results in a phenomenon called **satellitism**

- **satellitism:**

when we do streaking for staph. aureus and hemphillus, next day we will find that the growth of hemophillus inluenzae is around the staph as a source of V-factor



3. diphtheroids:

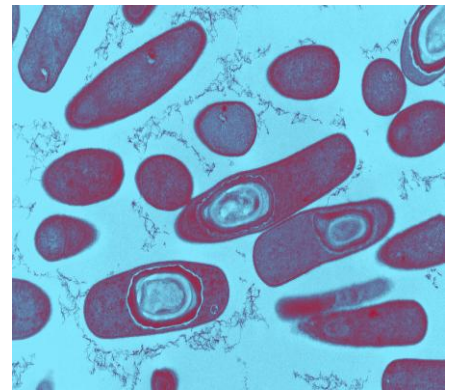
- example: corynobacteria
 - gram positive rod/bacillus “straight or slightly curved”
 - resembles Chinese letters under microscope
 - coagulase positive
-

4. Clostridium and bacillus:

- both of them produce endospores “highly resistant phase of bacterial growth”
- Note:
 - **SOME gram positive bacteria, but never ever gram negative, can produce spores
 - ** death stage can be replaced by sporulation in some bacteria
 - ** the role of spores is to maintain the bacteria itself or centuries
 - ** the only way to get rid of spores → autoclave
- these 2 bacteria have a role in food poisoning

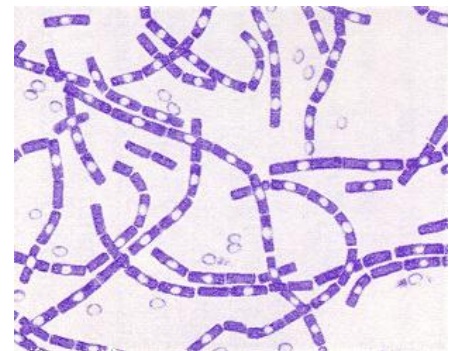
→ Clostridium:

- gram positive
- rod shape
- can produce spores
- 4 types of clostridium:
 1. Clostridium tetani
 2. Clostridium difficile
 3. Clostridium perfringens
 4. Clostridium botulinum
- all these have a role in food borne illness

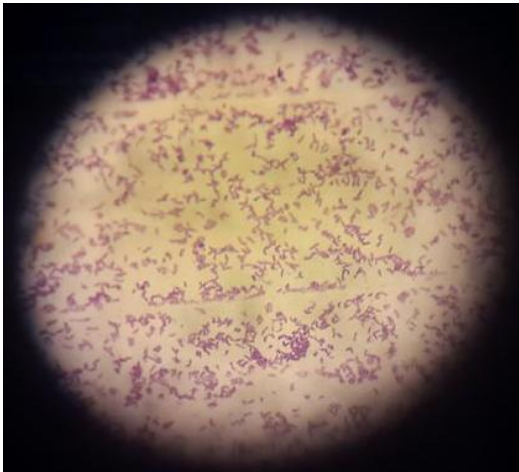


→ Bacillus:

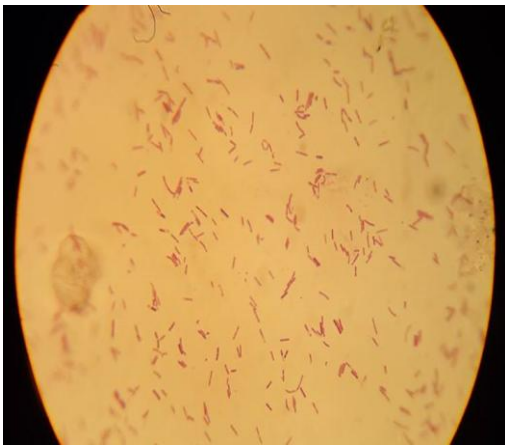
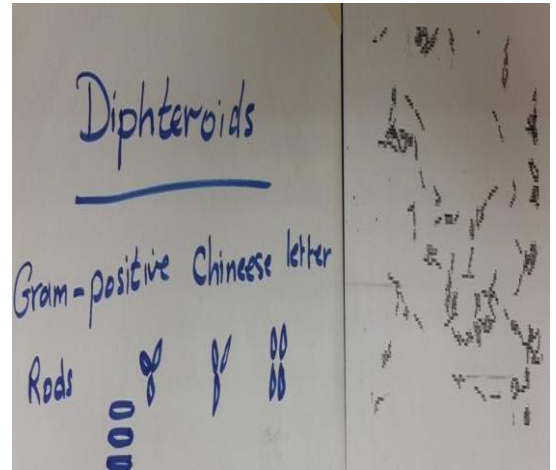
- gram positive
- rod shape
- can produce spores
- have a role in food borne illness
- 2 species:
 1. Bacillus anthracis: cause anthrax
 2. Bacillus cereus: cause food poisoning



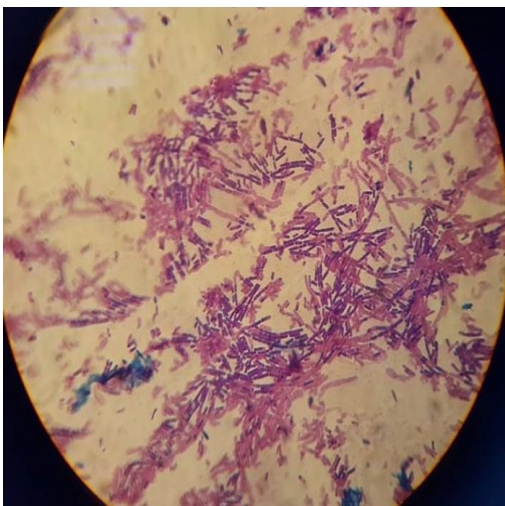
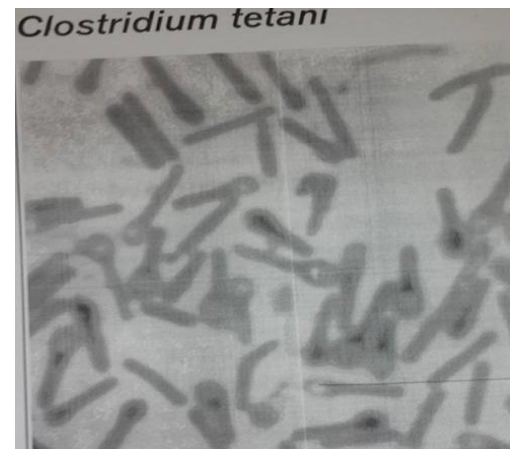
Practical part



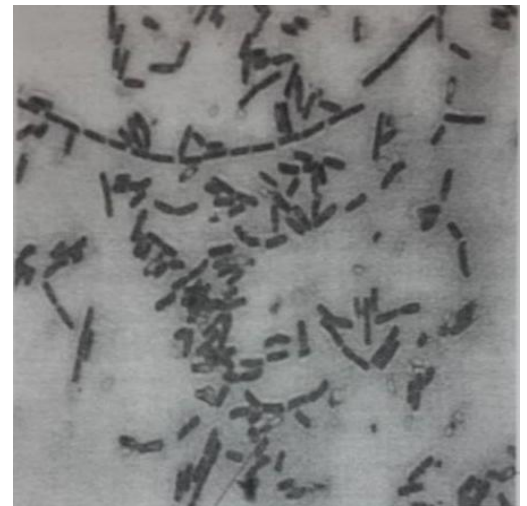
- Diphtheria
- gram +
- Chinese letters



- clostridim tetani
- spores "terminal/
subterminal"
- Gram +
- rods

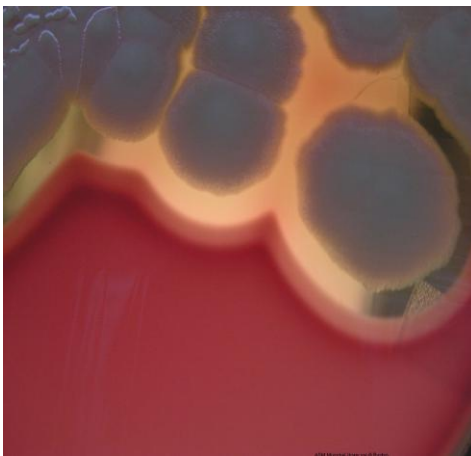
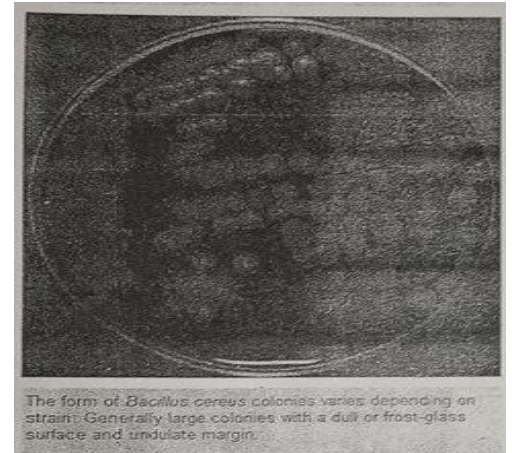


- bacillus cereus
- spores "spaces"
- Gram +
- thick rods
- food poison

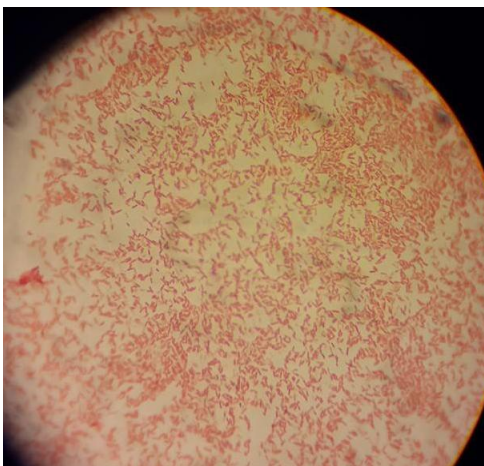
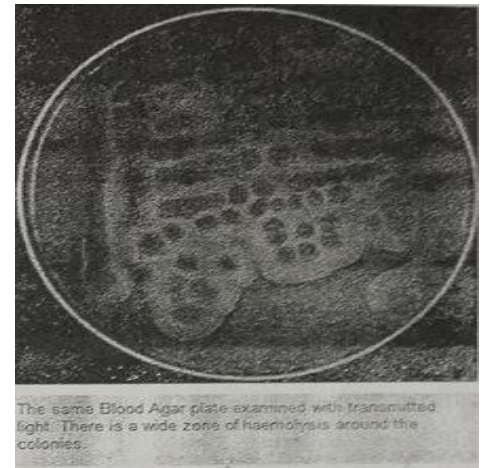




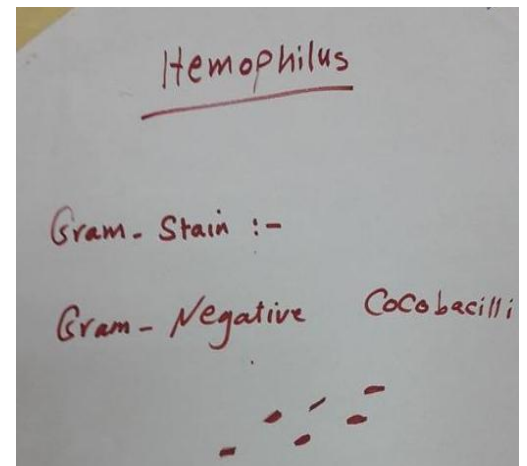
- bacillus cereus
- small- medium colonies
- frost-glass surface
- sporulation under stress conditions

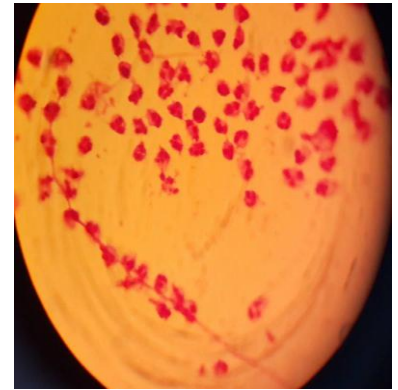
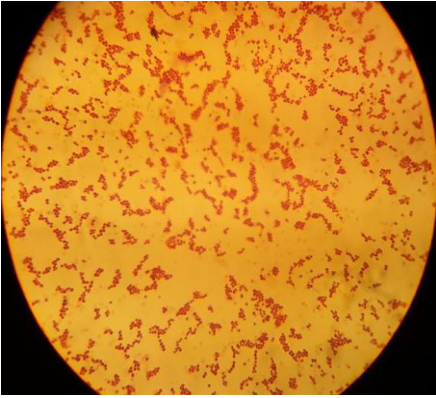


- bacillus cereus
- wide zone of hemolysis around the colonies
- dry colony under stressful conditions :only onr



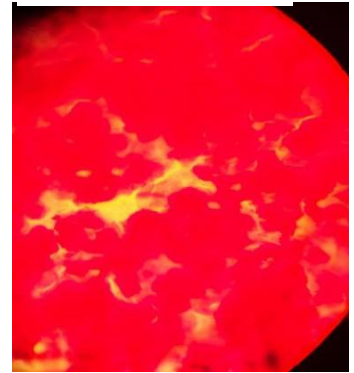
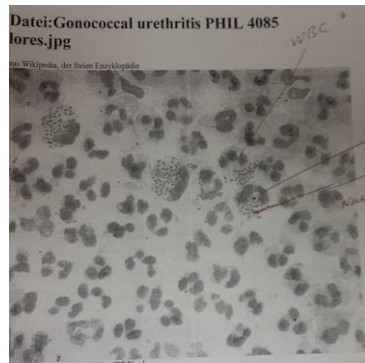
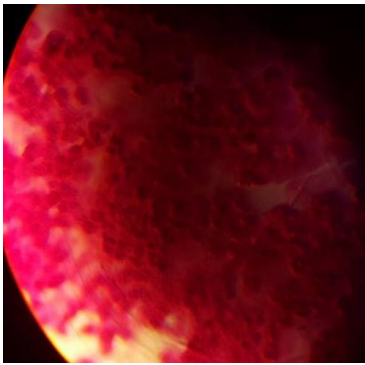
- Hemophilus
- coccobacilli





**-Neisseria
- diplococci**

**-Neisseria
- diplococcic
-meningococcus**



**-gonorrhoea
- urithritis**

Done by : Dana Ayman