Spore-forming Bacilli Toxin

❖ **Spore-forming Bacilli including *Bacillus & Clostridium***

Bacillus

✓ **Bacillus is** large gram-positive rods, endospore-forming.
✓ Aerobic or facultative anaerobic, have arranged in long chains.
✓ Most are saprophytic (soil, water, and air).
✓ Have **2** species of medical importance: *Bacillus anthracis & Bacillus cereus*

B. anthracis

B. anthracis: large, block shaped rods with central spore's and causes anthrax of the animals and humans. Including two virulence factors:

1- **Capsular polysaccharide:** inhibits phagocytosis, encoded by a plasmid.
2- **Anthrax toxin:** made up of 3 fractions, Edema factor (EF or Factor I), Protective antigen factor (PA or Factor II), and lethal factor (LF or Factor III).

They are not toxic individually, the whole complex produces local edema & shock

B. cereus

B. cereus: rods shaped terminal spores **with square ends**, and causes food poisoning & opportunistic infections. Including 2 types of toxin:

1- **Protein enterotoxin**: Heat-labile, this type is transmitted mostly by milk products and produced in small intestinal and causes watery diarrhea,
2- **Cyclic peptide emetic toxin:** Heat- stable, this type is transmitted mostly by rice and produced in food and causes vomiting.

Laboratory diagnosis

1-Diagnosis according to the **clinical signs important** for the type of disease.

2-Injection of laboratory animals, mouse or guinea pigs.

3-Using serological methods.

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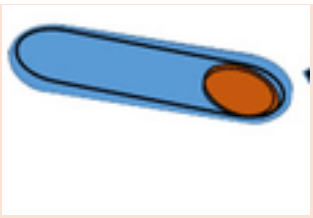
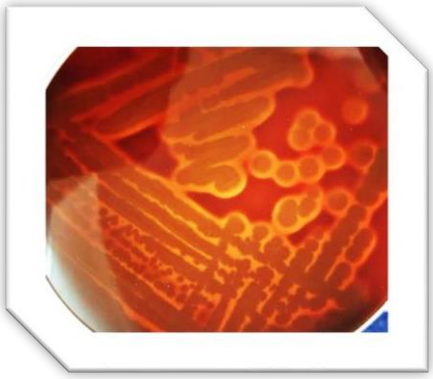
4-Microscopic examination



5-Culture sample

B. anthracis Selective media called Polymyxin lysozyme-EDTA- thallium acetate agar (PLET). On blood agar appearance flat or slightly convex with irregular edges and ground-glass. There are often comma shaped projections from the colony edge producing a "Medusa-head" colony.

B. cereus a large, smooth, pink colonies with mousy smell **on MacConkey's agar**. Lactose non-fermenter colonies and central black. Bacillus cereus Agar Base is a medium used with supplements for the selective detection of Bacillus cereus in food.



6- Biochemical tests.

Species	motility	B-hemolysis ON blood agar	Penicillin	7%NaCl	Capsule
B. anthracis	non	non	Sensitive	growth	Capsular
B. cereus	+	+	Resistant	non	Non-Capsular