Bacterial Structure (Lab 2)

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1. Why study Bacterial Cell Structure?

- Mechanisms of virulence.
- Drug development.
- Identification

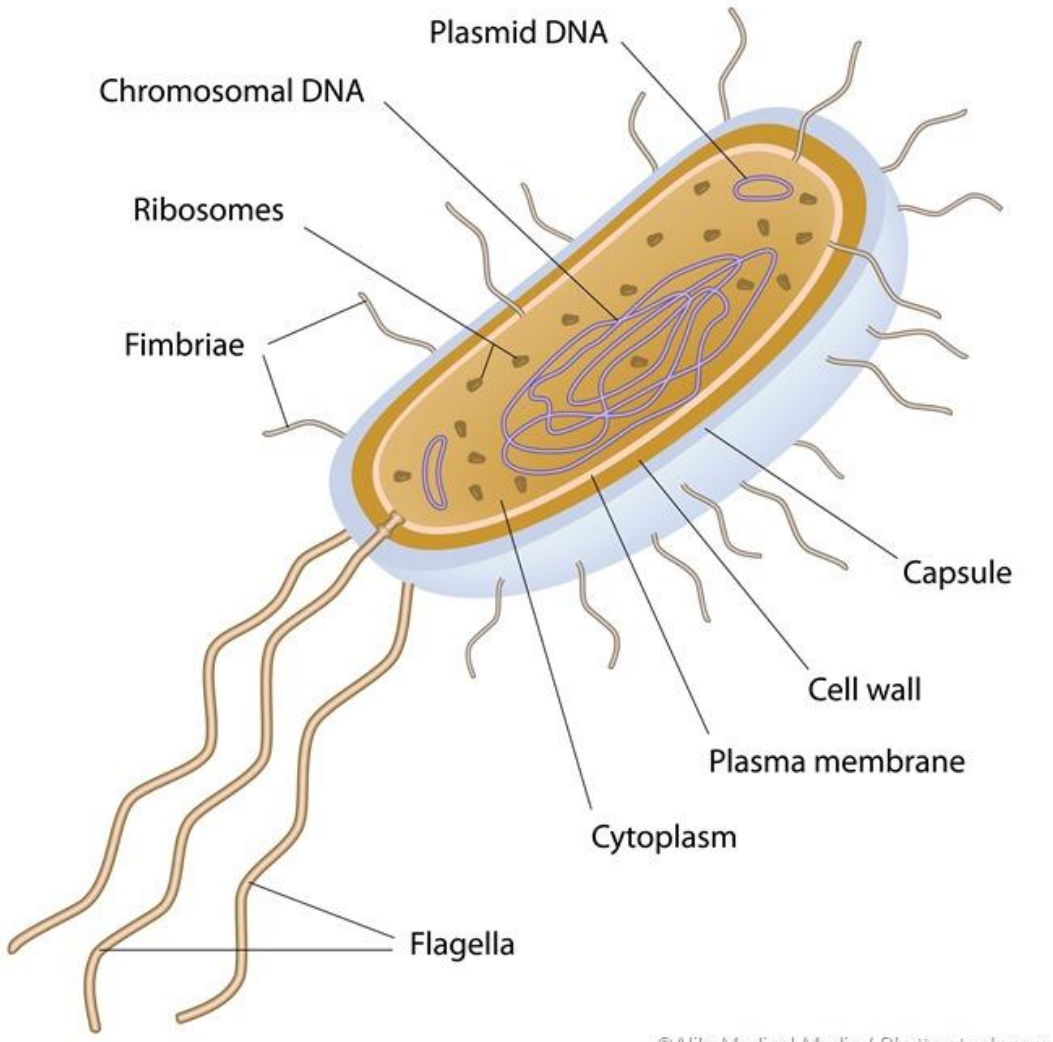
2. Essential structures

- Cell wall.
- Cell membrane.
- Cytoplasm.
- Nuclear material.

3. Particular structures

- Capsule.
- Flagella.
- Pili.
- Fimbriae.
- Spore.

Bacterial Structure (Cell wall)



Characteristics and Functions of Cell wall

- Outer most portion /barrier.
- Protection from turgor pressure.
- Gives shape.
- Surrounds plasma membrane.

Common Cell wall Components

- The bacterial cell wall consists of peptidoglycan, an essential protective barrier for bacterial cells that encapsulates the cytoplasmic membrane of both Gram-positive and Gram-negative bacterial cells.
- Peptidoglycan is a rigid, highly conserved, complex structure of polymeric carbohydrates and amino acids

Cell wall Identification

- 1884 Christian Gram (First publication for the Gram stain method)

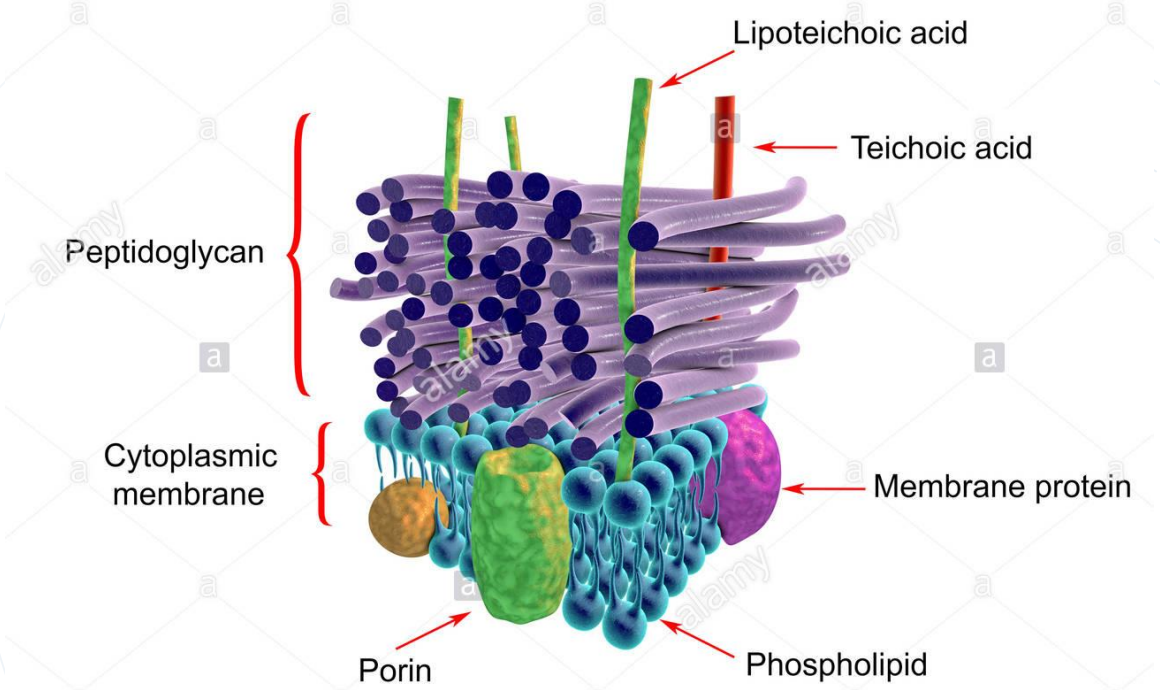
Classification based upon staining.

- Gram Positive vs Gram Negative:

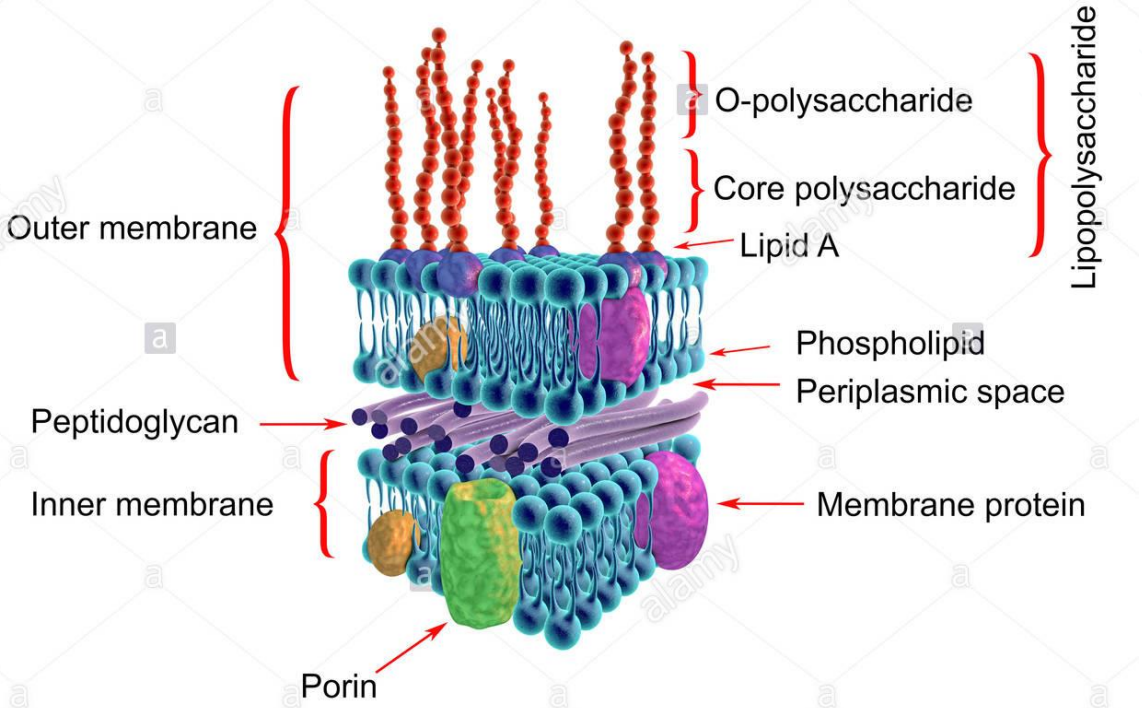
1. Hans Christian Gram (1884) differentiate between Positive and Negative.
2. It is the most important differential stain used in bacteriology because (it classified bacteria into two major groups)
3. Gram-positive organisms have a thicker peptidoglycan cell wall compared with gram-negative bacteria

Gram Positive Bacteria	Gram Negative Bacteria
The thick of peptidoglycan is 20-80 nm	The thick of peptidoglycan is 2-3 nm
appears violet after staining	appears red after staining
Just have one inner membrane	Have two membranes, inner membrane and outer membrane(with lipopolysaccharide)

Gram Positive



Gram Negative



Gram Stain

- This stain for differentiate between G +ve bacteria (which accept staining), and G -ve bacteria (which not accept staining).

Procedure

- Prepare your clear slide and put one drop of H2O .
- Take specimen from the colony and mix it well with water or normal saline.
- Leave for dryness on air then fix it on burner.
- Then pour Crystal Violet stain on the slide and leave it for 1 minute.
- Wash gently with water..

Procedure

- Then pour Iodine on the slide and leave it for 1 minute.
- Wash gently with water.
- Wash with Alcohol to decolorize the slide.
- Then pour Safranin stain on the slide and leave it for 1 minute.
- Examine the finished slide under a microscope

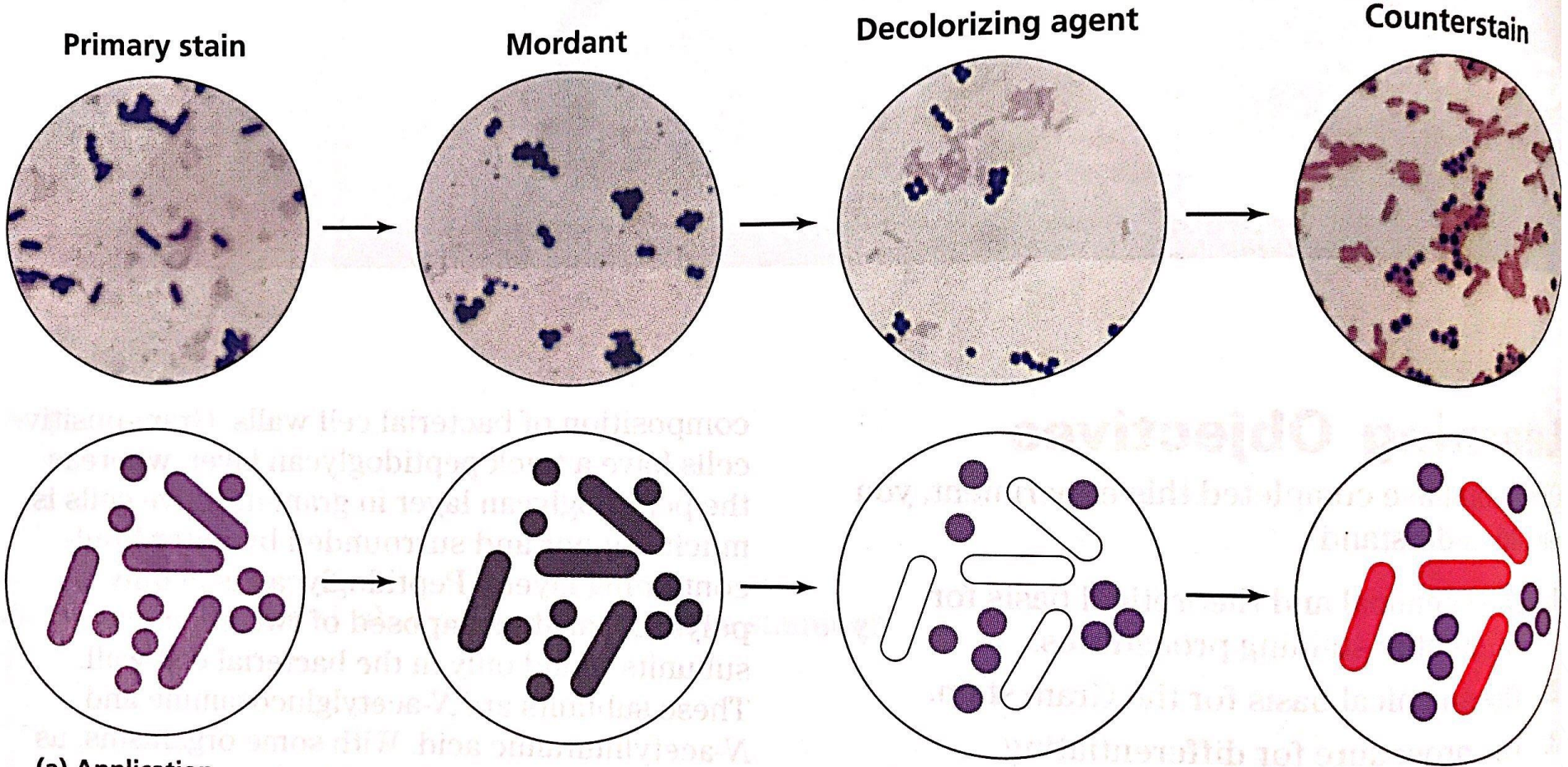
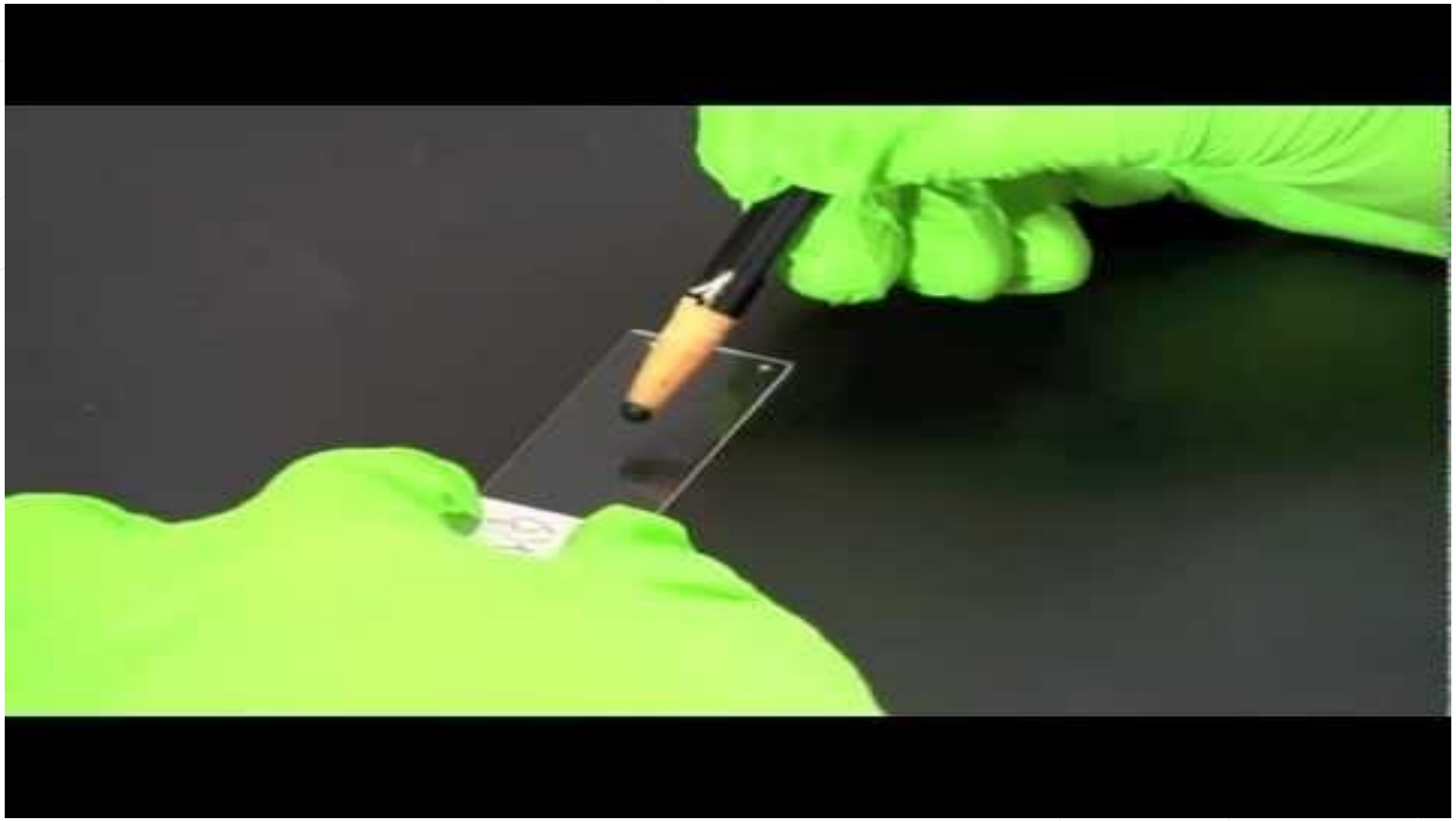


Figure 10.2 Microscopic observation of cells following steps in the Gram staining procedure



Reference

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- **James G. Cappuccino, Natalie Sherman. 2014. Microbiology a laboratory manual.**