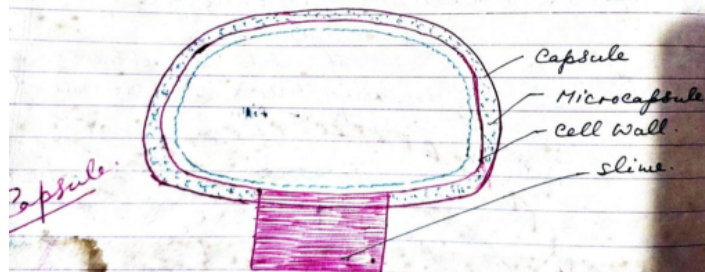






① Capsule → Some Bacteria like *Bacillus anthracis* and *Diplococcus pneumoniae* possess a thick or thin gelatinous covering outside the cell wall called Capsule. Its function is to protect bacterial cell from injury, to prevent complete drying of the cell and to protect from viral infection. Depending upon the thickness of the Capsule, it is named as MacroCapsule (more than  $0.2 \mu$ ) and Microcapsule (less than  $0.2 \mu$ ) if the covering is loose, it is termed as Slime but if it is rigid and well defined, then it is termed as Capsule. Capsule is made up of polysaccharides and polypeptides of only one and some times two different amino acids.





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(2)

Cell wall  $\Rightarrow$  Bacterial cells are surrounded by a wall made up of Mucopolysaccharide, which is peculiar to bacteria. The amount of cell wall varies in two main divisions of true bacteria commonly known as Gram '+' and Gram '-' bacteria.

In gram positive bacteria, it is major cell wall component (85%), however in gram negative, bacteria it is present in small quantity (3 to 12%) mucopolysaccharide. Mucopolysaccharide is composed of large number of alternating molecules of N-acetyl Glucosamine and N-acetyl muramic acid both being derivatives of glucose. The detailed chemical composition and structure of Gram positive and Gram negative bacteria can be well marked by their differences given below:-

## GRAM + (POSITIVE)

## GRAM - NEGATIVE

(1)

Thickness  $\Rightarrow$  Varies from 2-80 nm and lacks the outer lipopolysaccharide layer i.e. Laminar.

Thickness is upto 2-5 nm (thinner). It is suppressed between the cell membrane and lipopolysaccharide layer i.e. it is three layered.

(2)

Chemical Composition  $\Rightarrow$  Mucopolysaccharide forms major portion of the wall 85% of the dry weight rest being simple polysaccharides which are in form of Teichoic acid. (It doesn't contain lipid).

Muramic acid forms 3 to 12% of the total dry weight. Major portion is contributed by Lipoprotein, lipid and polysaccharide. Thus it has lipid content but absence of Teichoic acid.

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