

Q. Provide a detail account of cell organisation in Bacteria?

Ans: Bacteria are the simplest micro organisms. Again they are the smallest form of organic life visible under a compound microscope but even then they are capable of expressing all the basic features of a living organism. They were discovered by Leeuwenhoek in 1683. They were designated as small microscopic species.

Sedillot (1876) coined the word "microbe" for bacteria. Now a days it is well understood that bacteria are prokaryotic in cellular organisation.

**SHAPE OF BACTERIA** → Tremendous variation exists in the bacterial kingdom but the shape of bacteria may be of three central terms—

① **Spherical** → These are called cocci. The cells may occur in pairs, in groups of four, in bunches or in a bead-like chain.

② **Spiral** → Some bacteria appear like, short or long, in complete spirals, they have been called as spirilla.

③ **Rod-shaped** → These bacteria are popularly called bacilli, they also occur in pairs or in chains of bacteria.

Bacteria are approximately



0.5 to 1.0  $\mu$  broad and 2.0 to 5.0  $\mu$  long

**STRUCTURE OF THE BACTERIAL CELL**  $\rightarrow$  The cell of bacterial contains all basic components for life activities. They are prokaryotic in organisation in general. The typical cell shows the following structures.

**I) CELL WALL**  $\rightarrow$  The bacterial cell wall has a thick, rigid covering called the cell wall. It is composed of mucopeptide. Its amount vary in the cell wall of gram positive (+ve) and gram negative (-ve). In gram +ve bacteria mucopeptide is the main components but in gram -ve bacteria. It is presented in small quantities. Here the major portion is composed of lipo-protein and lipopolysaccharide.

**FUNCTION**  $\rightarrow$

1. It gives a definite shape to bacterial cell.
2. It also provide mechanical support to the bacterial cell.

**II) CAPSULE**  $\rightarrow$  The bacterial cell in some cases remain surrounded by a capsule. It is composed of polypeptide and polysaccharide containing a single amino acid or rarely the capsule is polymeric. It is typically thinner and less dense. It has been divided by two main type such as the micro and macro capsule. The macro capsule are at least



0.2  $\mu$  in thickness.

### FUNCTION $\rightarrow$

1. It is protective in nature.
2. Capsule stores food substances.
3. It forms the site for waste disposal.

**④ FLAGELLUM**  $\rightarrow$  The bacterial cell wall bears one or more long flagella which differs from flagella of eukaryotes in lacking its structure.

Bacterial flagella is hollow and cylindrical. They are composed of protein molecules called flagellum. Each flagella molecule is  $40\text{\AA}$  in diameter. They are longitudinally twisted around each other to form a heavy helical rope like structure.

The flagellum consist of three morphological parts —

**① BASAL BODY**  $\rightarrow$  It is the structure embedded in the plasma membrane. In gram +ve bacterial the basal body consist of two sets of ring. Each set has two ring. In this way 4 rings from inner to outer side are named as M-ring, S-ring, P-ring, L-ring. In gram -ve bacteria there is only one sets of ring.

**② Hook**  $\rightarrow$  This is part of flagellum penetrates the wall.