

## **Structures Internal to the Cell wall**

### **The Plasma (Cytoplasmic) Membrane**

1. The plasma membrane encloses the cytoplasm and is a lipid bilayer with peripheral and integral proteins (the fluid mosaic model).
2. The plasma membrane is selectively permeable.
3. Plasma membranes contain enzymes for metabolic reactions, such as nutrient breakdown, energy production, and photosynthesis.
4. Mesosomes, irregular infoldings of the plasma membrane, are artifacts, not true cell structures.
5. Plasma membranes can be destroyed by alcohols and polymyxins.

## **The Movement of Materials across Membranes**

6. Movement across the membrane may be by passive processes, in which materials move from areas of higher to lower concentration and no energy is expended by the cell.
7. In simple diffusion, molecules and ions move until equilibrium is reached.
8. In facilitated diffusion, substances are transported by transporter proteins across membranes from areas of high to low concentration.
9. Osmosis is the movement of water from areas of high to low concentration across a selectively permeable membrane until equilibrium is reached.
10. In active transport, materials move from areas of low to high concentration by transporter proteins, and the cell must expend energy.
- II. In group translocation, energy is expended to modify chemicals and transport them across the membrane.

## **Cytoplasm**

12. Cytoplasm is the fluid component inside the plasma membrane.
13. The cytoplasm is mostly water, with inorganic and organic molecules, DNA, ribosomes, and inclusions.

### **The Nucleoid**

14. The nucleoid contains the DNA of the bacterial chromosome.
15. Bacteria can also contain plasmids, which are circular, extrachromosomal DNA molecules.

### **Ribosomes**

16. The cytoplasm of a prokaryote contains numerous 70S ribosomes; ribosomes consist of rRNA and protein.
17. Protein synthesis occurs at ribosomes; it can be inhibited by certain antibiotics.

### **Inclusions**

18. Inclusions are reserve deposits found in prokaryotic and eukaryotic cells.
19. Among the inclusions found in bacteria are metachromatic granules (inorganic phosphate), polysaccharide granules (usually glycogen or starch), lipid inclusions, sulfur granules, carboxysomes (ribulose 1,5-diphosphate carboxylase), magnetosomes ( $\text{Fe}_3\text{O}_4$ ), and gas vacuoles.

### **Endospores**

20. Endospores are resting structures formed by some bacteria; they allow survival during adverse environmental conditions.
21. The process of endospore formation is called sporulation; the return of an endospore to its vegetative state is called germination.

References: 1- Microbiology an introduction TENTH EDITION. Gerard. Tortora.2010.

2- Microbiology an introduction TWELFTH EDITION. Gerard. Tortora.2016.