CELL WALL :

→ Primary cell wall.
→ Secondary cell wall.
→ Tertiary cell wall
→ Middle lamella (Calcium pectate)

* Cellulose, Hemicellulose, pectin building block of cell wall.
Carbohydrates / non-sugar polysaccharides.

STRUCTURE OF CELL WALL :

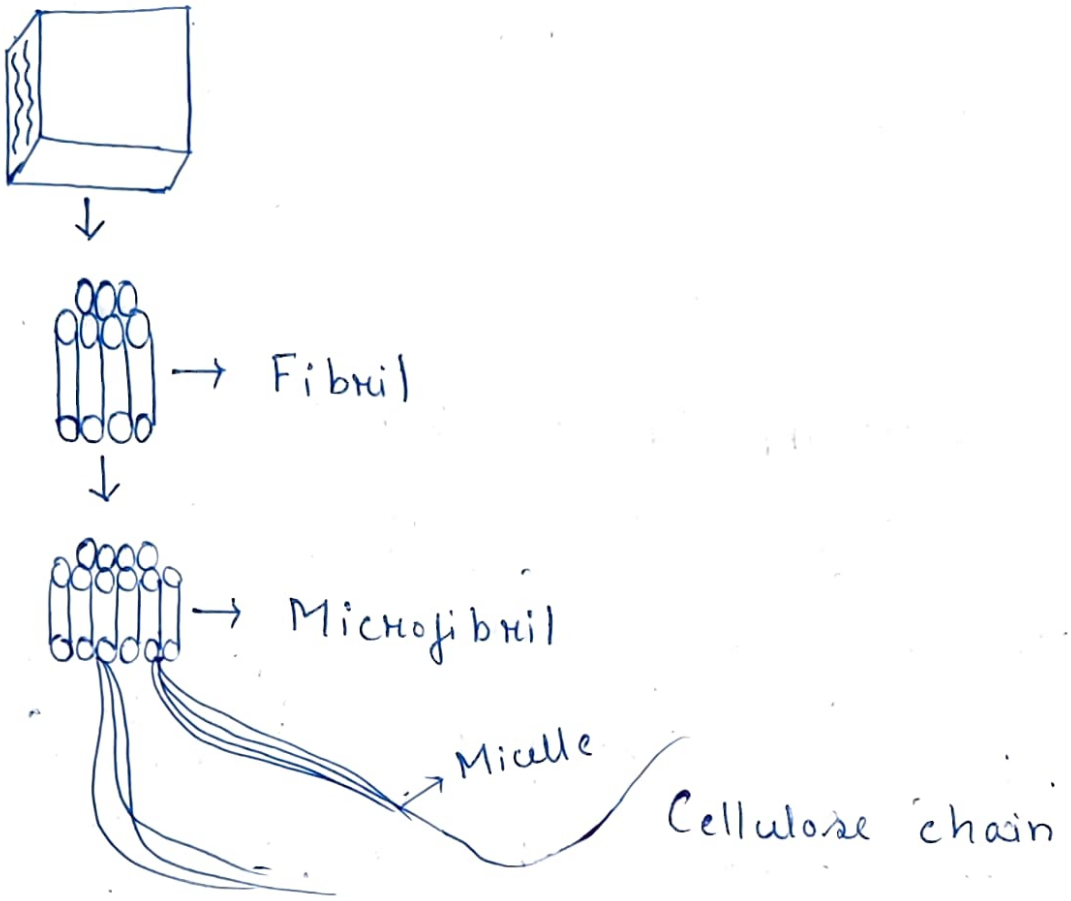
A typical plant cell wall consists of middle lamella, primary cell wall, secondary cell wall and tertiary cell wall.

1. Middle lamella : It is a thin amorphous cementing layer or intercellular matrix present between two adjacent plant cell. Middle lamella is mainly composed of pectic substances with salts of calcium (Ca) and Magnesium (Mg). The free surfaces of plant cells lack middle lamella.

2. Primary cell wall : It is present inner to the middle lamella which is thin, elastic and capable of growth. Its thickness varies from 0.1 - 3 µm. Primary wall consists of microfibrils and gel like matrix. Microfibrils are composed of cellulose fibres embedded in an amorphous mixture of pectic polysaccharide and glycoproteins.

3. Secondary cell wall : The secondary walls appears when the cell has reached to its mature size. It is present in parenchyma, collenchyma, sclerenchyma, tracheids and vessels. The thickness of secondary wall is 3 - 10 µm which again consists of three layers, designated as S_1, S_2 and S_3.

Like the primary wall, the secondary wall has the same microfibrils embedded in gel like matrix of hemicellulose, pectin and protein.



Microfibrils are composed of micelles, the smallest structural unit of the cell wall. Each micelle consist of many cellulose chains. About 20 micelles produce a microfibril, with a cross-sectional area. Again, about 250 microfibrils form a fibril.

PITS: In the secondary cell wall, pits are present which are depressions.

4. Tertiary Cell Wall: It is a xylem rich layer deposited inner to the secondary wall of some plant cells. E.g: wood of some gymnosperms. This wall lacks cellulose and microfibrils.