Plant Histology

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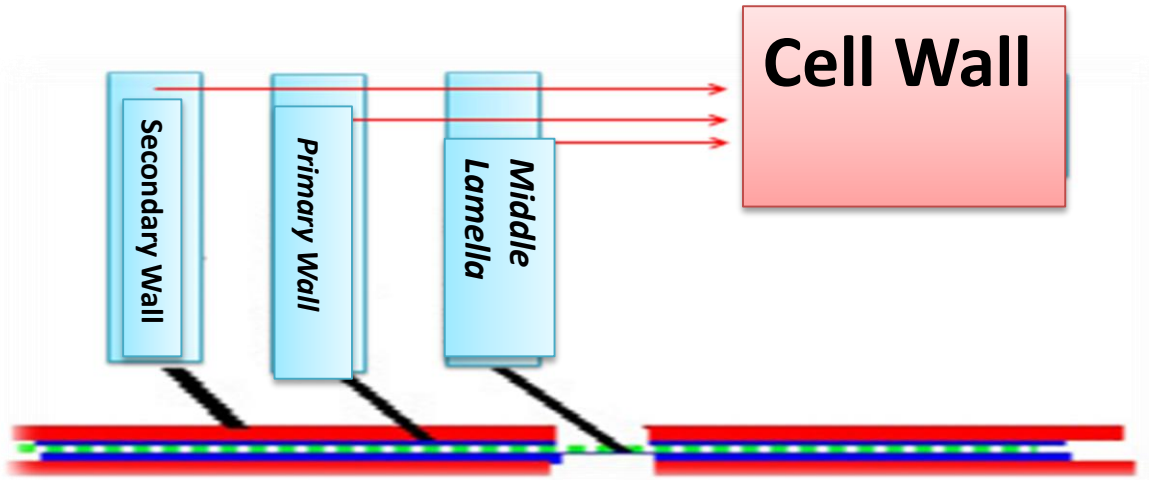
(2)

The Cell Wall

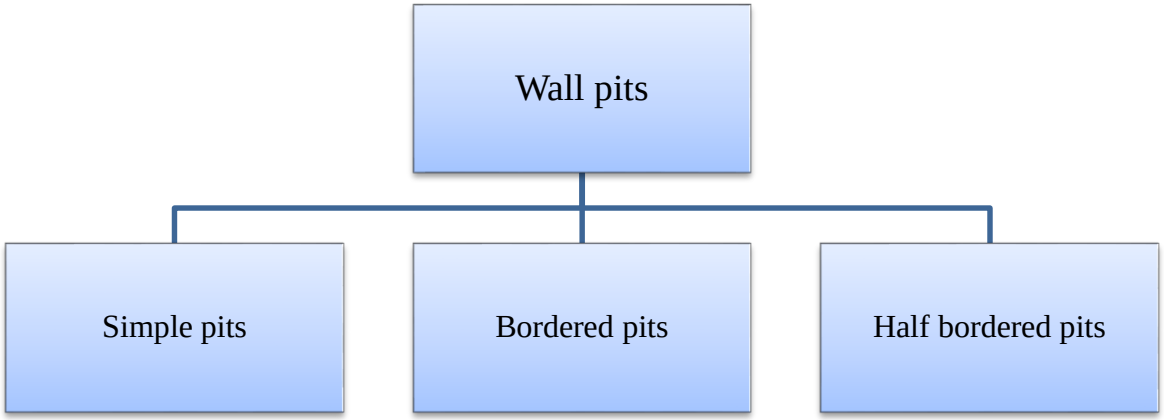
- Cell wall is present only in plant cells. Cell wall is non-protoplasmic. It is considered as metabolic by product of the protoplast. Cell wall provides support and protection to cell. It also plays an important role in absorption, translocation and secretion.

- **It is composed of different layers:**
- **1.** ***The Cell Plate and Middle Lamella***
- The cell wall first becomes visible as a cell plate that arises during late telophase of mitosis. Each cell has its own middle lamella. The cell wall of the adjacent cells is joined by middle lamella.
- 2. ***The Primary Wall***
- The primary wall is optically anisotropic, meaning that its wall materials have unequal optical properties along different axes. The primary wall is the first visible layer of the cell wall, and its formation accompanies extension growth. It develops on either side of the middle lamella when two cells are adjacent and largely determines cell shape and size during plant growth and development. It is composed of a continuous interconnected, fortifying system of aggregated, threadlike cellulosic microfibrils that result from the simultaneous polymerization and crystallization of cellulose molecules.
- 3. **The Secondary Wall**
- The secondary Wall is very thick. Secondary walls also are strongly anisotropic. In cells like the gymnospermous secondary xylem water-conducting tracheid, they are microscopically layered, consisting of a relatively narrow outer layer (S1), a middle layer of variable width (S2), and narrow inner layer (S3). The three layers are characterized by a different fibril angle of orientation of the abundant and extremely long cellulose microfibrils.



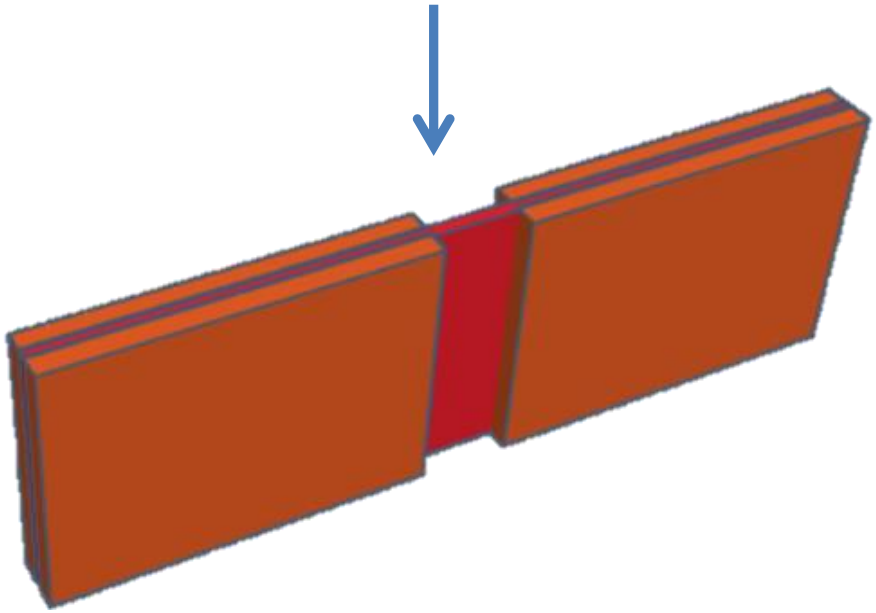
Wall Pits

- They act as the channels for the transport of water and minerals between adjacent cells. Pits of two neighboring cells are usually located opposite to each other and these opposite pits together are called pit pair. Each pit has a cavity called pit cavity. Pit cavity opens internally to the lumen of the cells.



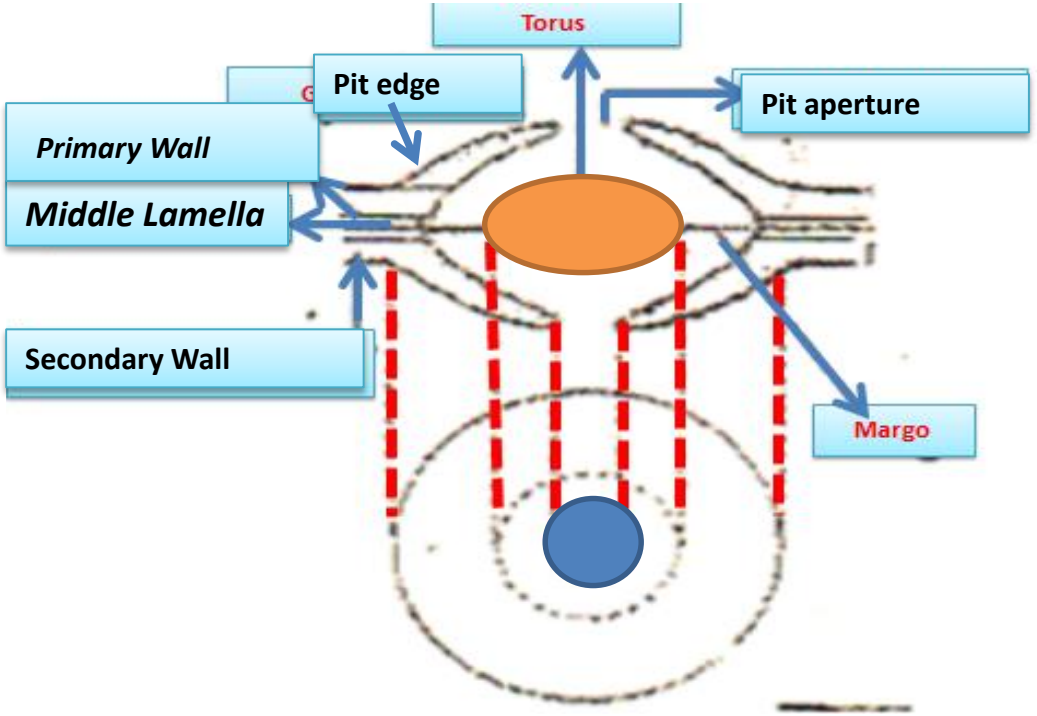
Simple pits

- Pits which lack the borders are called simple pits. Two opposite simple pits are called simple pit pair. Simple pits are usually present in parenchyma cells and Scelerid cell.



Bordered pits

- During the development of pits, the secondary cell wall may over arch the pit cavity forming a border, leaving an inner opening called pit-aperture. Such pits with borders are called bordered pits. Two opposite bordered pit are called bordered pit pair. It is found in lignified fibres, opposite between *tracheary cells (trache or tracheid).*
- The middle of the pit membrane forms a circular thickening structure called torus. Torus is larger in diameter than the pit aperture and is composed of primary cell wall materials. The remaining part of the pit membrane surrounding the torus is called margo. Margo is flexible and thin. Under certain circumstances, the margo moves towards one or the other pit aperture closing the same with the torus
- pit aperture



Half bordered pits

- When a bordered pit is opposed by a simple pit. It is found to opposite between parenchym cell and tracheid or trache cells.