

# Pits

## Pits

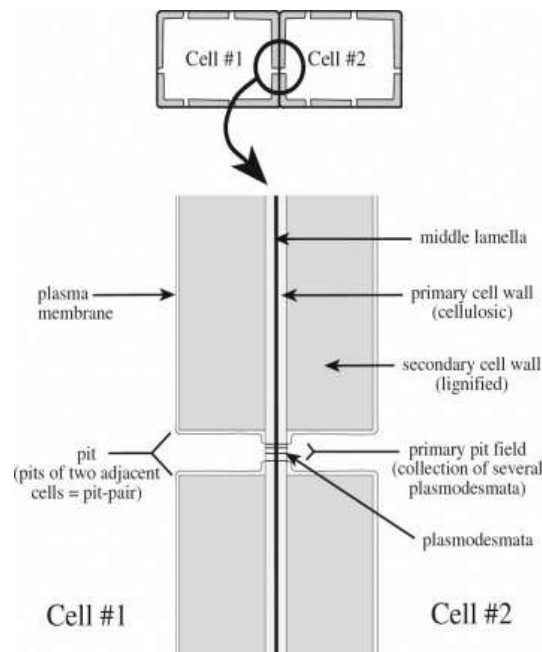
Pits are areas in which no secondary wall material has been deposited. It is thin area in the cell wall.

Pits are microscopic channels that connect plant cells to each other through their cell walls. They allow for the passage of water, nutrients, and signalling molecules between cells, facilitating communication and transport within the plant.

Pits of two neighbouring cells are usually located opposite to each other and these opposite pits together are called **pit pair**.

## Pit structure

- Pit membrane (the membrane between adjacent cell walls, consists of the primary cell wall and middle lamella).
- Pit chamber or cavity (hollow area where the secondary cell wall are absent, it located between pit membrane and pit aperture).
- Pit aperture (The opening at the end of the pit chamber).



## Types of Pits

1. **Primary pit field** : An area of reduced thickness in the primary wall of a plant cell, or depression like pits in the primary cell wall, Characteristic feature of primary pit field is the presence of plasmodesmata, which connect the cytoplasm of adjacent cells.
2. **Simple pit** : A pit pair in which the diameter of the pit chamber and the diameter of the pit aperture are equal in secondary walls.

Simple pit are the most common type of pits, consisting of a narrow channel through the cell wall. They are often found in parenchyma cells.

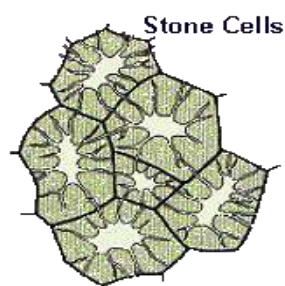
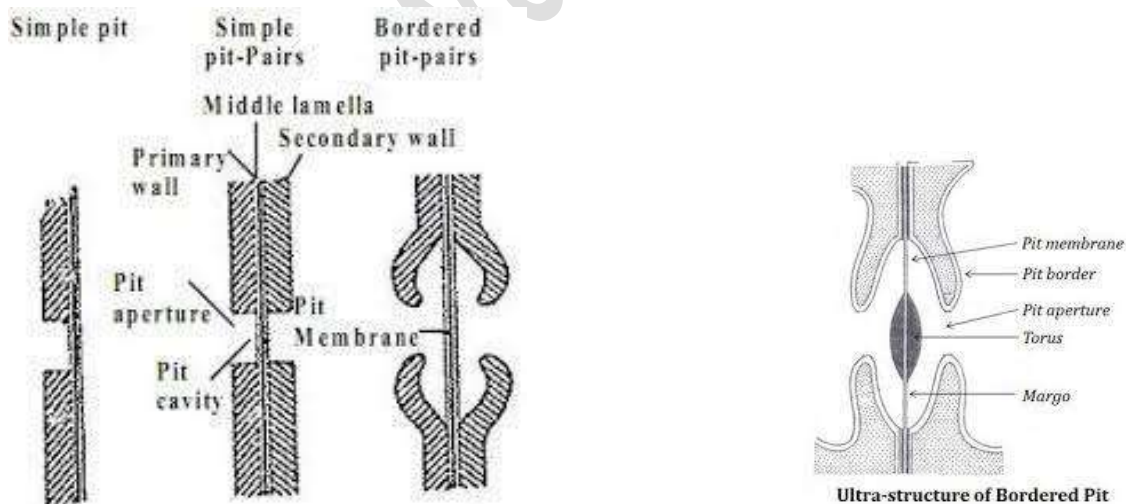
3. **Bordered pits** : Occurs when the secondary wall separates from the pit membrane extends into the cell forming a Border. It found in xylum elements; tracheids and vessels.

(The secondary wall forms an arch over the pit cavity creating a larger pit chamber and smaller pit aperture and forms the border).

The bordered pits consist of :

1- Border    2- Torus    3- Pit chamber    4- Pit membrane    5- Pit aperture

4. **Ramiform or Branched pits** : occurs when the secondary cell wall become more thick, the pits look like a canal. It found in stone cells in pear fruit.

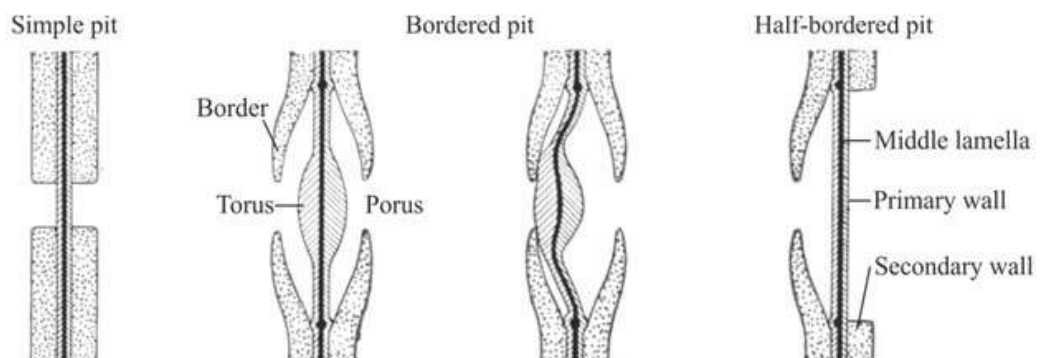
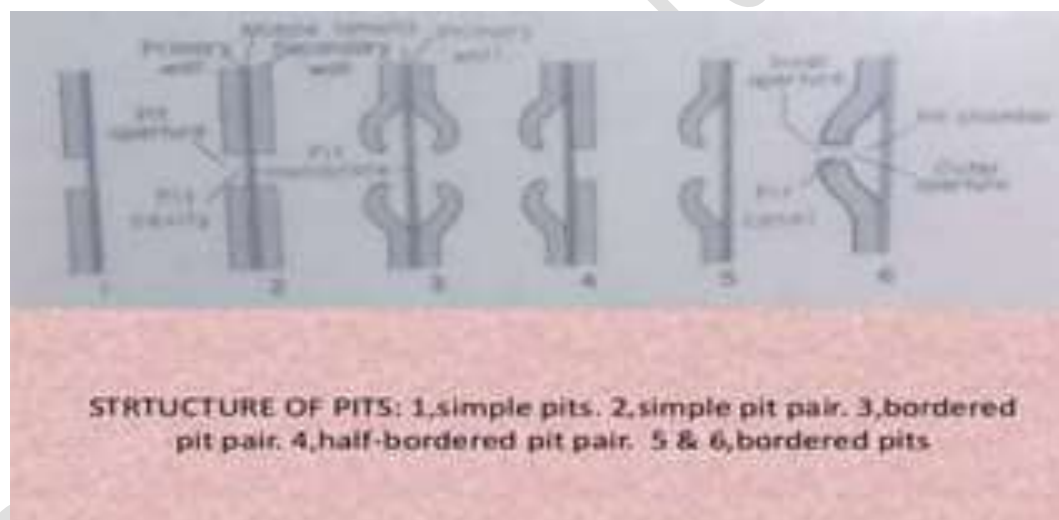


## Pit combination

When the pit on one side of the cell wall is associated with similar or different pits on the other side of the cell wall, the two associated pits are called Pit pair.

### Types of pit pairs

- Simple pit pair (combination of two simple pits)
- Bordered pit pair (two opposing bordered pits)
- Half-bordered pit pairs or Semi bordered pit pair (Combinations of simple pits and bordered pits).
- Blind pits (A pit on one side not associated with another pits on other side of the wall).
- Aspirated pit (happened when the torus closed the pit aperture of only one pit in Bordered pit pair to be un functional) , the aspirated pit is non functional because the torus is thick and prevents movement of dissolved materials in water.



## Torus and margo

The torus and margo are characteristic features of **bordered pit-pairs** in gymnosperms, such as Coniferales, Ginkgo, and Gnetales. In other vascular plants, the torus is rare.

The pit membrane is separated into two parts:

- a thick **impermeable** torus at the center of the pit membrane, and
- **permeable** margo surrounding it. The torus regulates the functions of the bordered pit, and the margo is a cell wall-derived porous membrane that supports the torus.

The margo is composed of bundles of microfibrils that radiate from the torus.

The margo is flexible and can move towards either side of the pit while under stress. This allows the thick, impermeable torus to block the pit aperture. When the torus is displaced so that it blocks the pit aperture, the pit is said to be **aspirated**.

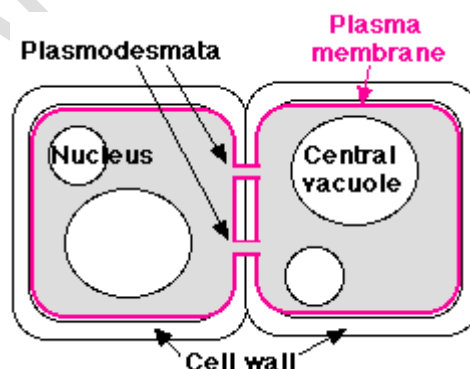
## Plasmodesmata

are protoplasmic strands that connect the protoplasts of neighbouring cells.

They essentially create a network of interconnected cells within a plant, allowing for the exchange of various molecules and signals.

- Structure: They are tube-like structures that pass through the cell walls, connecting the cytoplasm of adjacent plant cells.
- Function: Plasmodesmata facilitate the movement of molecules, including small photosynthetic products, large proteins, and even RNA, between cells.

This is crucial for plant growth, development, and response to environmental changes.



## What is the Difference Between Pits and Plasmodesmata?

Pits and plasmodesmata help plant cells to communicate with each other and transport substances between them.

Pits are thin areas of the cell wall. In contrast, plasmodesmata are the cytoplasmic bridges that transverse in the cell wall.

## Functions of Pits

Pits play several important roles in plant physiology:

- **Transport:** Pits allow for the transport of water, nutrients, and signaling molecules between cells, which is essential for the plants growth and development.
- **Communication:** Pits allow for the communication between cells, which is important for coordinating plant responses to environmental stimuli.
- **Symplastic transport:** Plasmodesmata allow for the movement of substances through the symplast, which is the network of cytoplasm that connects plant cells. This allows for the rapid transport of materials throughout the plant.

## Frequently Asked Questions

Q1

**What is the function of a pit and plasmodesmata?**

Pits and plasmodesmata are channels that connect the adjacent cells and aid in their communication. They help in the exchange of molecules and signals between the cells.

Q2

**What are torus and margo?**

These are features seen in the border pits of gymnosperms. The torus and margo are parts of the pit membrane. The thick impermeable part is the torus, and the permeable one is the margo. It is the margo that surrounds the torus. They support the pit membrane and regulate its functions.

Q3

**Where are pits found?**

Pits are found in the walls of phloem parenchyma, sclerenchyma, xylem vessels, and tracheids. Bordered pits are found mostly in tracheids of gymnosperms and vessels of angiosperms.