

# Difference Between Plasmolysis and Turgidity

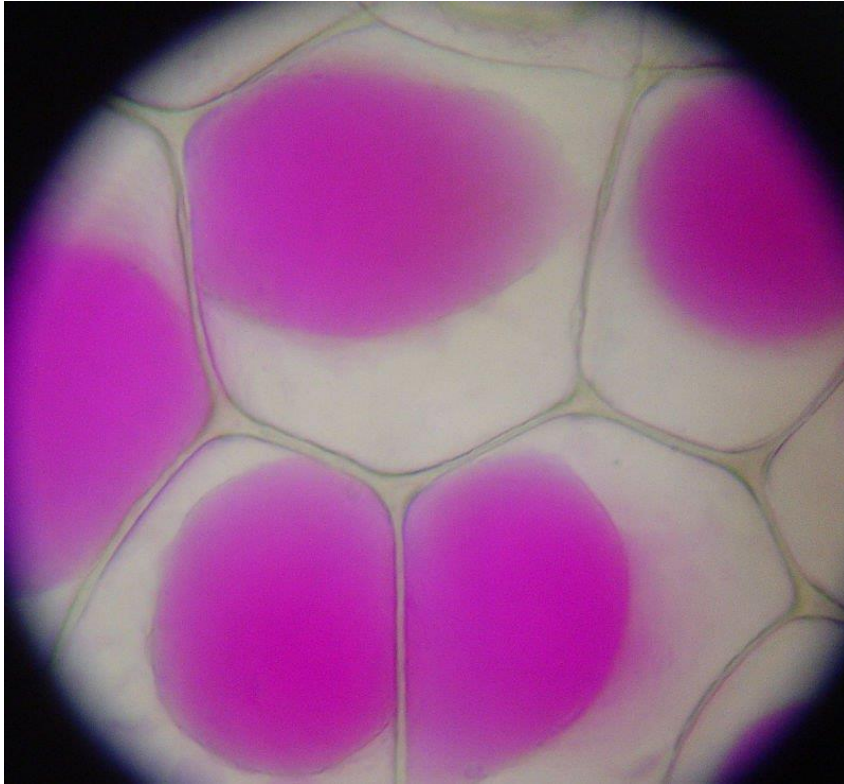
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## Key Difference - Plasmolysis vs Turgidity

The movement of water molecules from a region of high water potential to a region of low water potential via a semi-permeable membrane is 'Osmosis'. The [cell membrane](#) is a semi-permeable membrane that surrounds the cell. It allows selected types of molecules to go in and out of the cell. When cells are placed in solutions, water molecules go in and out the cell via the cell membrane according to the difference of the water potential. Solutions can be three types based on the water potential. They are a [hypertonic solution](#), [isotonic solution](#) and [hypotonic solution](#). Water potential of the cell in the hypertonic solution is less compared to the high water potential of the cell while in a hypotonic solution. Water potentials of the cell and the solution are equal in isotonic condition. Based on the water movements, cells undergo different changes. Plasmolysis and turgidity are two such processes that occur in cells due to water movement. Plasmolysis is the process that occurs when a plant cell is placed in a hypertonic solution. Cell loses water molecules to the outside by the exosmosis. Hence [protoplasm](#) contracts and detaches from the [cell wall](#). It is known as plasmolysis. When a plant cell is placed in a hypotonic solution, water molecules move inside the cell. Protoplasmic volume increases due to the water absorption, and it pressurises the cell wall. This is known as turbidity. The **key difference** between the plasmolysis and turgidity is that **plasmolysis occurs due to exosmosis while turgidity occurs due to endosmosis**.

## What is Plasmolysis?

Plasmolysis is a process occurs in cells due to the water loss in a hypertonic solution. A hypertonic solution has a more solute concentration. Hence, the water potential of the solution is less compared to cell cytoplasm water potential. When a cell is placed in a hypertonic solution, due to the high water potential, water molecules move from the cell to the outside solution until the equilibrium is reached. When water leaves the cell, protoplasm volume decreases.

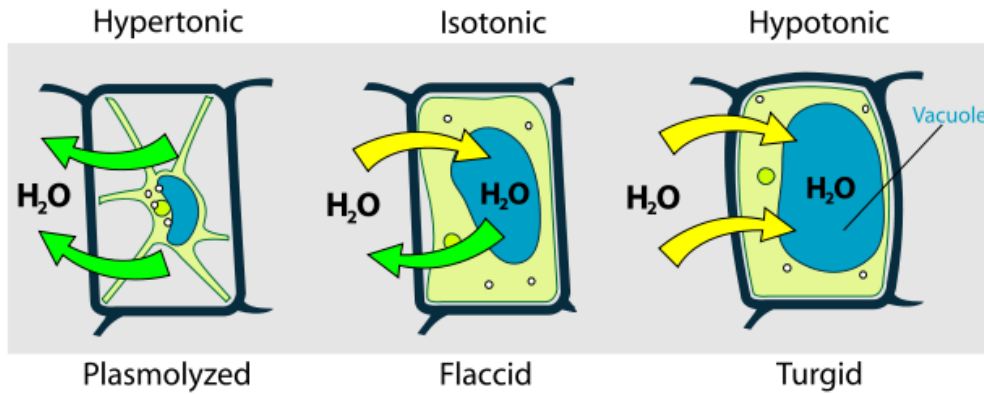


**Figure 01: Plasmolysis**

Cell membrane together with [cytoplasm](#) detaches from the cell wall since the cell wall is a rigid structure, and it will not contract. When protoplasm contracts and reduces its volume it is known as the cell is plasmolyzed. This process is plasmolysis. Plasmolysis is a reversible process. When the cell is placed in a solution that has a higher water potential, cell reverses to its normal condition. It is known as deplasmolysis.

## **What is Turgidity?**

Turgidity is a process that occurs when a cell absorbs water from the outside solution. When water potential is less inside the cell compared to the water potential of the solution, water molecules move into the cell from the solution via osmosis. Due to this, the protoplasm volume increases and cell become expanded or swollen. Cell contents together with the cell membrane push the cell wall to the outside. The cell wall is a strong structure, and it stays firm and rigid. This occurs when a plant cell is placed in a hypotonic solution. A hypotonic solution has a high water potential and low solute concentration.



**Figure 02: Turgid, Plasmolysed and Flaccid cells**

Turgidity is an important process to maintain the rigidity of the plants. Turgor pressure keeps plants upright and stiff. Loss of turgidity occurs due to the plant wilting.

## What are the Similarities Between Plasmolysis and Turgidity?

- Plasmolysis and Turgidity occur due to osmosis.
- Both happen due to the water movements of the cell.
- Both phenomena are related to the cell wall and cell membrane.
- Both processes are associated with plant cells.

## What is the Difference Between Plasmolysis and Turgidity?

Plasmolysis vs Turgidity	
Plasmolysis is the process of water moving out to the cell when placed in a hypertonic solution. Protoplasm detaches from the cell wall during the plasmolysis.	Turgidity is the process where the cell content pressurises the cell wall due to water absorption into the cell by osmosis.
Solution Referred	
Plasmolysis occurs when a plant cell is placed in a hypertonic solution.	Turgidity occurs when a plant cell is placed in a hypotonic solution.
Endosmosis or Exosmosis	
Plasmolysis occurs due to water loss from the cell via exosmosis.	Turgidity occurs as a result of water absorption via endosmosis.
Direction of the Water	

Water moves out of the cell during the plasmolysis	Water moves into the cell during the turgidity.
<b>Volume of the Protoplasm</b>	
When water loses from the cell during the plasmolysis, protoplasm volume decreases.	When the osmosis absorbs water during the turgidity, protoplasm volume increases.
<b>Connection of Plasma Membrane and Cell Wall</b>	
Plasma membrane detaches from the cell wall in plasmolysis.	The plasma membrane is attached to the cell wall under pressure during the turgidity.

## Summary - Plasmolysis vs Turgidity

When a cell absorbs water from the solution into the cell, the cell becomes swollen, and the cell is said to be in a state of turgid. When a cell loses water and shrinks, the cell is said to be in the state of plasmolyzed. Plasmolysis and turgidity are caused due to the water movements of the cell membrane. These two processes occur when a cell is placed in a hypertonic and hypotonic solution respectively. During plasmolysis, protoplasm refracts, and the cell membrane detaches the cell wall while during the turgidity, protoplasm expands and cell membrane contacts the cell wall. This is the difference between plasmolysis and turgidity.

### Reference:

- 1.Lang, Ingeborg, et al. "Plasmolysis: Loss of Turgor and Beyond." Plants, MDPI, Dec. 2014. [Available here](#)
- 2."Turgor pressure." Wikipedia, Wikimedia Foundation, 22 Dec. 2017. [Available here](#)

### Image Courtesy:

- 1.'Rhoeo Discolor - Plasmolysis'By Mnolf - Photo taken in Innsbruck, Austria, [\(CC BY-SA 3.0\)](#) via [Commons Wikimedia](#)
- 2.'Turgor pressure on plant cells diagram'By LadyofHats- Own work (Public Domain) via [Commons Wikimedia](#)

### How to Cite this Article?

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