FACULTY OF ENGINEERING & TECHNOLOGY

Topic -4th

PLASMOLYSIS

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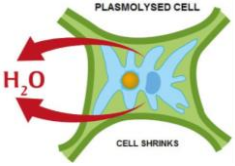
Introduction

- The word Plasmolysis was generally derived from a Latin and Greek word plasma – The mould and lusis meaning loosening.

- Plasmolysis is defined as the process of contraction or shrinkage of the protoplasm of a plant cell and is caused due to the loss of water in the cell. Plasmolysis is an example of the results of osmosis and rarely occurs in nature.

- In this process cells lose water in a hypertonic solution it is a reverse process, deplasmolysis or cytolysis, can occur if the cell is in a hypotonic solution resulting in a lower external osmotic pressure and a net flow of water into the cell.

- Plasmolysis is the process of shrinkage of the protoplasm of a plant due to loss of water from the cell. Plasmolysis is one of the results of osmosis and occurs very rarely in nature, but it happens in some extreme conditions.

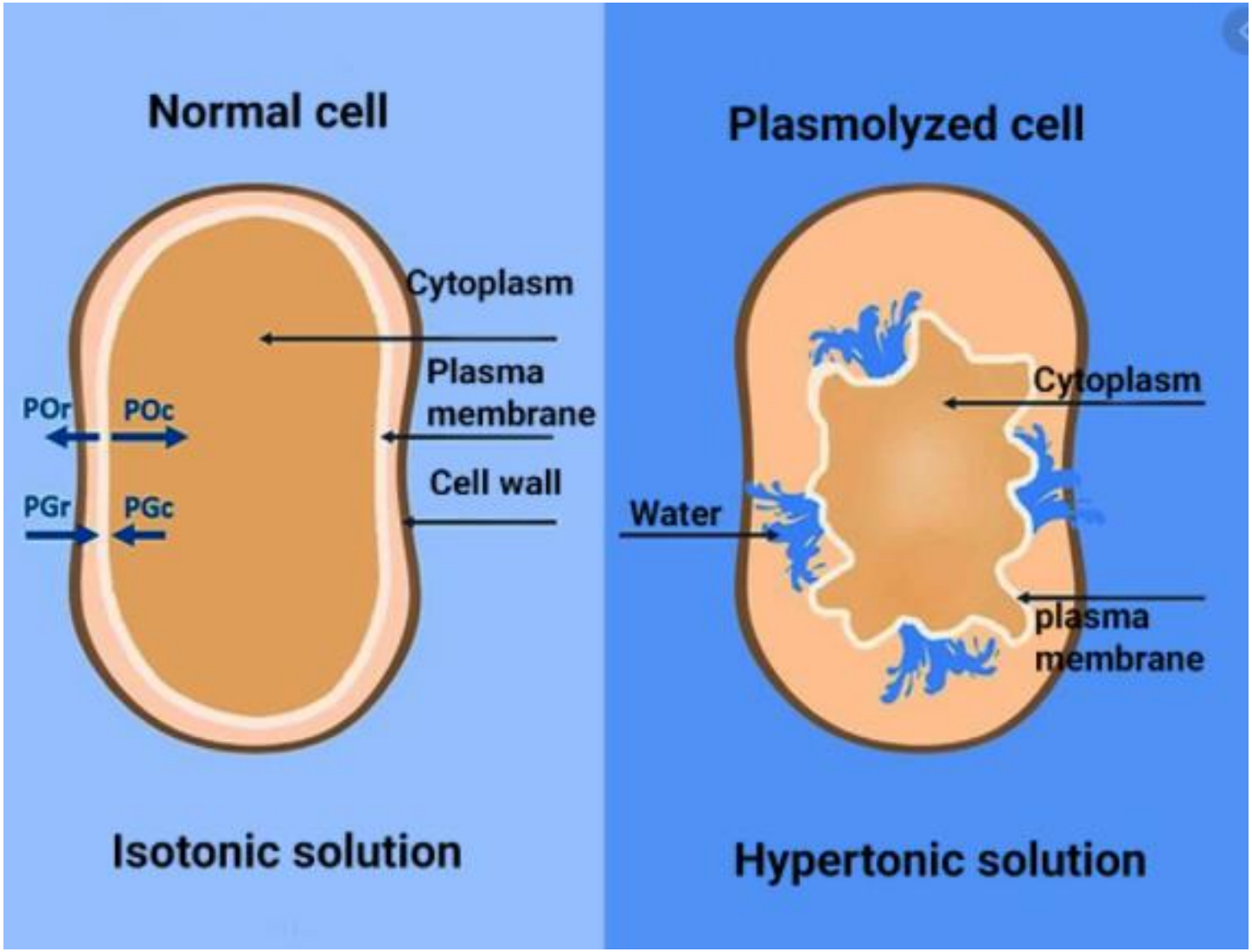


- **Plasmolysis** is the shrinking of the cytoplasm of a **plant** cell in response to diffusion of water out of the cell and into a high salt concentration solution.

- During **plasmolysis**, the cell membrane pulls away from the cell wall. This **does** not happen in low salt concentration because of the rigid cell wall.

- The vacuoles, a fluid-filled membrane-bound organelle, located within the cytoplasm, holds the water in the plant cell. In certain conditions, plant cells do not get a sufficient amount of water, or there is a severe loss of water from the cell. This results in the total shrinkage of the plant cell and the phenomenon are called plasmolysis.

PLASMOLYSIS



Stages of Plasmolysis

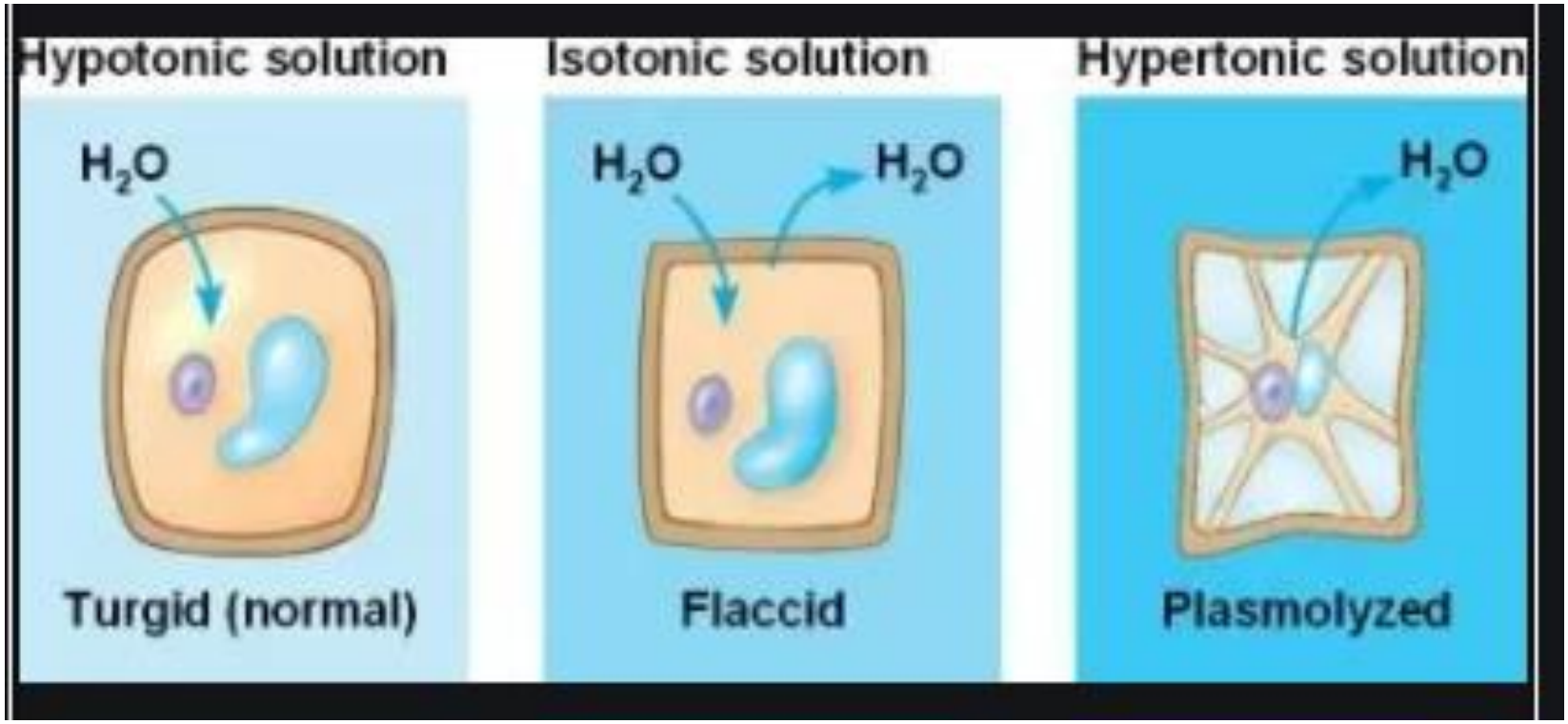
1.Incipient plasmolysis: It is the initial stage of the plasmolysis, during which, water starts flowing out of the cell; initially, the cell shrinks in volume and cell wall become detectable.

2.Evident plasmolysis: It is the next stage of the plasmolysis, during which, the cell wall has reached its limit of contraction and cytoplasm gets detached from the cell wall attaining the spherical shape.

3.Final plasmolysis: During this stage the cytoplasm will be completely free from the cell wall and remains in the centre of the cell.

Water Pass through the Cell Membranes;

- During the process of Plasmolysis within the plant cell, the cell membrane separates the interiors of the cell from the surrounding.
- It allows the movement of water molecules, ion and other selective particles across the membrane and stops others.
- Water molecules travel in and out of the cell across the cell membranes and the water flow is a necessary consequence that enables cells to fetch water.



Plasmolysis has occurred by looking at the gap between the cell wall and the plasma membrane

Types of Plasmolysis

There are two different types of plasmolysis and this classification is mainly based on the final structure of the cytoplasm.

1. Concave Plasmolysis
2. Convex plasmolysis

1. Concave Plasmolysis-

During this process both the cell membrane and protoplasm shrink away and begins to detach from the cell wall, which is caused due to the loss of water.

Concave plasmolysis is a reversible process and it can be revised by placing the cell in a hypotonic solution, which helps calls to regain the water back into the cell.

2. Convex plasmolysis-

During the convex plasmolysis, both the cell membrane and protoplasm lose so much water that they completely get detach from the cell wall in future, the destruction of the cell. Similar to concave plasmolysis.

convex plasmolysis cannot be reversed, and this happens when a plant wilts and dies from lack of water. This type of plasmolysis is more complicated compared to convex plasmolysis.

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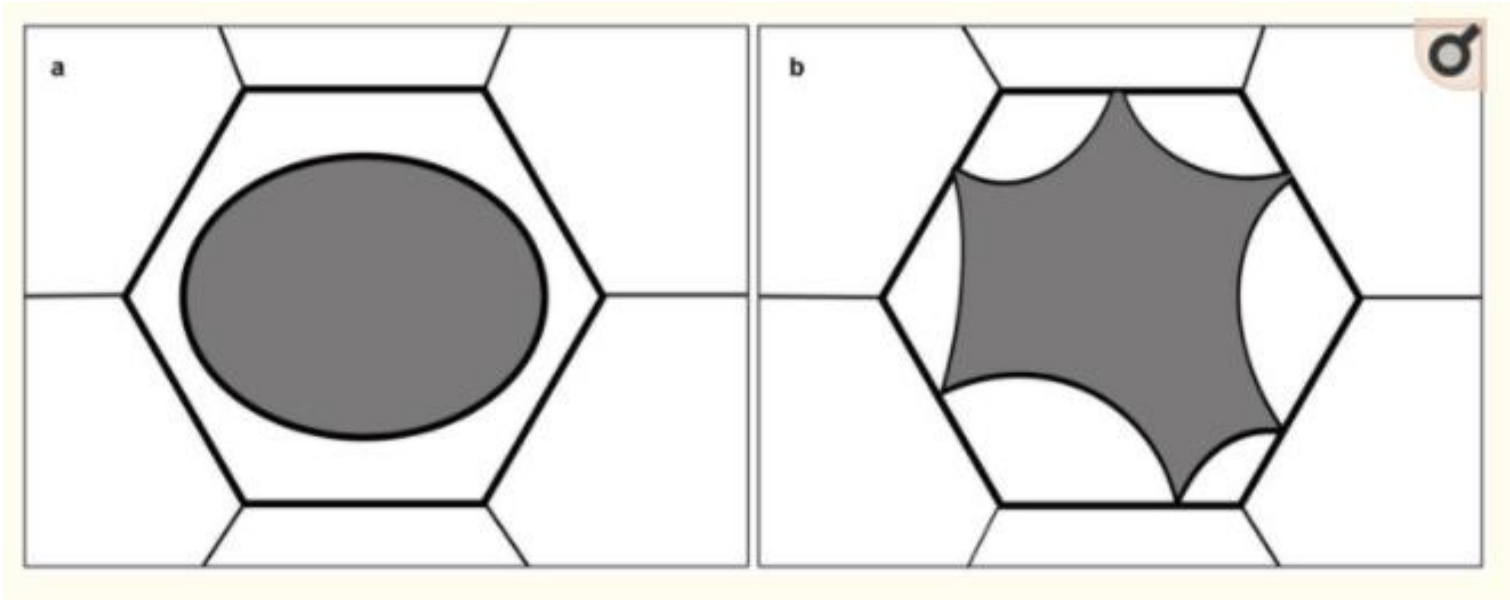

Schematic of the two major plasmolysis forms;
(**a**) convex plasmolysis (**b**) concave plasmolysis

THANK YOU