



Bulk flow

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Objectives



Identify bulk transport



Anther cell membrane
Transport

Why is bulk transport important for cells?


There are materials that are too large to pass through the cell membrane using these methods.

Endocytosis and exocytosis are the bulk transport mechanisms used. As these transport processes require energy, they are known as active transport processes.

Vesicle function in endocytosis and exocytosis

- The walls of vesicles are made up of a lipid bilayer, which is why they are capable of fusing with the cell membrane.
- This fusion between vesicles and the plasma membrane facilitates bulk transport both into and out of the cell.



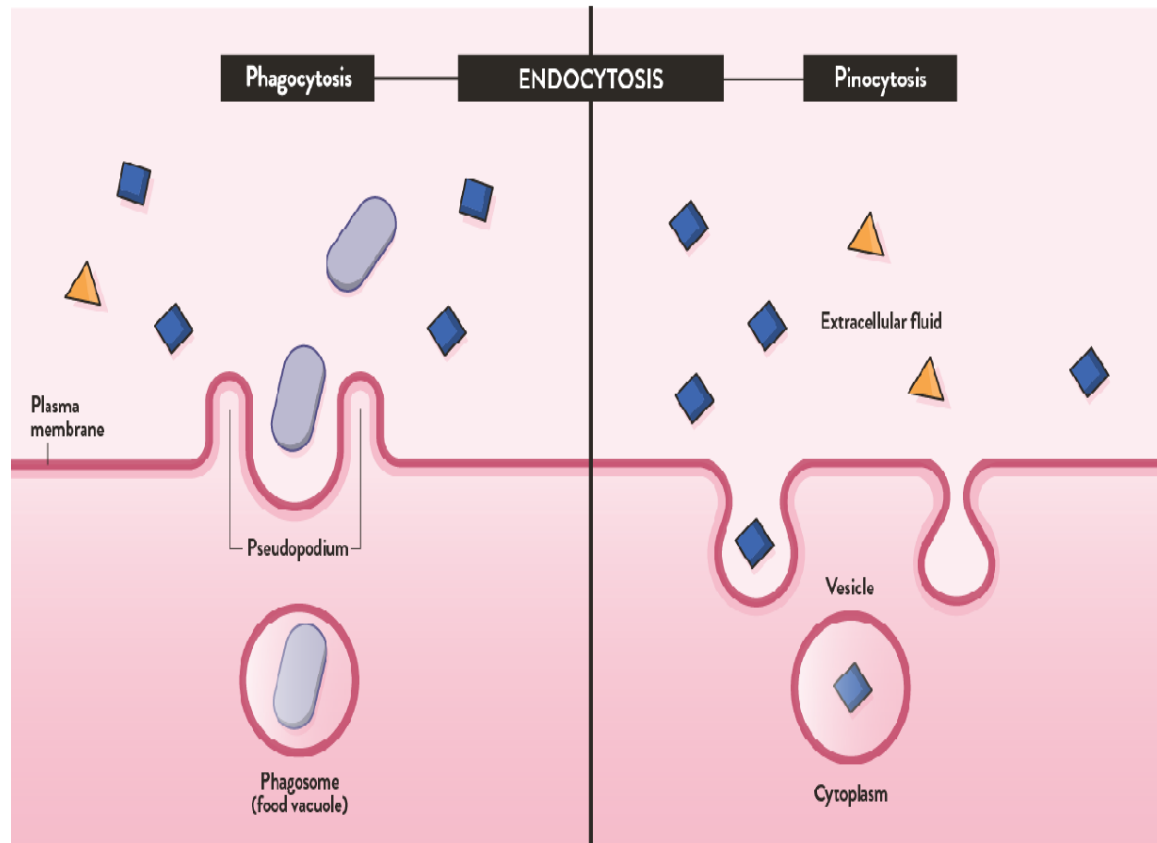


The function of endocytosis?

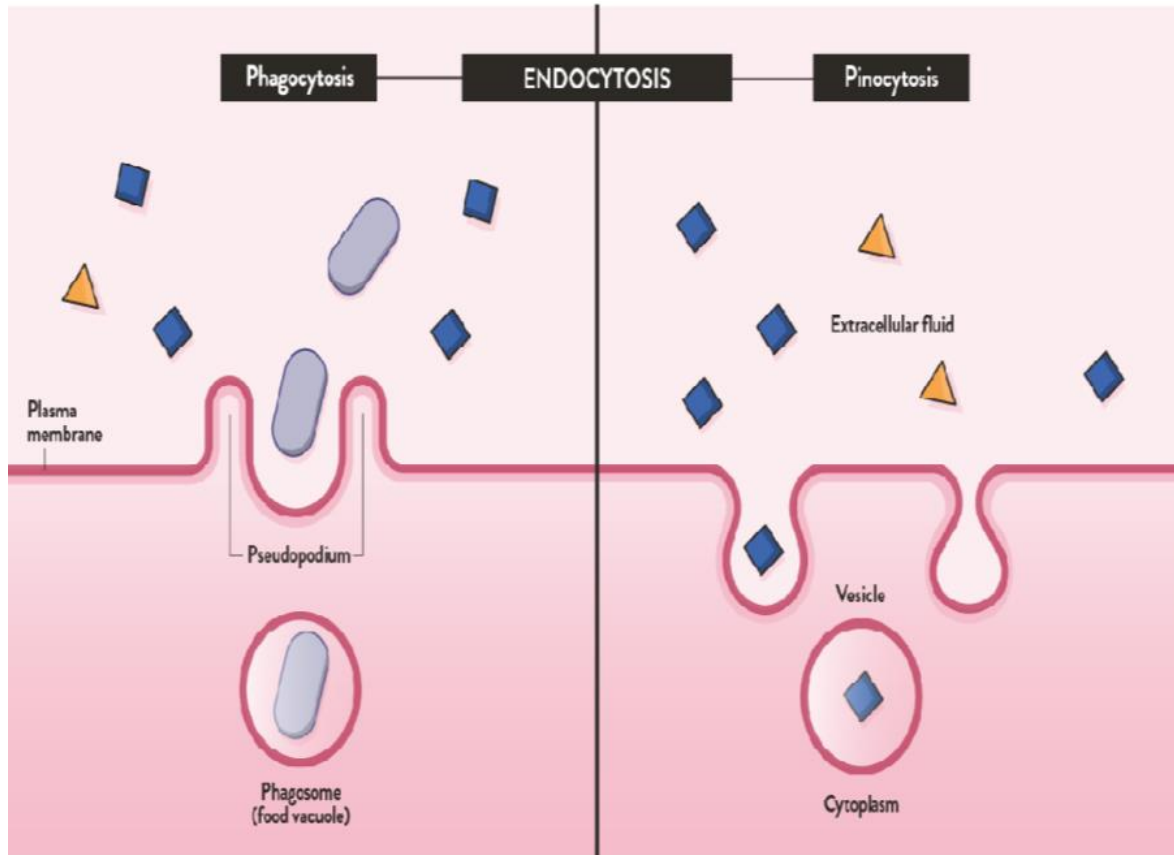
- **Taking in nutrients for cellular growth, function and repair**
- **Capturing pathogens or other unknown substances that may endanger the organism**
- **Disposing of old or damaged cells**

The types of endocytosis

1. Phagocytosis:



- A particle or substance binds to receptors on the cell's surface, stimulating the release of pseudopodia (extensions of the plasma membrane filled with cytoplasm).
- Pseudopodia surround the object until their membranes fuse, forming a phagocytic vesicle.
- The phagocytic vesicle pinches off from the cell membrane, entering the cell.
- The phagocytic vesicle fuses with lysosomes, which recycle or destroy the vesicle's contents.



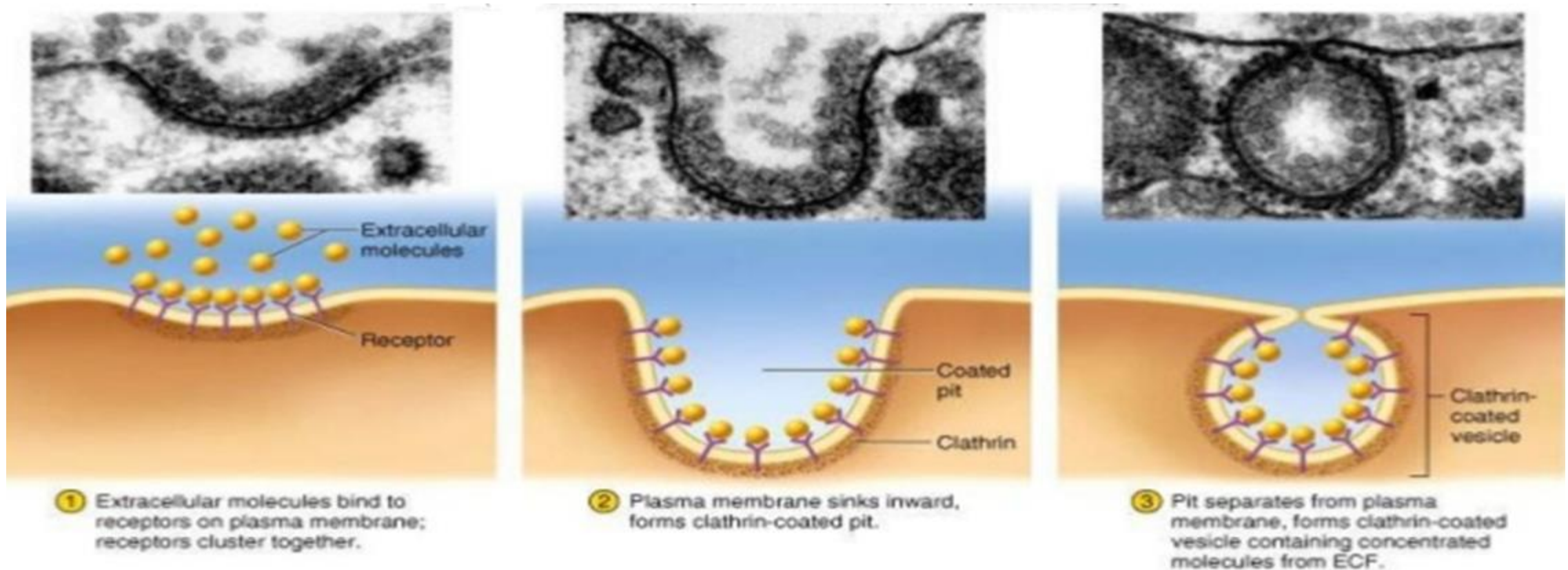
2. Pinocytosis (Cellular drinking)

- Molecules bind to receptors located along the surface of the cellular membrane.
- The plasma membrane folds in, forming a pinocytotic vesicle that contains the molecules and the extracellular fluid.
- The pinocytotic vesicle detaches from the cell membrane inside the cell.
- The vesicle fuses with early endosomes where the contents found within are sorted.

- A selective process
- **Involves formation of vesicles at surface of membrane**
 - Vesicles contain receptors on their membrane
 - Vesicles contain specific target molecule in high concentration
- **Clathrin-coated vesicle in cytoplasm**
 - uptake of LDL from bloodstream
 - If receptors are lacking, LDL's accumulate and *hypercholesterolemia* develops

Receptor Mediated Endocytosis

Receptors mediated endocytosis



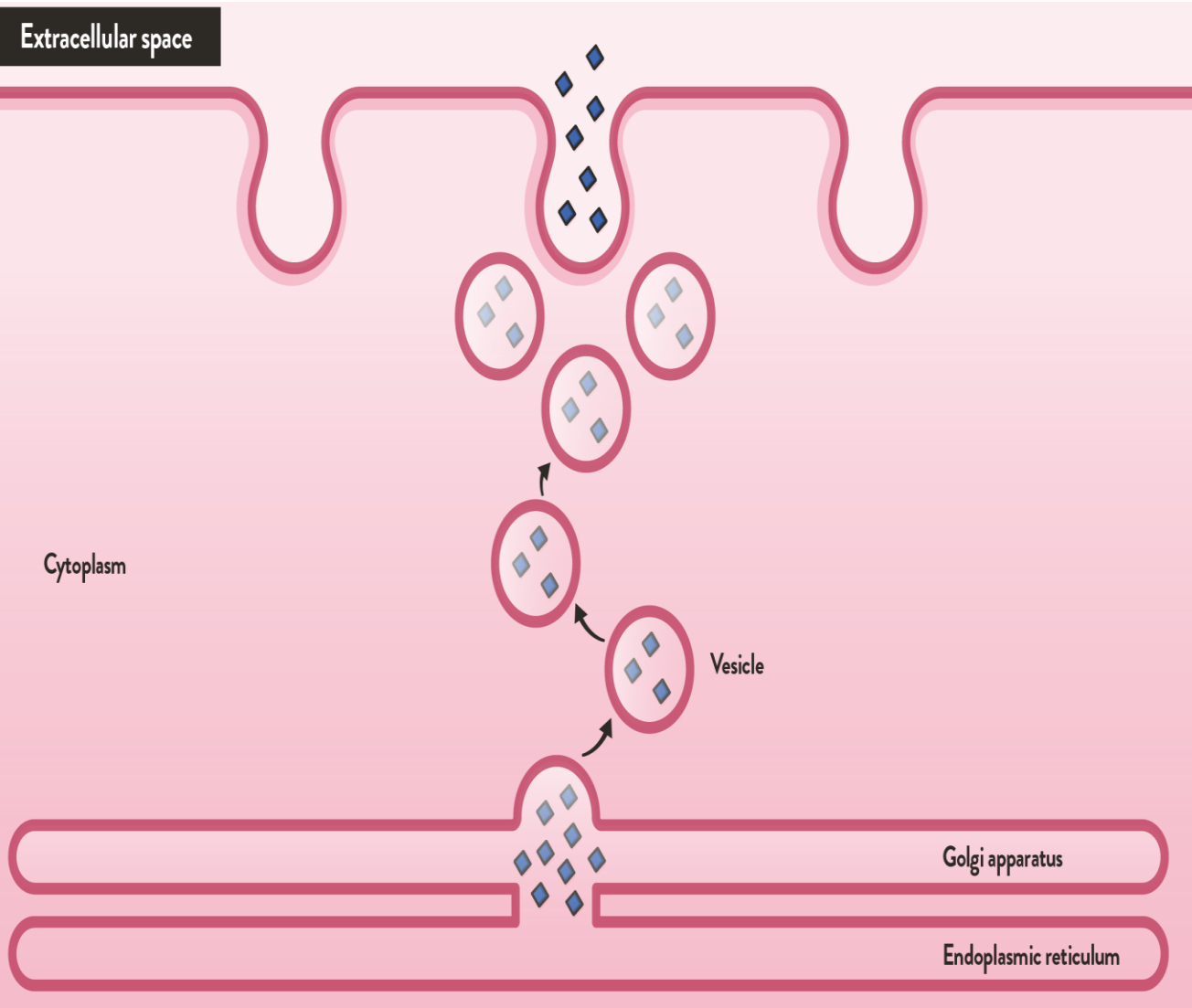
Exocytosis

Exocytosis serves the following purposes:

- **Removing toxins or waste products from the cell's interior**
- **Facilitating cellular communication**
- **Facilitating cellular membrane growth, repair, signaling and migration**

Extracellular space

Cytoplasm



- The steps of exocytosis

The steps of exocytosis.

- A vesicle is formed, typically within the endoplasmic reticulum and the Golgi apparatus or early endosomes.
- The vesicle travels to the cell membrane.
- The vesicle fuses to the plasma membrane, during which the two bilayers merge.
- The vesicle's contents are released into the extracellular space.
- The vesicle either fuses with or separates from the cell membrane.



Types of exocytosis

Regulated Exocytosis

- Such as neurotransmitters or hormones.
- Once excreted from the endoplasmic reticulum, these vesicles are transported to the Golgi apparatus (also known as the Golgi complex) for further modification.
- The expulsion of the materials is controlled, or regulated, by extracellular signals that cause membrane depolarization.

Constitutive Exocytosis

- doesn't require any extracellular signals. Most molecules traveling to the plasma membrane do so using this pathway.
- some exocytotic vesicles are incorporated into the plasma membrane (full vesicle fusion)
- while others return to the interior of the cell after their contents have been released .
- Others remain docked to the membrane, where they can be used multiple times