

# BSB 1163

# CELL AND MOLECULAR BIOLOGY

## Transport across membrane

By  
NOOR SUHANA ADZAHAR  
MUHAMMAD ADAM LEE ABDULLAH

Faculty of Industrial Science and Technology  
[nsuhana@ump.edu.my](mailto:nsuhana@ump.edu.my)



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# Bulk Flow

- Vesicles are used to transport large particles across the plasma membrane
  - This transportation requires energy
- Types:
  - Exocytosis
  - Endocytosis
    - Phagocytosis, pinocytosis, receptor-mediated



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- ▶ In addition to solutes transported by diffusion and active transport, the cells also have to transport **very large molecules** and **aggregates of macromolecules** across the cell membrane.
- ▶ Substances such as these enter the cell by **endocytosis** or leave the cell by **exocytosis**.
- ▶ Both these processes **require energy**.



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# Exocytosis

- Is the process in which substances produced by the cell are carried in vesicles and released to the exterior of the cell.
- Vesicles that store cellular products for export from the cell are called secretory vesicles.
- The secretory vesicle moves to the plasma membrane, fuses with the plasma membrane and the contents of the vesicle are discharged to the outside of the cell.
- Important substances such as hormones, digestive enzymes and even toxins are secreted from cells in this way.
- Exocytosis may be constitutive or regulated



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# *Endocytosis*

- Endocytic vesicles are formed by the plasma membrane ballooning in to form a pocket that contains the material from the exterior of the cell.



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- Unique to eukaryotic cells.
  - Pinocytosis
    - uptake of fluid and particles  $< 0.5\mu\text{m}$ .
  - Phagocytosis
    - uptake of large particles and debris  $> 0.5\mu\text{m}$ .
  - Receptor mediated endocytosis
    - requires specific binding of protein or other ligand to a specific receptor on the surface of the plasma membrane



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# *Endocytosis*

## Endocytosis can occur in three ways

- Phagocytosis ("cell eating")
- Pinocytosis ("cell drinking")
- Receptor-mediated endocytosis



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