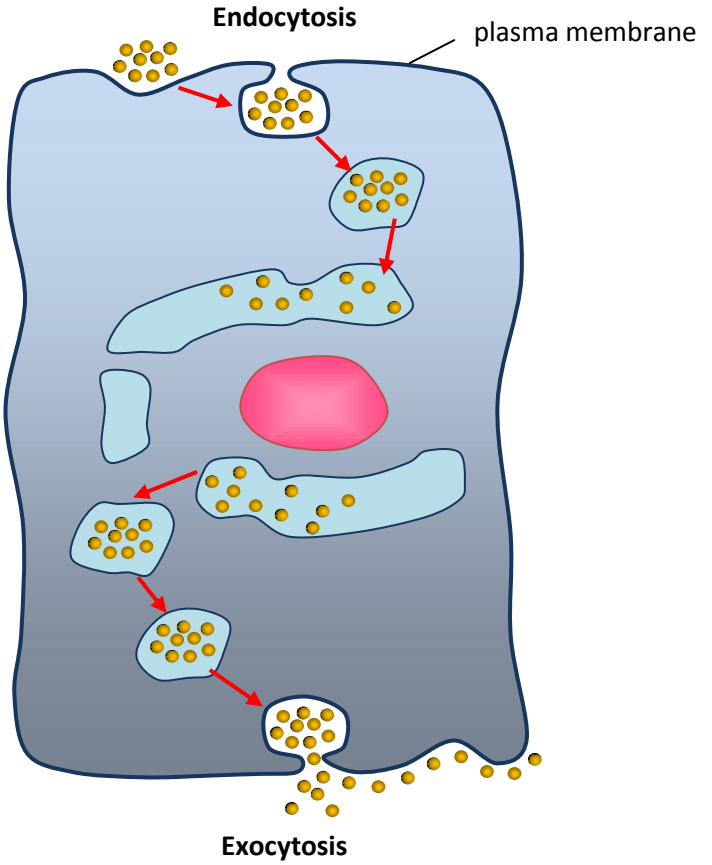
1.9 Transporting Large Amounts

Processes involving moving large amounts of material into or out of the cell

Some cells need to move large quantities of material either in or out. The process of bringing materials into the cell is called **endocystosis** and the process of moving materials out of the cell is **exocytosis**. This **bulk transport** is possible because membranes can easily fuse, separate and "pinch off." Like active transport, bulk transport requires energy in the form of ATP. In this case, the energy is used to move the membranes around to form the vesicles that are needed, and to move the vesicles around the cell.



Some examples of bulk transport are:

- hormones – pancreatic cells make insulin in large quantities, the insulin is processed and packaged into vesicles by the Golgi body, and these vesicles fuse with the outer membrane to release insulin into the blood
- in plant cells, materials required to build the cell wall are carried outside in vesicles
- some white blood cells engulf invading microorganisms by forming a vesicle around them – this vesicle then fuses with lysosomes so that the enzymes from the lysosomes can digest the microorganisms – such cells are called phagocytes

Movement Across Membranes – A Summary

Different names are given to the movements of materials in bulk transport:

endo = inwards *exo* = outwards *phago* = solid material *pino* = liquid material

So the bulk movement of liquid material out of a cell is described as "exopinocytosis"

Passive processes (i.e. no energy input from ATP required)	**Diffusion**	Down a concentration gradient; lipid soluble or very small molecules; through a lipid bilayer
	Facilitated diffusion	Down a concentration gradient; charged or hydrophilic molecules or ions; via a channel or carrier proteins
	Osmosis	Down a water potential gradient; through bilayer or protein pores
Active processes (i.e. energy input in the form of ATP is required)	**Active transport**	Against a concentration gradient via carrier proteins that use energy from ATP to change shape
	Endocytosis and exocytosis	Bulk transport of materials via vesicles that fuse with or break from the cell surface membrane