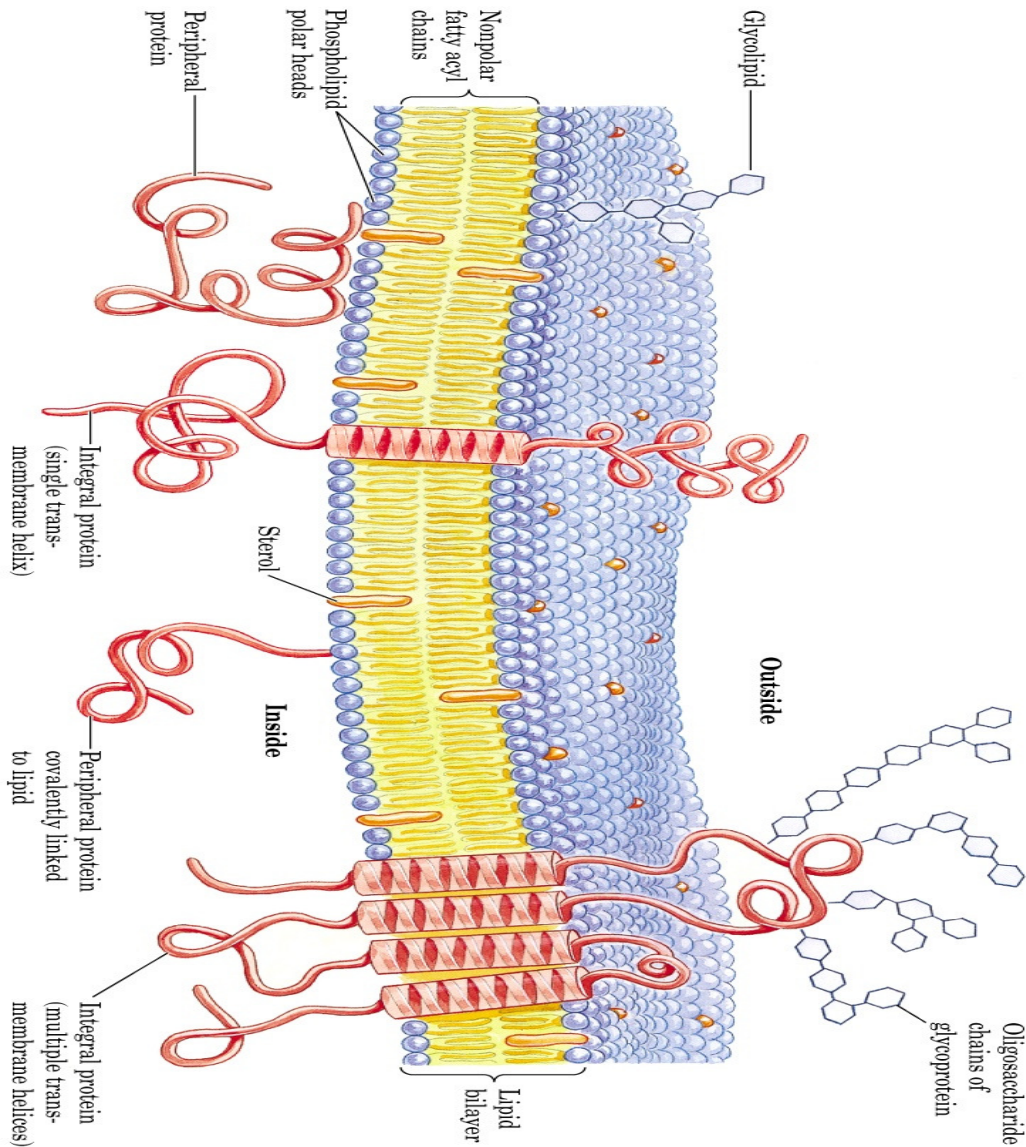


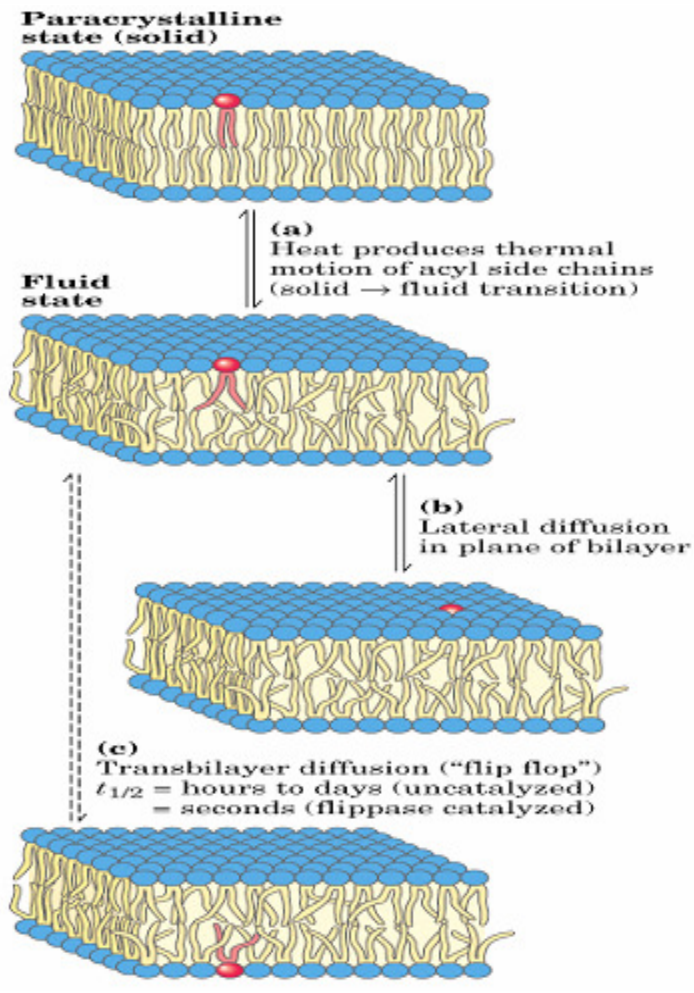
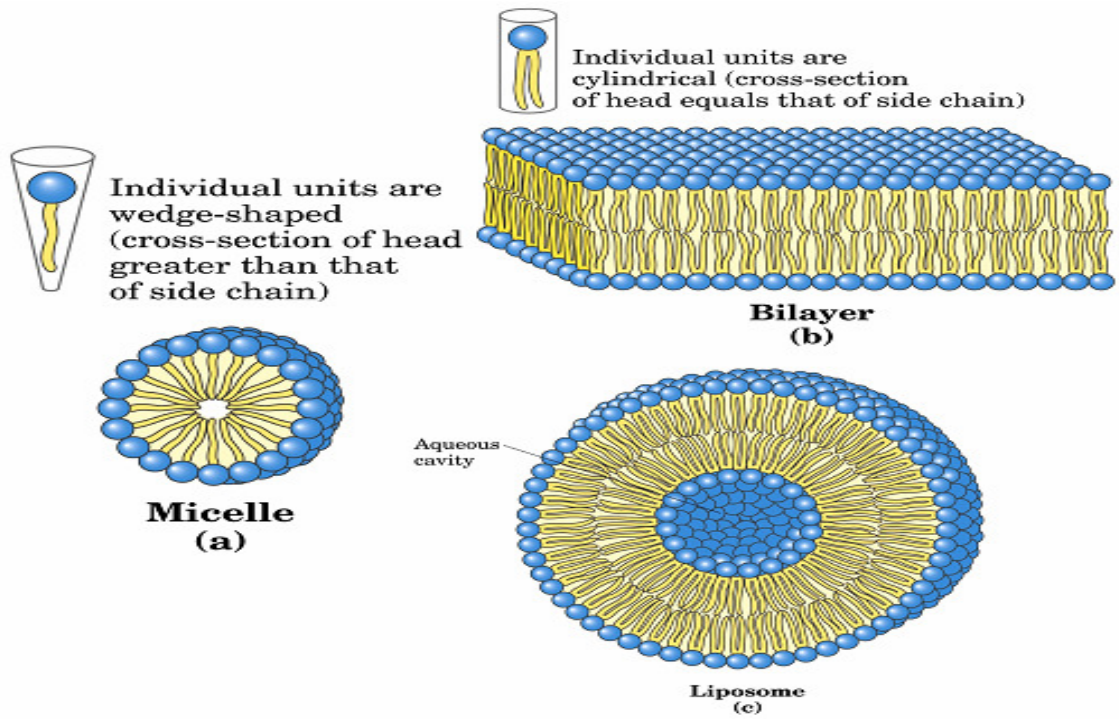
Biological Membranes and Transport

Major Components of Plasma Membranes in Various Organisms

	Components (% by weight)				
	Protein	Phospholipid	Sterol	Sterol type	Other lipids
Human myelin sheath	30	30	19	Cholesterol	Galactolipids, plasmalogens
Mouse liver	45	27	25	Cholesterol	—
Maize leaf	47	26	7	Sitosterol	Galactolipids
Yeast	52	7	4	Ergosterol	Triacylglycerols, steryl esters
<i>Paramecium</i> (ciliated protist)	56	40	4	Stigmasterol	—
<i>E. coli</i>	75	25	0	—	—

Fluid mosaic model for membrane structure

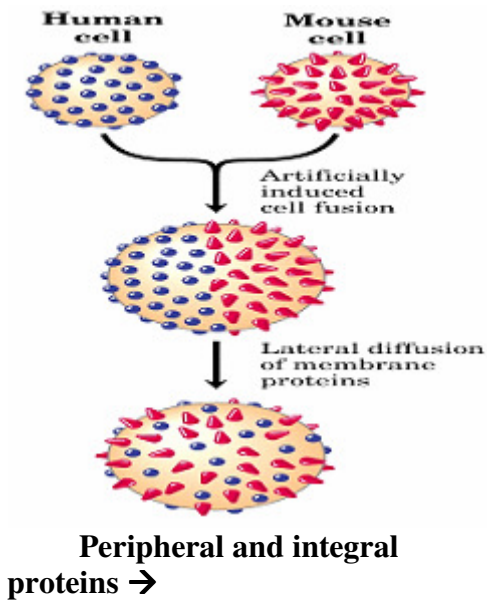




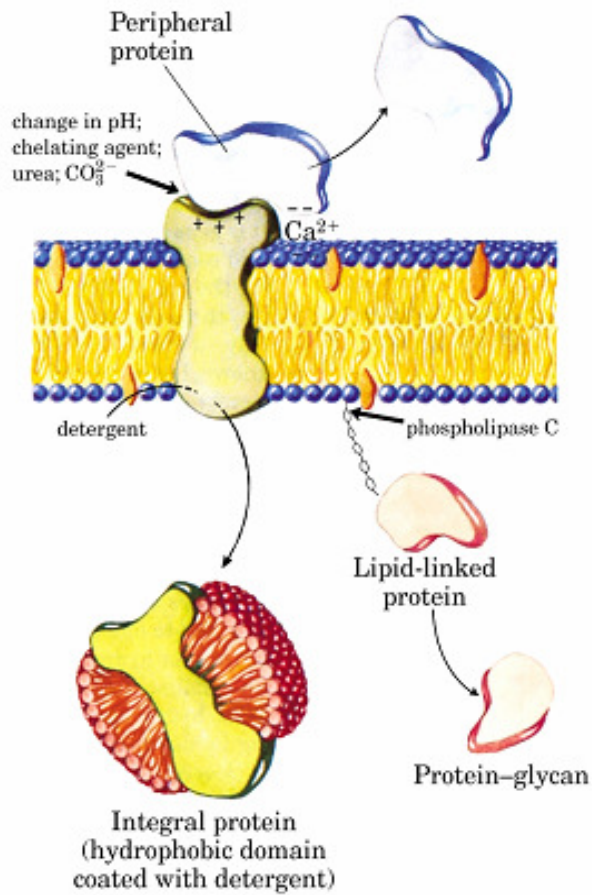
Motion of membrane lipids.

Transition temperature

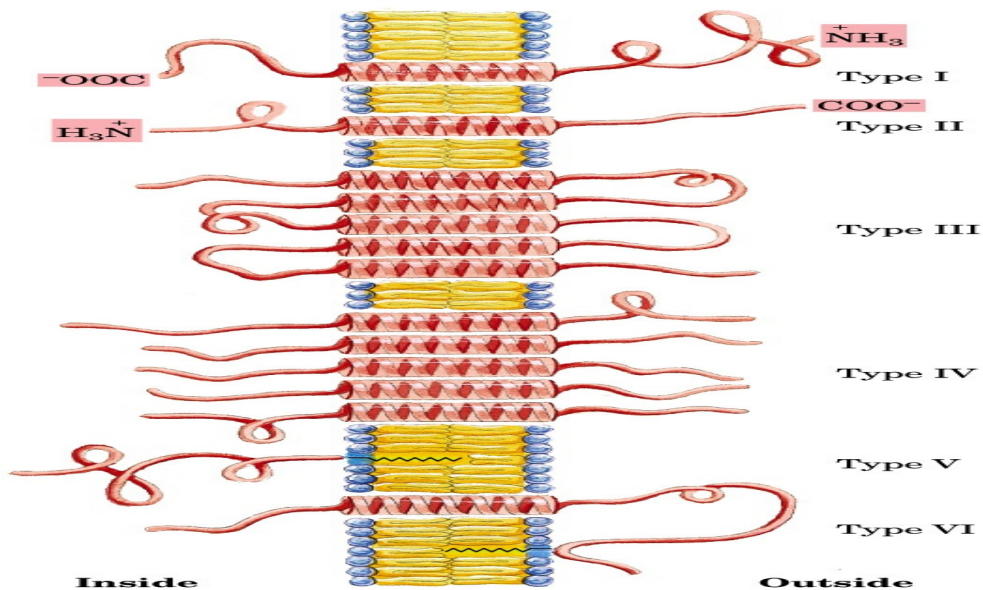
The temperature above which the para-crystalline solid changes to fluid, is characteristic for each membrane depends on its lipid composition.



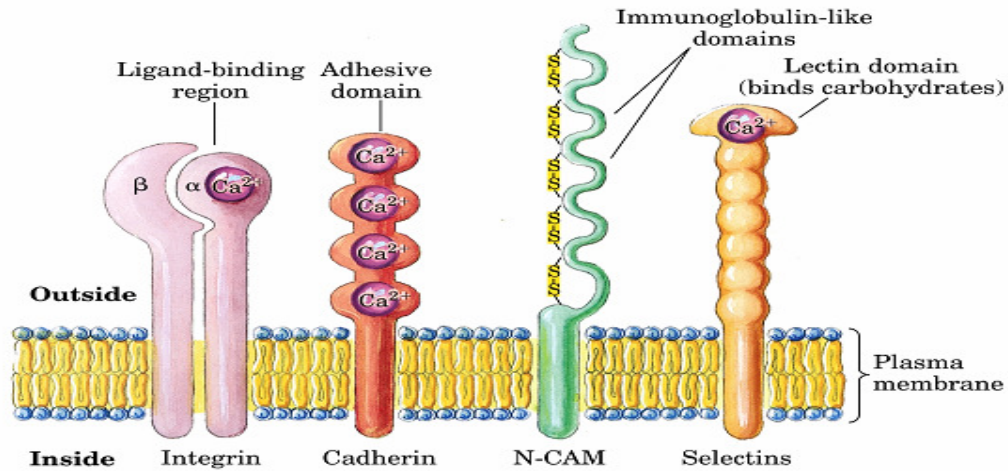
← Lateral diffusion of membrane proteins.



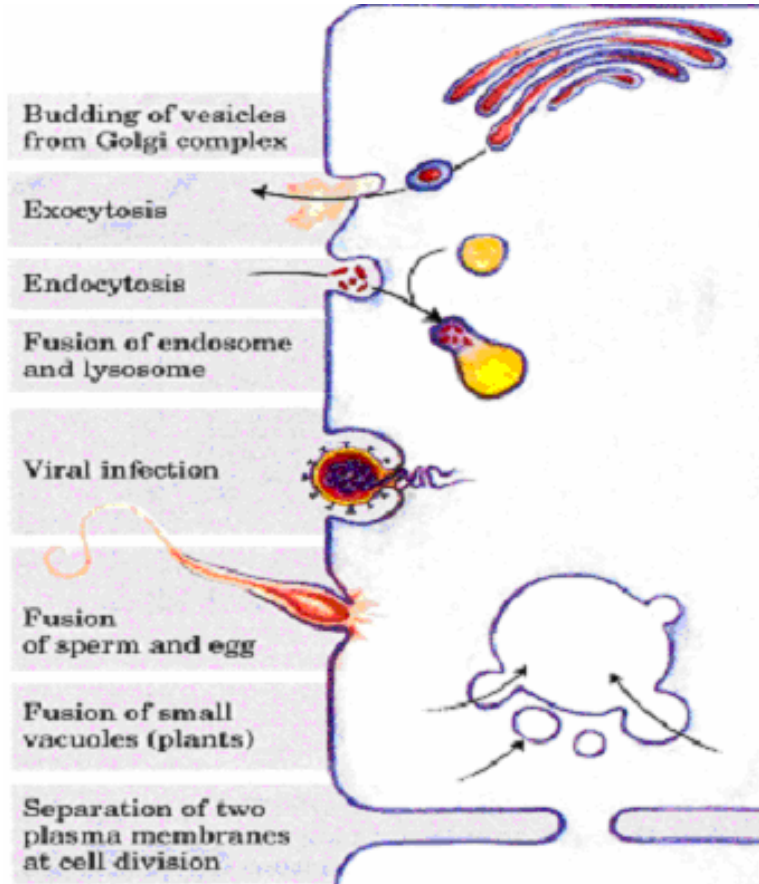
Integral membrane proteins.
Hydropathy index – determination of hydrophobic vs hydrophilic segments



Examples of integral protein types that function in cell-cell interactions

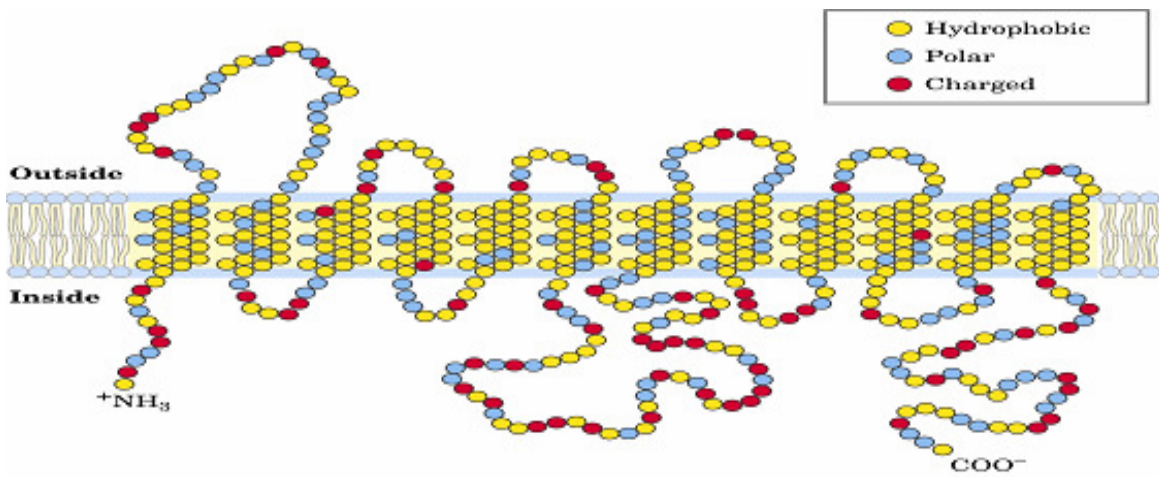
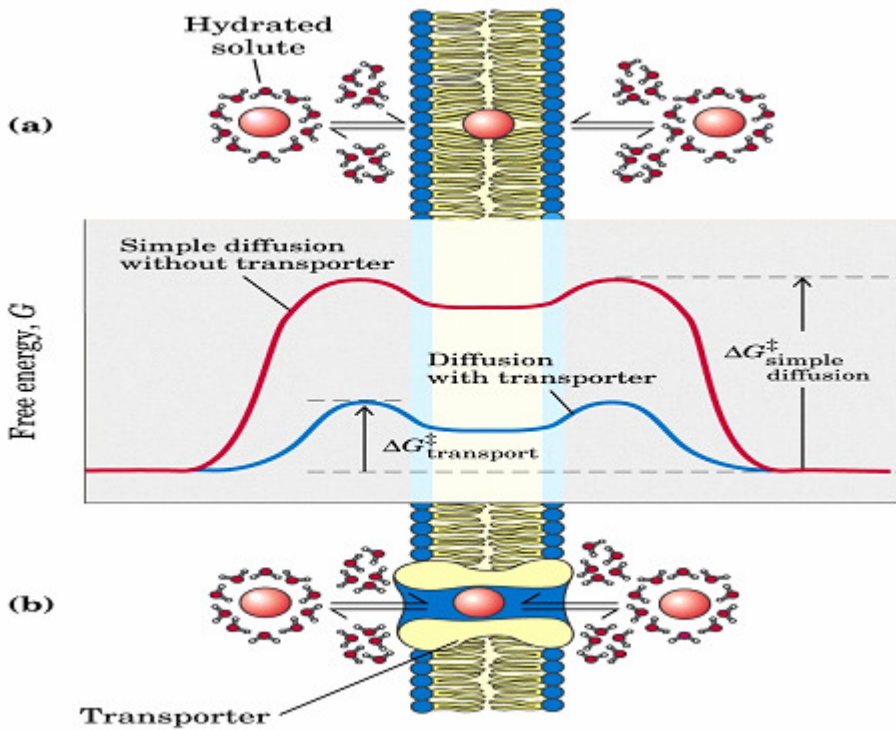
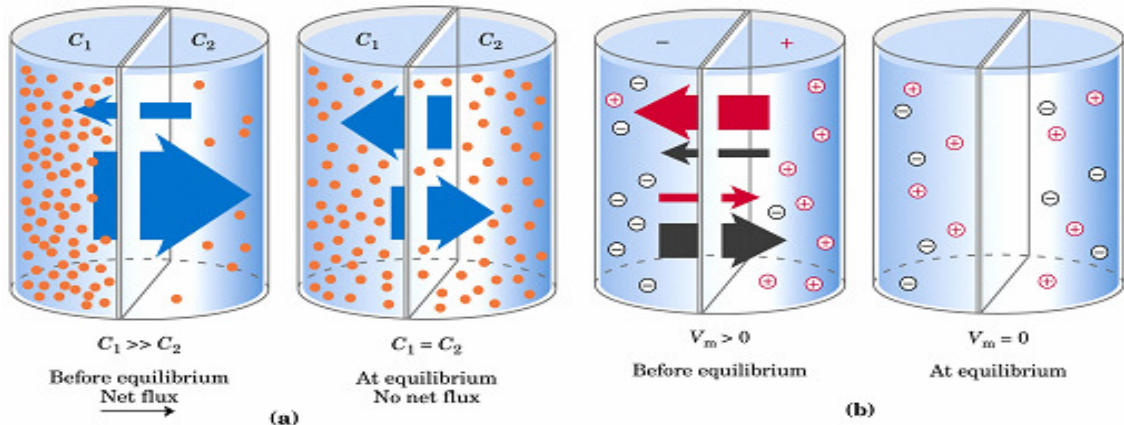


Membrane fusion

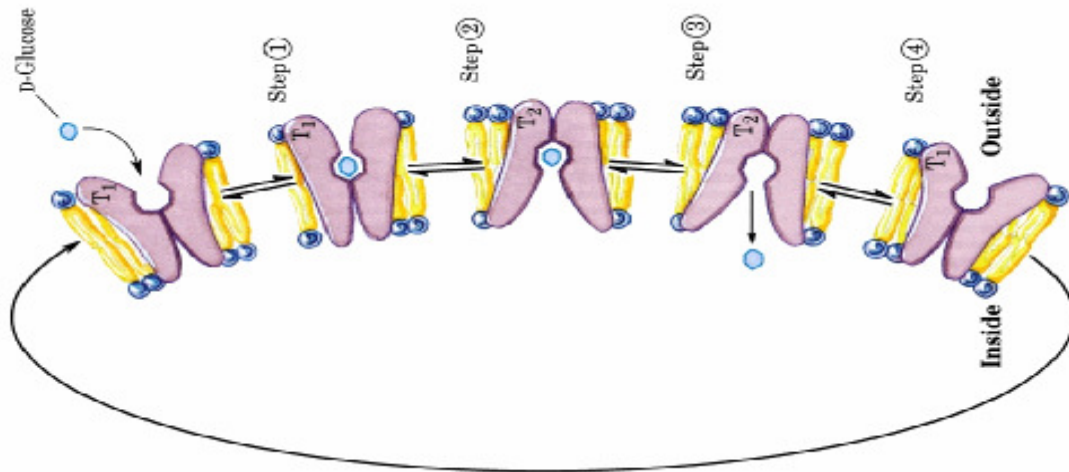


Solute transport across membranes

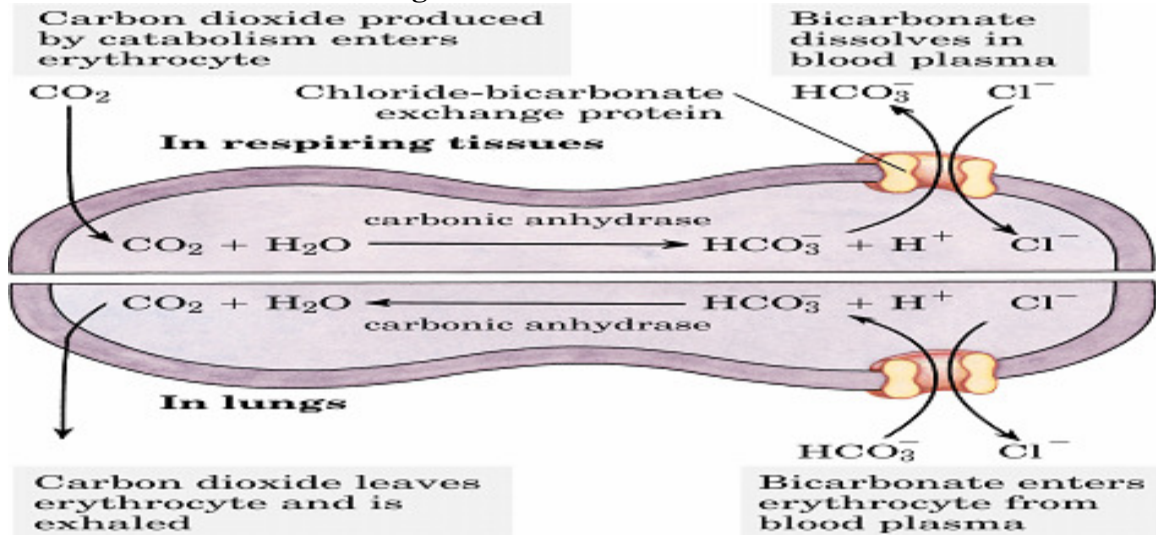
- Passive transport
- Passive transport + transporter molecule
- Active



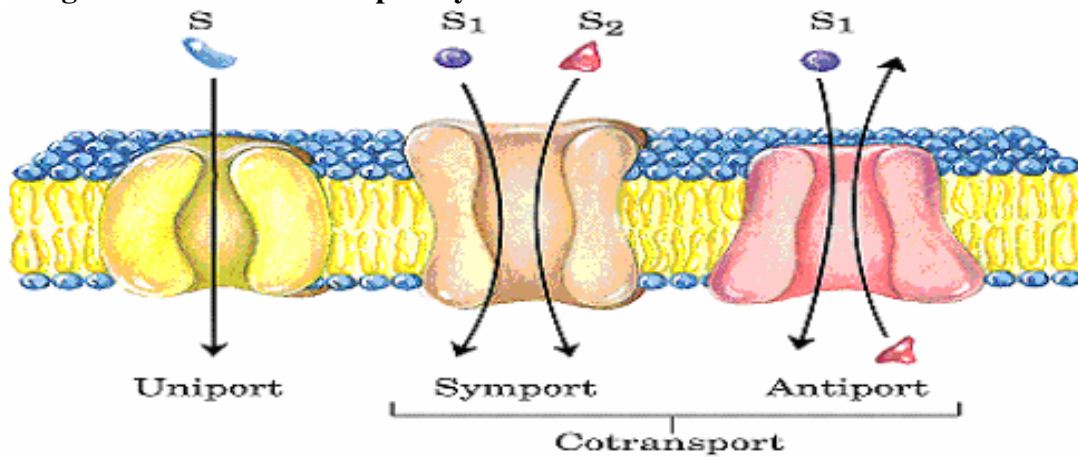
Glucose Transporter



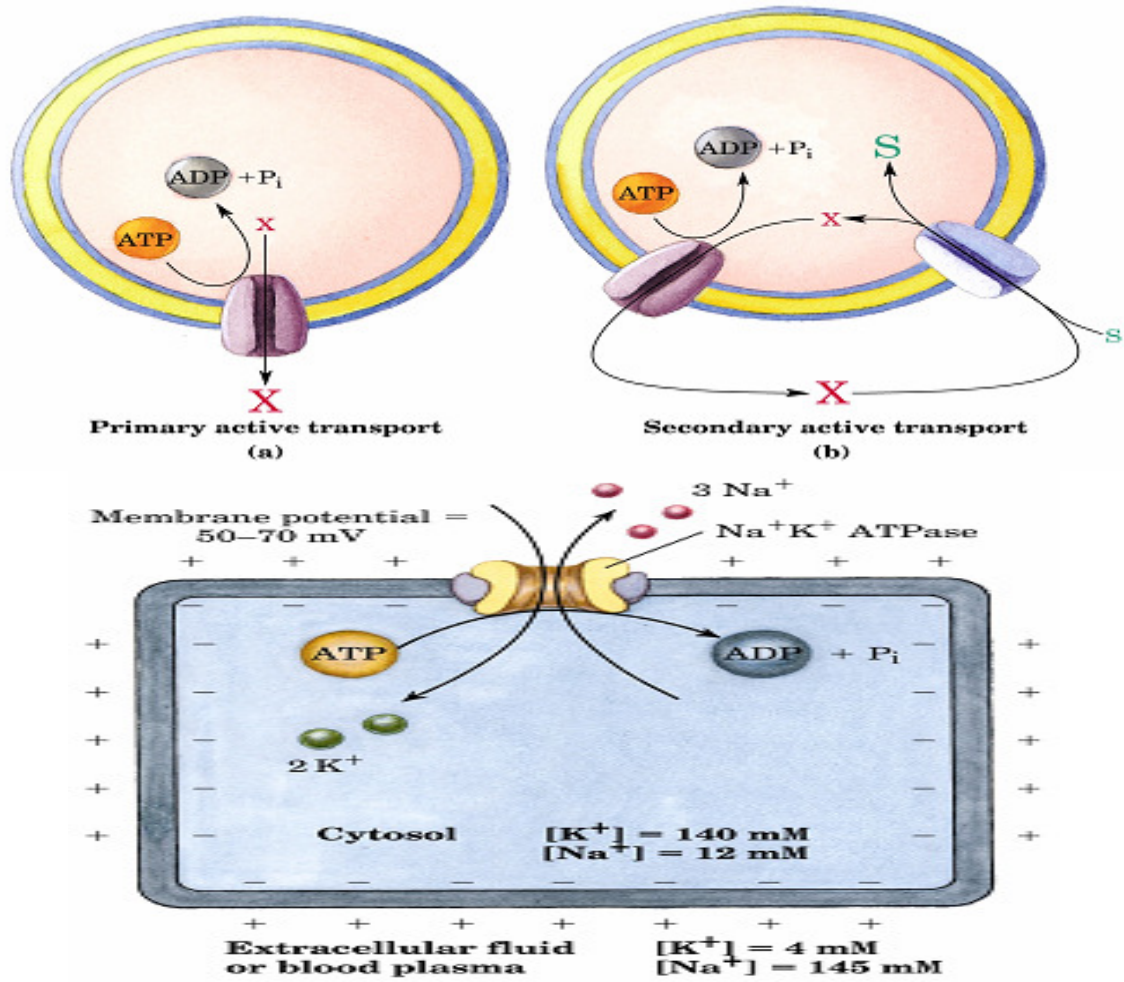
Chloride-Bicarbonate exchanger



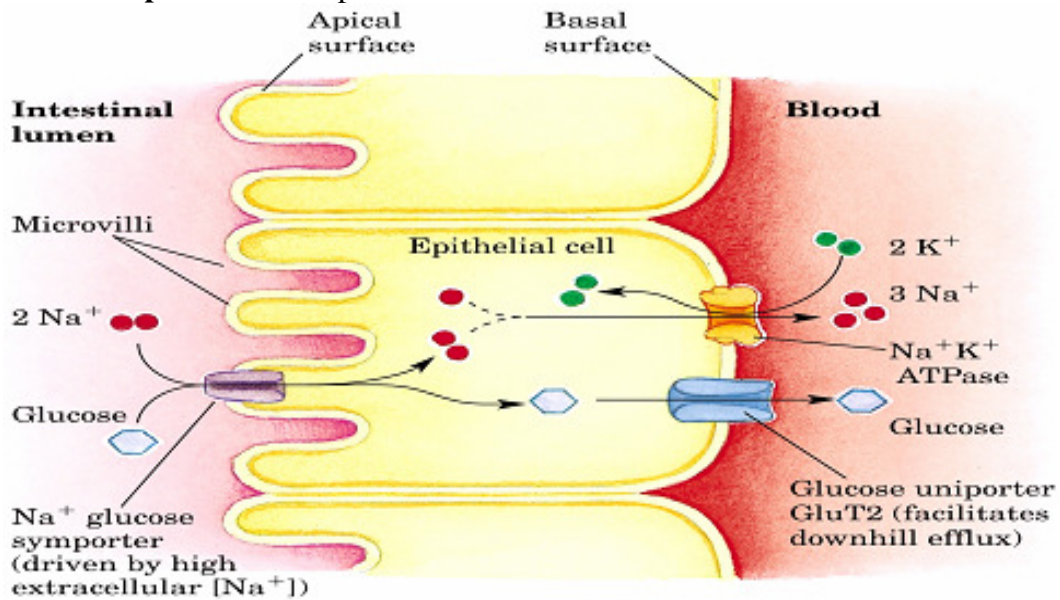
Three general classes of transport systems



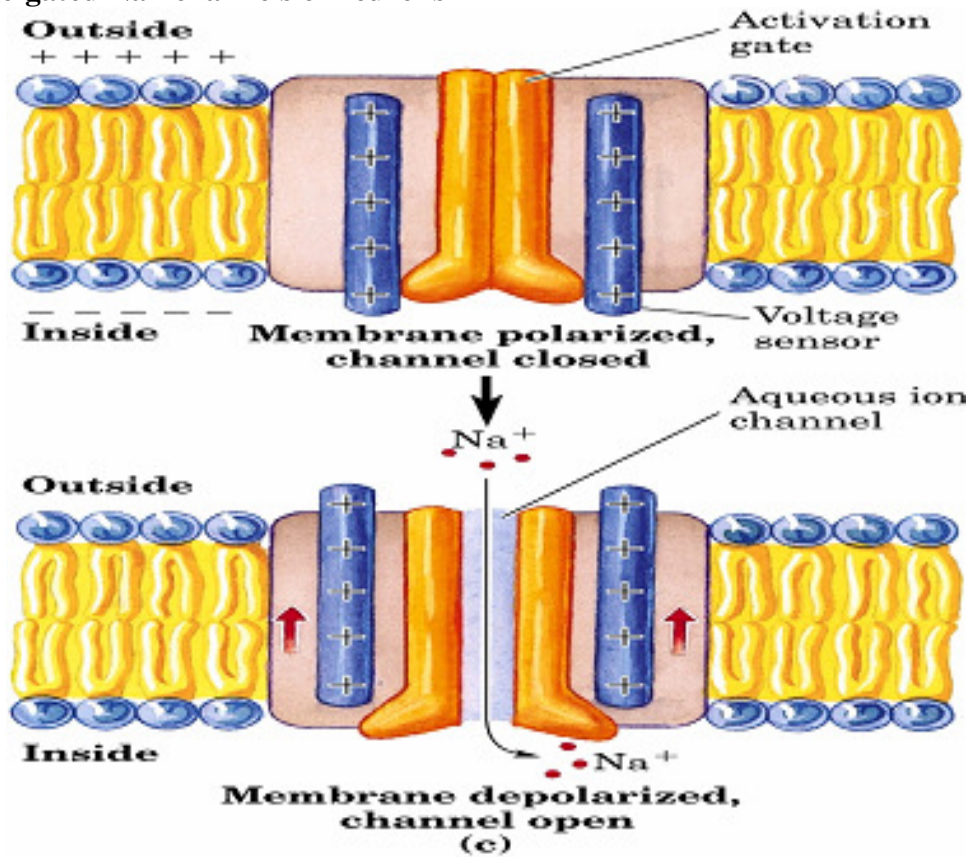
Active transport



Glucose transport – co-transported with sodium ions



Voltage-gated Na⁺ channels of neurons

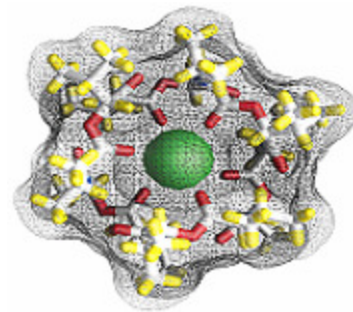


Ionophore mediated ion transport

Compounds that shuttle ions across membranes are called **ionophores** (ion bearers).

eg. Valinomycin – a peptide ionophore that binds K⁺
Monensin – a Na⁺ carrying ionophore

Both are antibiotics, kill microbial cells by disrupting secondary transport processes and energy-conserving reactions



Summary

