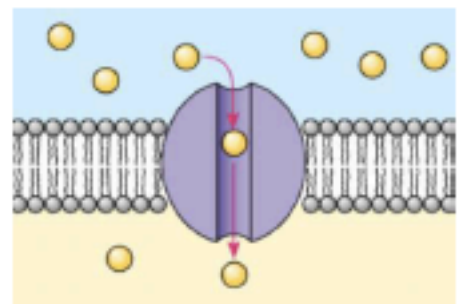


Facilitated diffusion

- In facilitated diffusion, transport proteins assist movement of molecules down a concentration gradient; requires no energy input
- There are 2 types of proteins that aid this process:
 - **Channels:** conduits allow direct passage from one side of the membrane to the other
 - **Carriers:** which bind to the solute on one side of the membrane, causing a conformational change in the protein which moves the solute through. In this case, there is no direct connection between the extracellular environment and the intracellular one, at any given time.

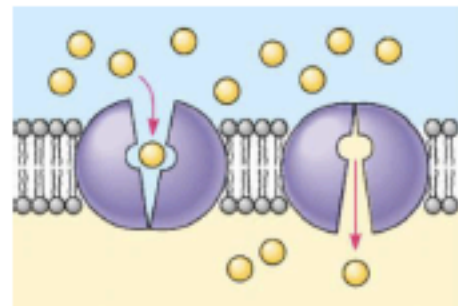
Channels

- These are integral membrane proteins, which allow diffusion across the membrane across a concentration gradient
- Channel proteins provide a corridor for **specific** molecules or ions to cross the membrane
- Water can diffuse across the membrane – but only very slowly because it is polar. Aquaporins are the specific channel proteins for water
- Channels allow the cell to take up and retain the molecules it needs and exclude what is unwanted



Transporters/carriers

- These are integral membrane proteins which help molecules to cross the membrane
- They alternate between two shapes and move the solute across the membrane during the shape change
- Transport solute in either direction depending on the concentration gradient
- Shows specificity – transporters have binding sites equivalent to the substrate binding sites of enzymes. Transport through transporters is slower than via channels. Eg: glucose transporters in mammalian cells.



Gated channels

- Channels (and transporters) may be “gates” – they may require another type of molecule to be bound to a specific site before they function (open up to allow molecules and ions through)
- For example: neurotransmitter receptors in the brain are neurotransmitter-gated ion channels

