

Facilitated Diffusion and Active Transport

SO WHAT ABOUT BIGGER STUFF??

*HOW DOES IT GET THROUGH THE MEMBRANE
AND INTO THE CELL?*



Passive Transport by **TRANSPORT PROTEINS** embedded in the membrane

THIS TYPE OF DIFFUSION IS CALLED FACILITATED DIFFUSTION

- ✪ Substances move through protein channels or tunnels
- ✪ Cell does ***not*** have to expend energy
- ✪ Substance must fit through the protein channel or tunnel
- ✪ Substances can move in either direction
- ✪ Movement is caused by a gradient (higher to lower concentration)
- ✪ Two types of proteins involved in facilitated diffusion
 - Channel proteins
 - Carrier proteins

Channel Proteins

- ☺ Simplest type
- ☺ Like a tunnel extending through the membrane

Carrier Proteins

- ☺ Has a specific shape that fits a specific molecule
- ☺ Molecule binds with protein
- ☺ Protein changes shape and moves molecule across the membrane
- ☺ Molecule is released
- ☺ Protein returns to original shape

ACTIVE TRANSPORT

Can cells ever move particles from a region of LOWER concentration to a region of HIGHER concentration?

YES THEY CAN!
BUT THE CELL **MUST USE ENERGY**

ACTIVE TRANSPORT – Transport of materials against a concentration gradient requires **energy** and we call this type of movement active transport.

ACTIVE TRANSPORT IS LIKE A PUMP.

- ☑ Particle is moving **AGAINST A GRADIENT**
- ☑ Transport protein binds with a particle
- ☑ Chemical energy from cell is used to change the shape of the protein
- ☑ Particle is then released on the other side of the membrane
- ☑ Proteins original shape is restored
- ☑ Some carrier proteins are used in this way

TRANSPORT OF LARGE PROTEINS

Endocytosis – a process by which a cell surrounds and takes in material from its environment

- Material does not pass directly through the membrane
- Instead it is engulfed and enclosed by a portion of the cells membrane
- This portion then breaks away and moves inside the cell

ENDOCYTOSIS REQUIRES ENERGY AND IS A TYPE OF ACTIVE TRANSPORT

Exocytosis – the reverse process of endocytosis

- Cells use exocytosis to expel wastes, secrete hormones, etc.
- Sac of contents to be removed inside the cell fuses with the plasma membrane
- Membrane opens up and contents are released

EXOCYTOSIS REQUIRES ENERGY AND IS A TYPE OF ACTIVE TRANSPORT