

MEMBRANES (part 2)

The phospholipid bilayer membrane separates the inside from the outside. However, cells need to bring things in and send things out. There are many methods for getting things in and out, depending on the size and the chemical properties of those things. Some ways require energy and some don't.

PASSIVE TRANSPORT

Does not require energy.

1) SIMPLE DIFFUSION

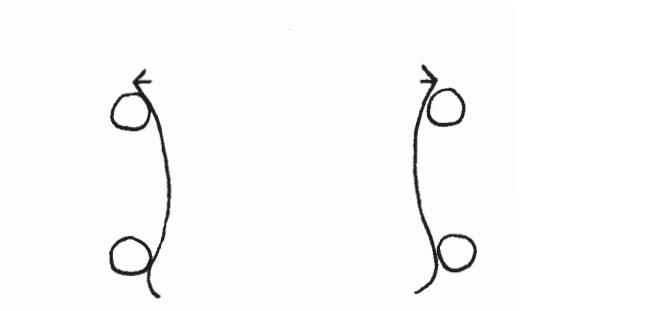
Very small, non-polar molecules, such as oxygen and carbon dioxide can go right through the membrane.

Small lipids can also diffuse because they get along so well with the fatty acid tails in the middle layer.

2) FACILITATED DIFFUSION (facil = to make easier)

Molecules that are polar or electrically charged can't use simple diffusion; they must use channel proteins.

A) Aquaporins (for water)



Center of tube is tiny and will allow only 1 water molecule through at a time. However, 1 million water molecules get through every second!

B) Ion channels

Types of gates: light, temperature, pressure, voltage, binding of messenger molecules

ACTIVE TRANSPORT

Uses energy (often from ATP or NADH)

1) PUMPS

Use energy to push molecules across the membrane against the "concentration gradient."

Types of energy: ATP, NADH carrying high-energy electrons

2) ENDOCYTOSIS (when particles are brought inside)

3) EXOCYTOSIS (when particles are sent out)