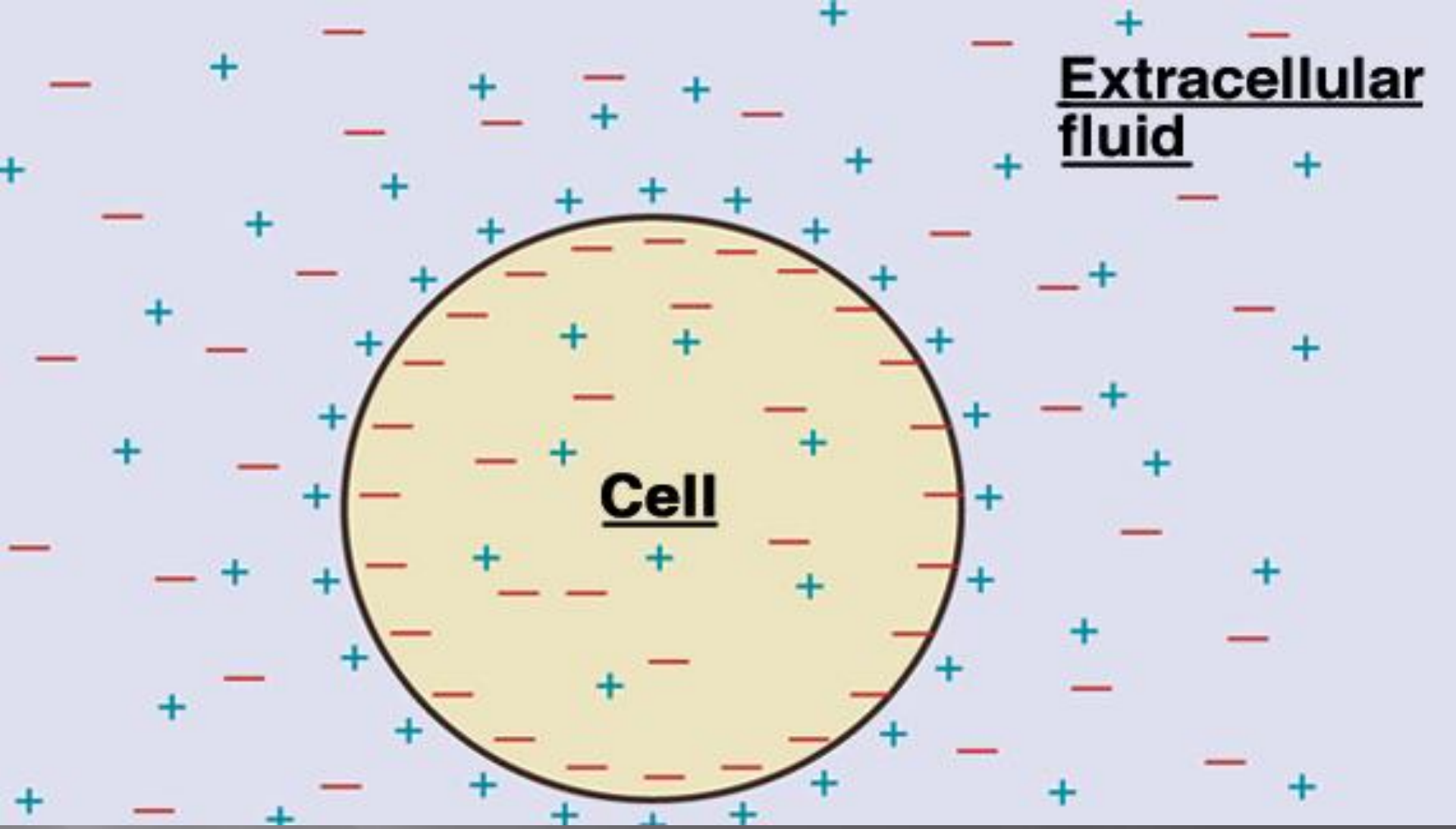
RESTING MEMBRANE POTENTIAL(RMP)

Mechanism of RMP:

- The **resting membrane potential** refers to a situation in which the cell is at rest and no perturbations ones have been done to change the potential.
- Messages transported through neurons to cell.
- Transmission of nerve impulse in form of electric potential(mv-100mv).
- The resting membrane potential of large nerve fibers is about –90 millivolts. That is, the potential inside the fiber is 90 millivolts more negative than the potential in the extracellular fluid on the outside of the fiber. **Potential**

Difference in ionic concentration b/w intracellular and extracellular enviornment.



- The membrane potential is due to the sodium ions found in the extracellular matrix and the potassium ions found in the intracellular matrix of cell.

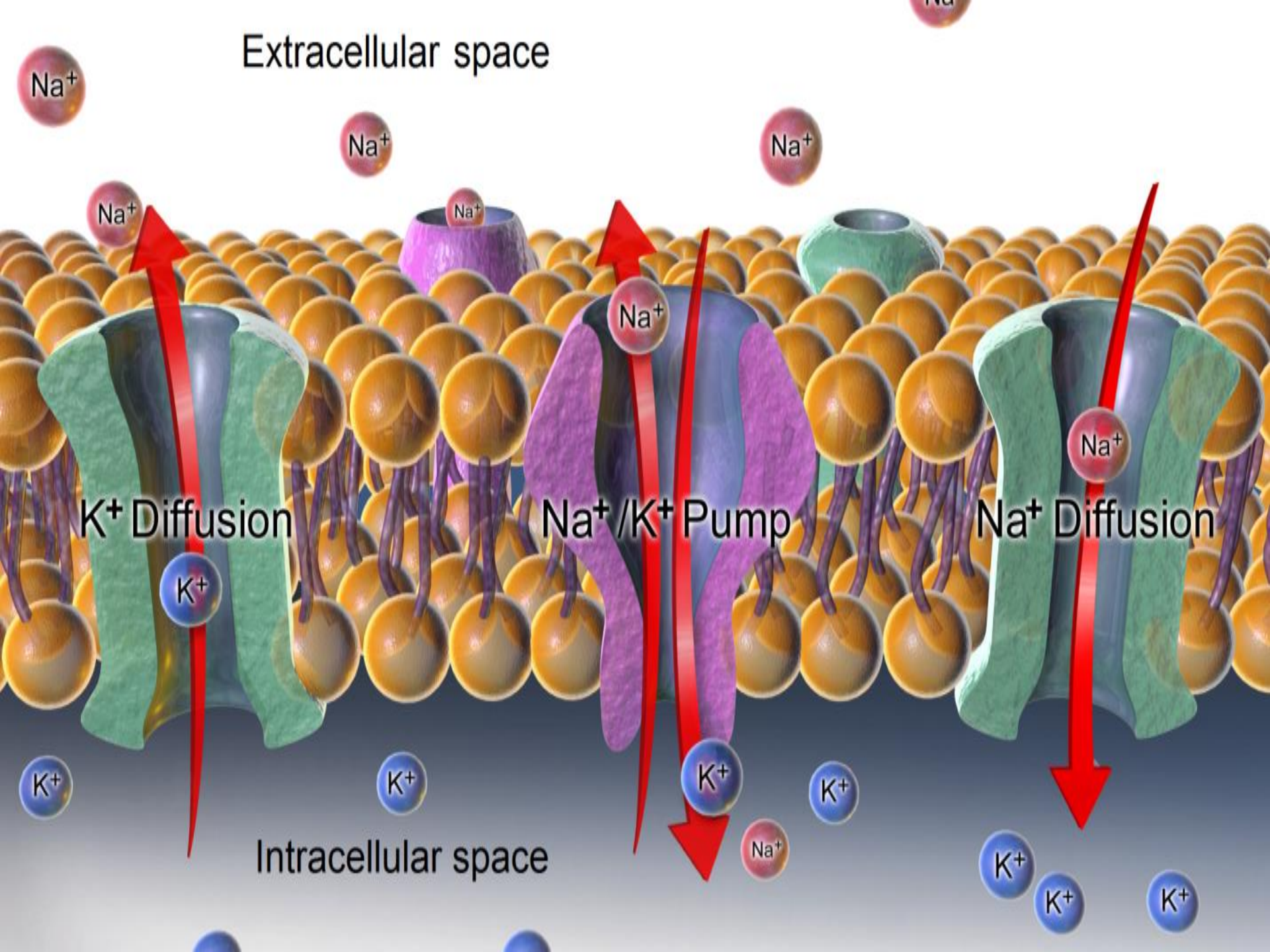
How RMP produced and maintained:

ELECTROGENIC IONS PUMP:

- Active Transport of Sodium and Potassium Ions through the Membrane—The SodiumPotassium (Na+-K+) Pump.

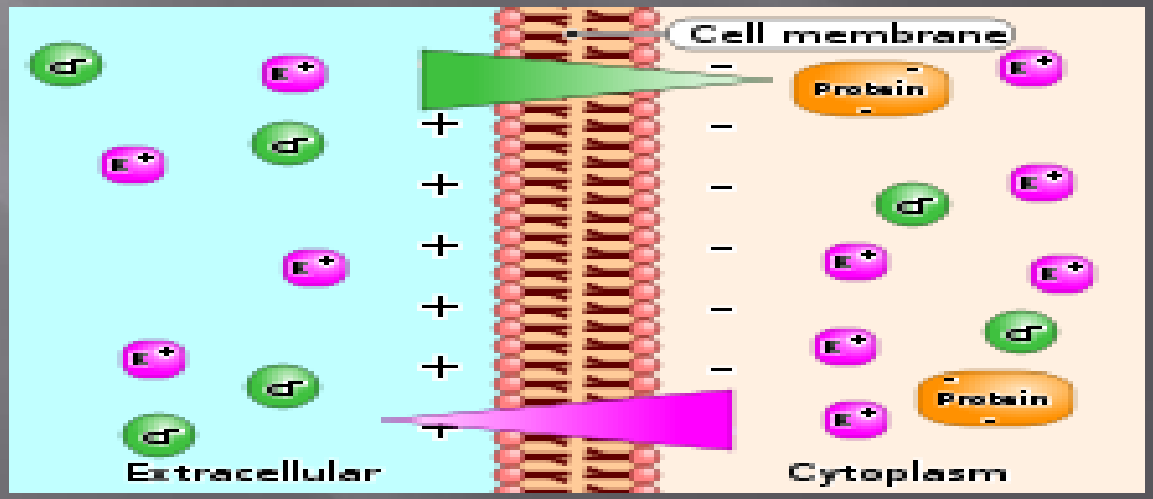
- Cell membranes of the body have a powerful Na+-K+ that continually pumps sodium ions to the outside of the cell and potassium ions to the inside because more positive charges are pumped to the outside than to the inside (three Na+ ions to the outside for each two K+ ions to the inside), leaving a net deficit of positive ions on the inside; this causes negative potential inside the cell membrane.

- The Na+-K+ also causes large concentration gradients for sodium and potassium across the resting nerve membrane.Specific blockers are also used to maintain the RMP like tetradoxin(TTX)


Extracellular space
Na+
Na+
Na+
Na+
Na+
Na+
Na+
K+ Diffusion
Na+ /K+ Pump
Na+ Diffusion
K+
K+
K+
K+
K+
K+
K+
K+
Intracellular space

Donnan equilibrium:

- is a name for the behavior of charged particles near a semi-permeable membrane that sometimes fail to distribute evenly across the two sides of the membrane.
- The usual cause is the presence of a different charged substance that is unable to pass through the membrane and thus creates an uneven electrical charge.
- Small membrane potential because the intracellular fluid has a higher protein concentration than the extracellular fluid.



Diffusion potential:

It depends upon:

Ion mobility:

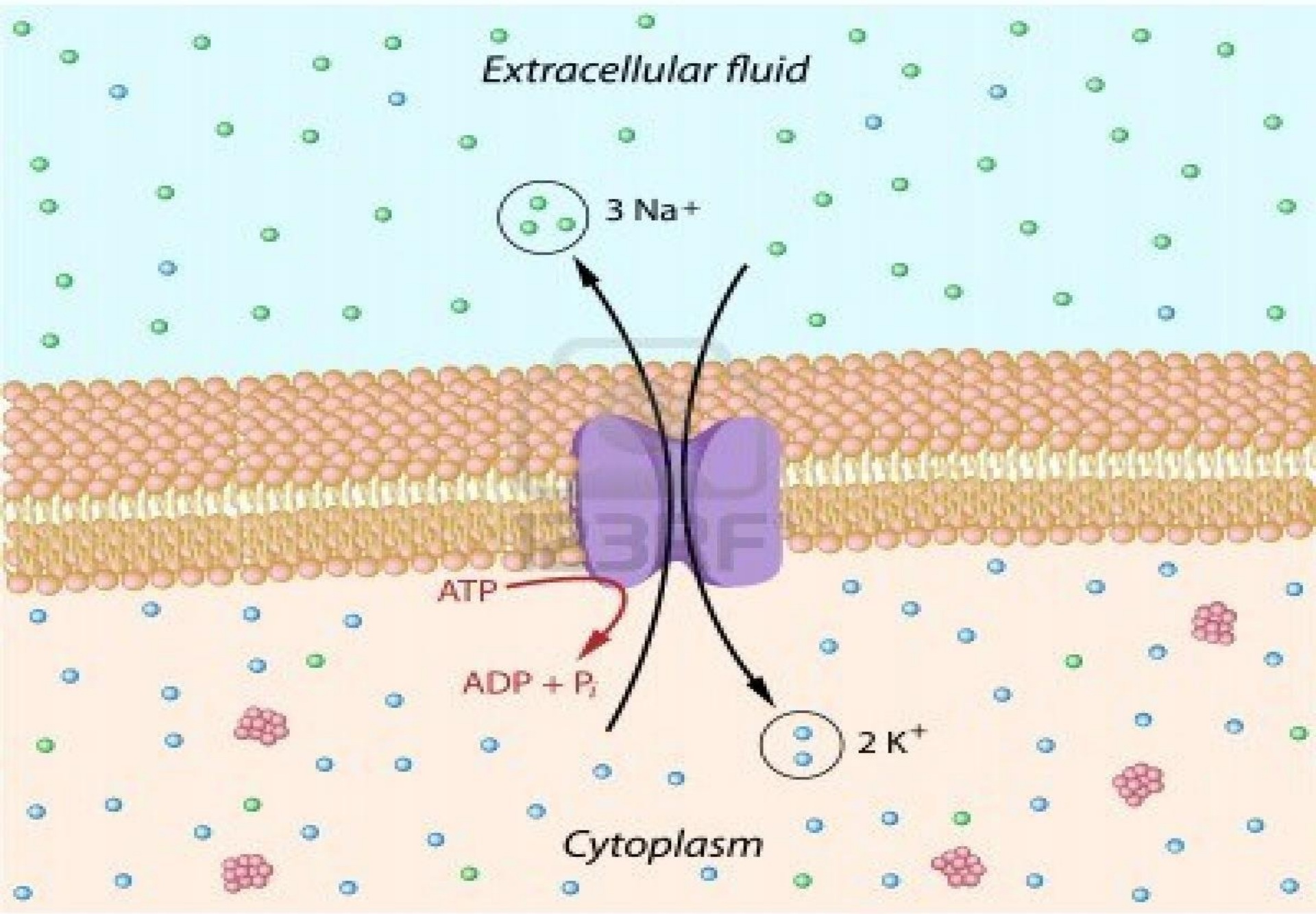
Heavier ions moves slowly while slower moves fastly.Heavier means charge density and size.

Ion permeability:

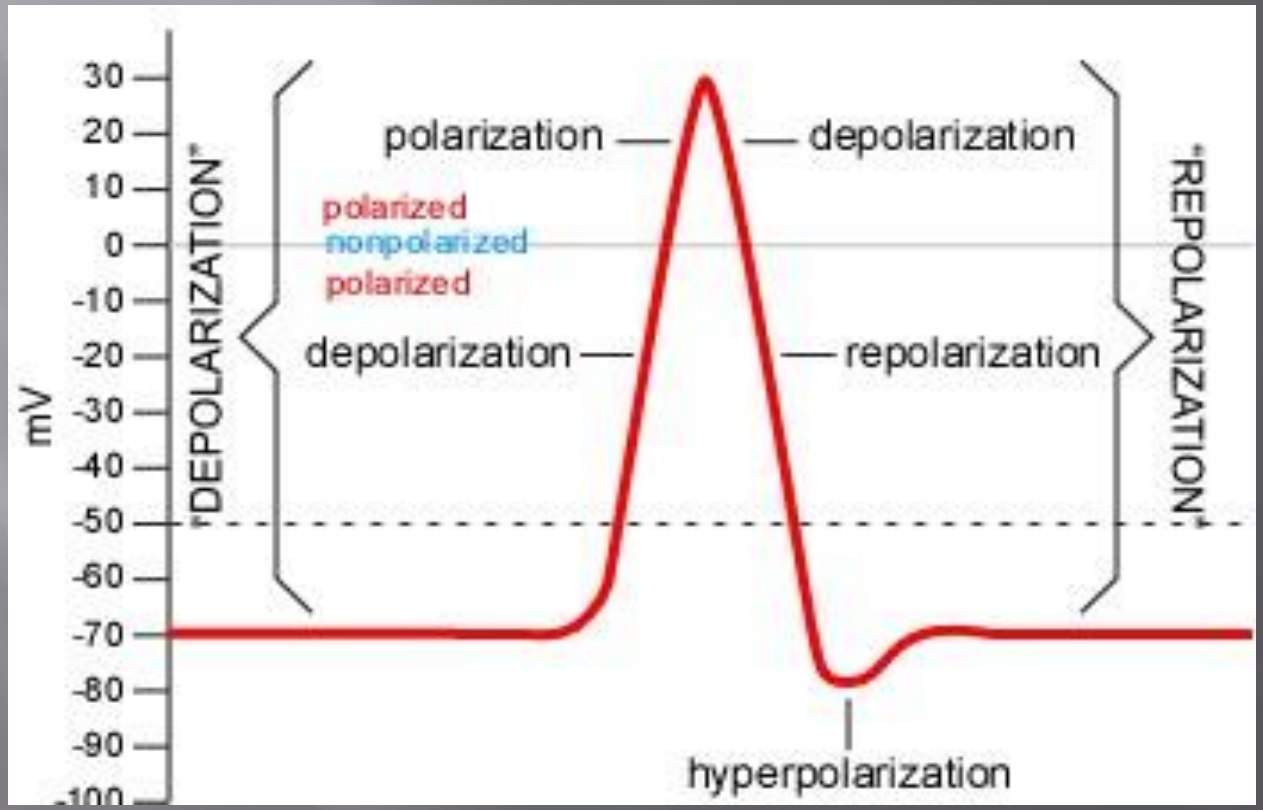
- The electrical properties of cell membrane depend upon on selective permeabilities of the membrane to different ions.Specific ion channels are present to make the cell membrane highly but selective permeable to ions.

Ion concentration gredient:

- Na and Cl has higher concentration in extracellular fluid than the K ,like K has higher concentration in intracellular fluid.


Extracellular fluid
3 Na+
ATP
ADP + Pi
2 K+
Cytoplasm
= Na+
= K+
= Large anion

Relationship b/w action potential and RMP:




Thank
You