

## Chapter 04

# Transportation Through Plasma Membrane

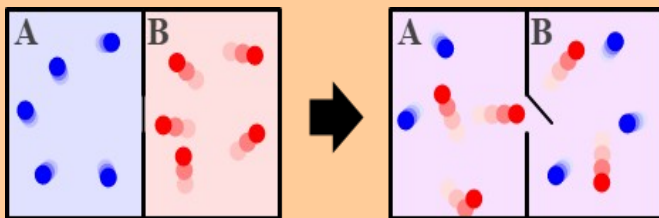
When you take a small ball of coffee powder and slowly put it in water beaker you will observe that water coffee powder has diffused in the water.

### Case I:

Let us take another beaker containing hot water.

If you try adding coffee powder,

- Observe that coffee powder diffused faster than the case I.
- Diffusion is a process dependent on temperature and is directly proportional to it.
- Higher temperatures increase the energy of molecules and therefore the movement of the molecules, increasing the rate of diffusion.

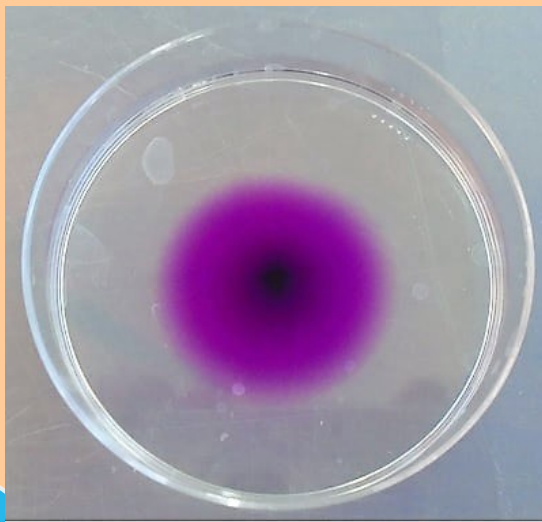


### Experiment:

- Keep a small crystal of potassium permanganate in

the center of petri dish.

- Fill the petri dish with water slowly.
- Purplish bronze crystal has started to diffuse in the water giving a pink color to the water.
- The color will spread from center to periphery of the petri dish and its dark pink towards the crystal and the colour gets lighter as we move away from the center.



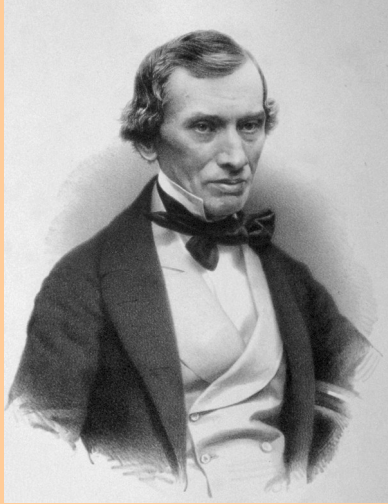
- Instead of potassium permanganate, if you take copper sulfate, you will see the same phenomena but the colour of hydrous copper sulfate is blue so the solution will be blue in colour.

### **Comparison of diffusion of a drop of ink and coffee powder in water:**

- You will notice that ink has diffused faster than the coffee powder.
- This is due to Graham's law of diffusion.

Thomas Graham, a Scottish physical chemist,

worked on diffusion of gases. Graham measured the rate of diffusion of gases and studied about diffusion of substances in solutions.



He inferred that a more soluble substance in a medium diffuse faster than a less soluble substance. This popularly known as Graham's law of diffusion.

In our comparison test, ink is more soluble in water than coffee, hence diffuse faster.