

Please mute your microphones.  
You may keep your video on if you wish.  
We will begin shortly.

**Thank you.**



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# Potato/Strawberry Osmosis

## *Biology*

# Materials

Potato OR Strawberry

Sugar (for Strawberry) OR Salt (for Potato)

Water

Multiple Cups





# Procedure

## **POTATO**

1. Fill two glasses with water.
2. In one of the glasses, add 2-3 tablespoons of salt and stir it in.
3. Break up the potato into pieces. Put half of the pieces in the pure water glass, and half in the saltwater glass
4. Make your observations on these pieces: pay attention to color, how flexible it is, smell, etc.

## **STRAWBERRY**

1. Break up the strawberries into halves, and leave them on a plate.
2. Sprinkle sugar on half of the strawberries, on the flat side.
3. Notice the texture and appearance of the strawberries, and consider how it might change.



What do you think is going to  
happen?



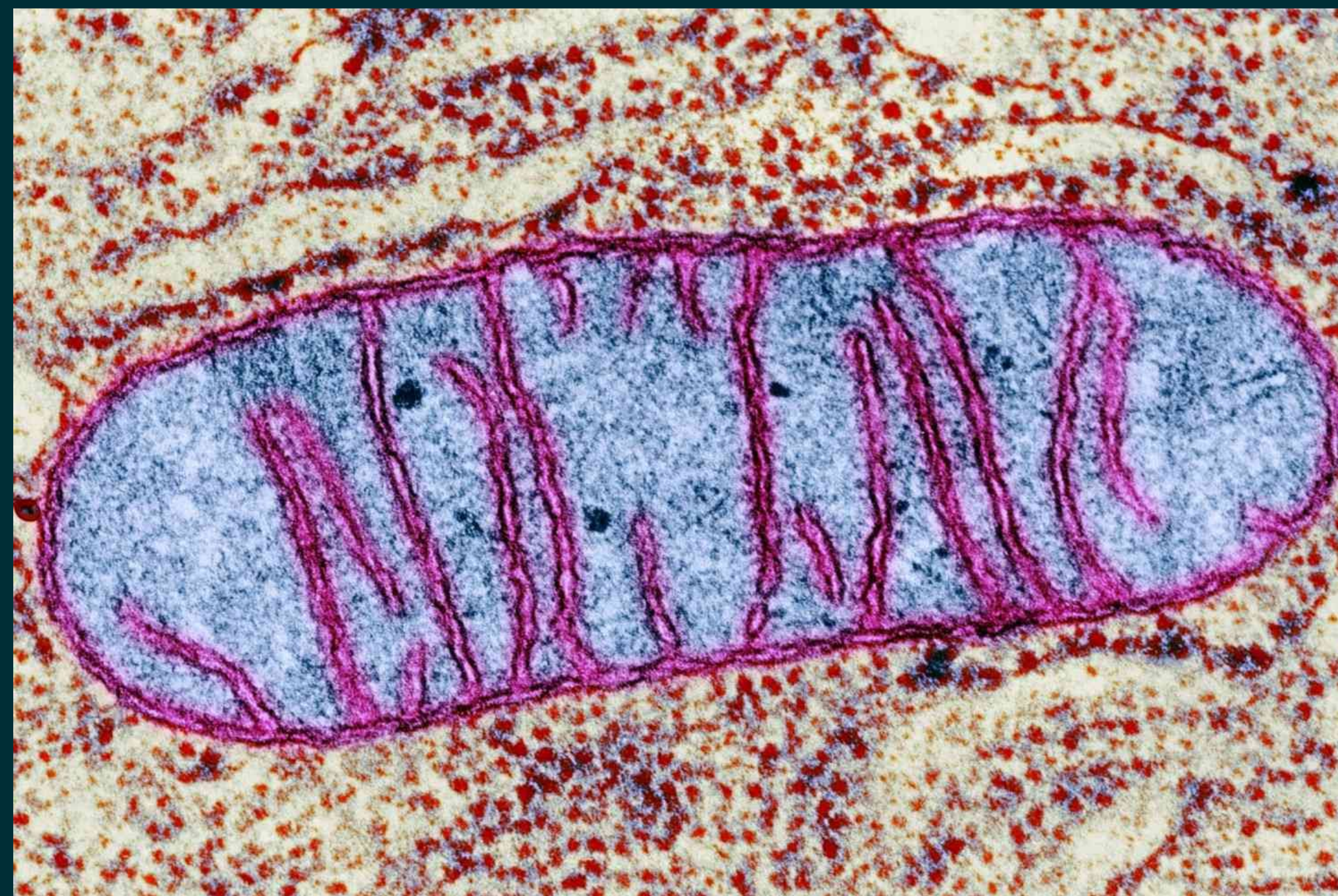
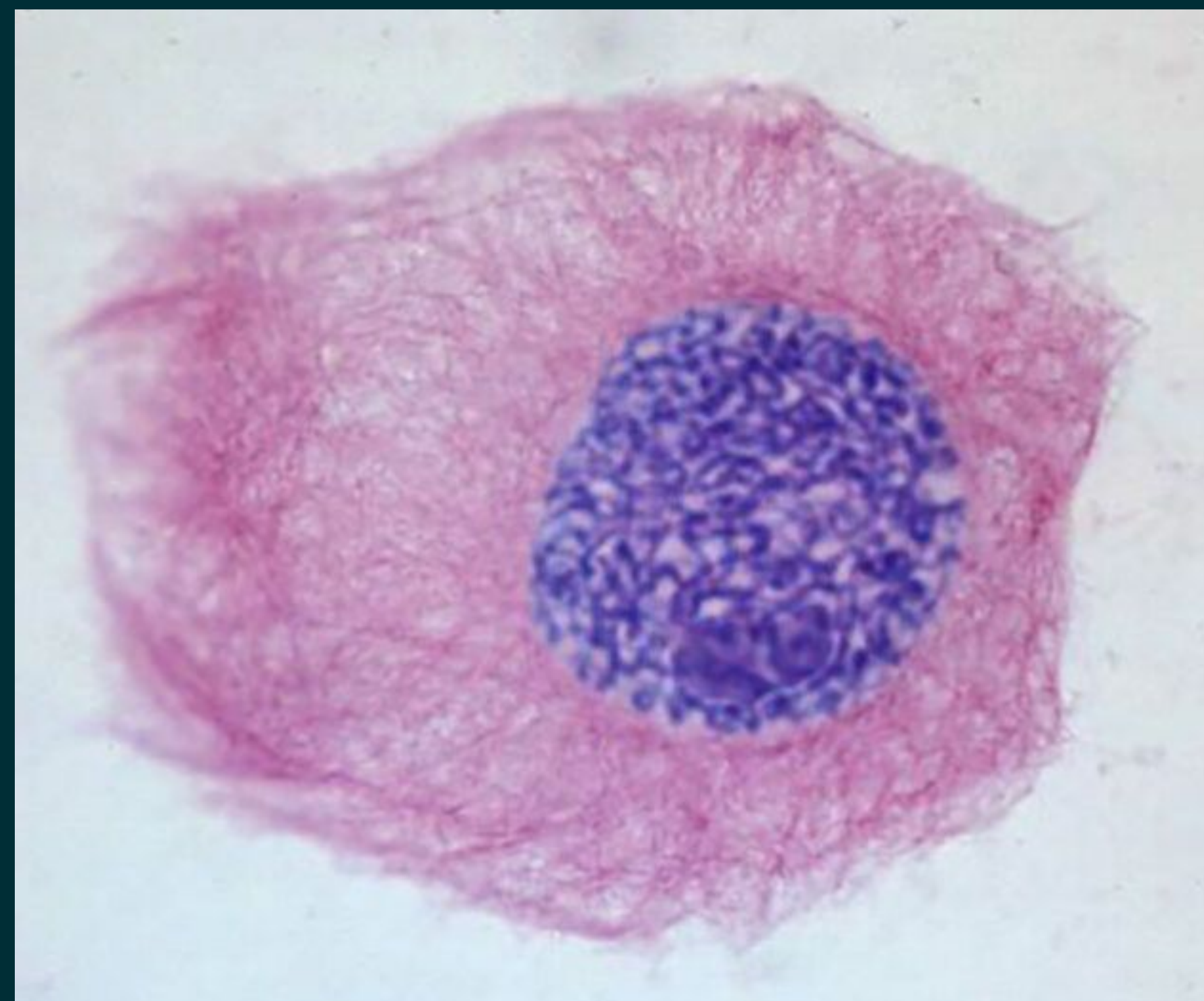
*Let's Think:*

What is a cell?



# Cells

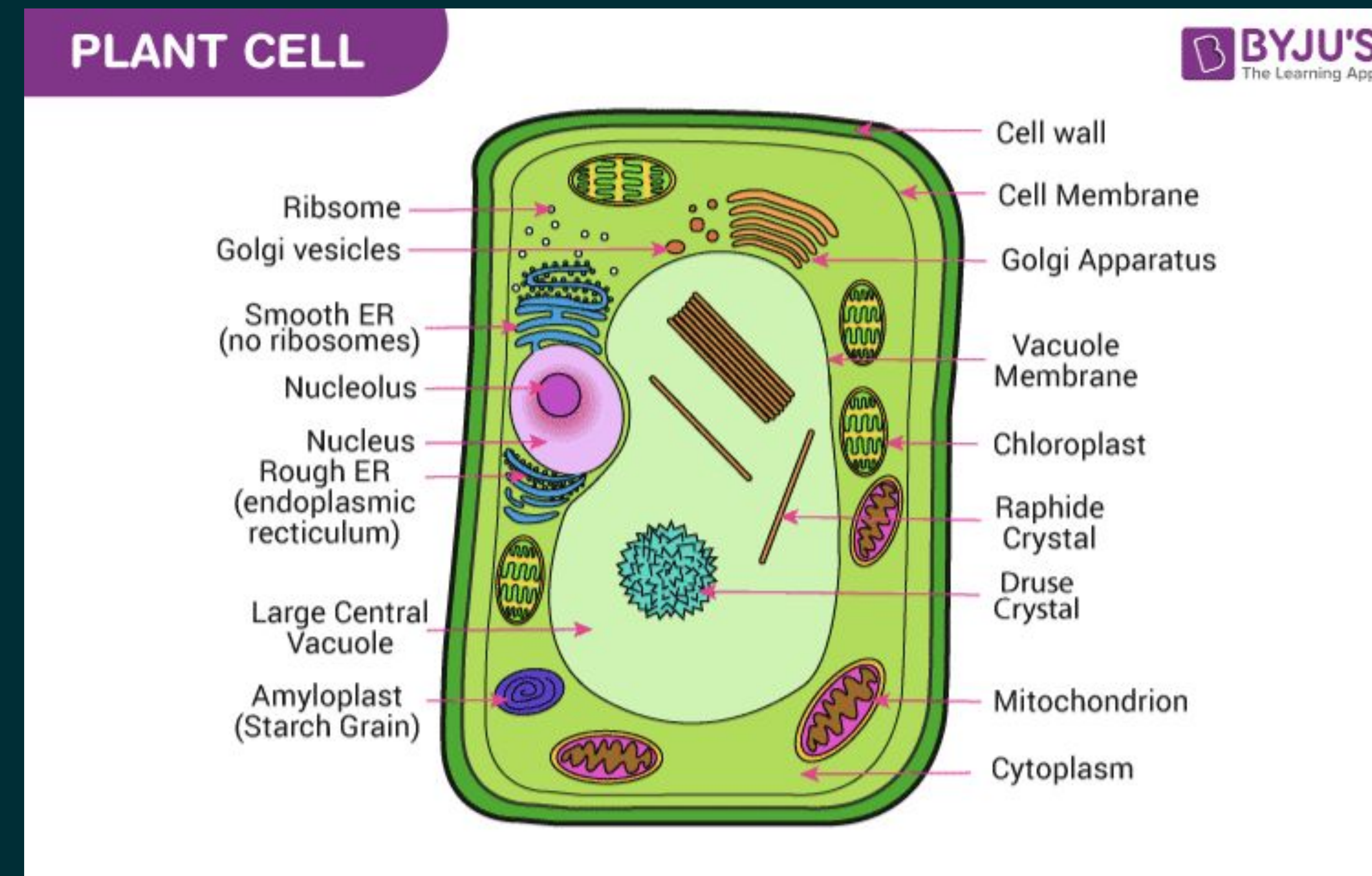
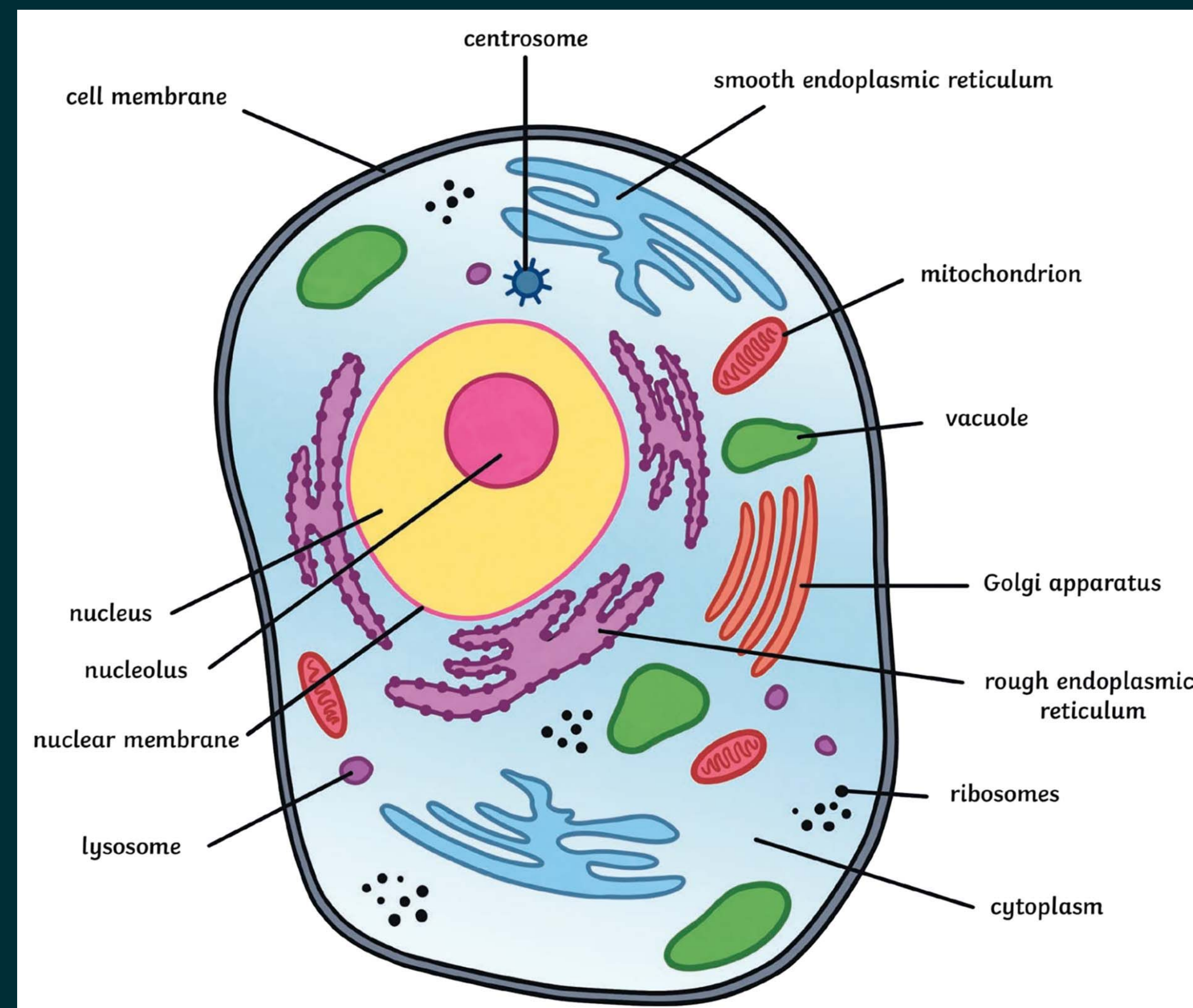
- Humans (and all other organisms) are made up of tiny structures are called **cells**, often described as the basic building blocks of life.
- Cells are made up of many different parts, such as:
  - **Nucleus**: contains DNA and controls other parts of the cell
  - **Mitochondria**: create chemical energy to power the cell
  - **Vacuoles/vesicles**: transport materials around the cell





# *Let's Think:*

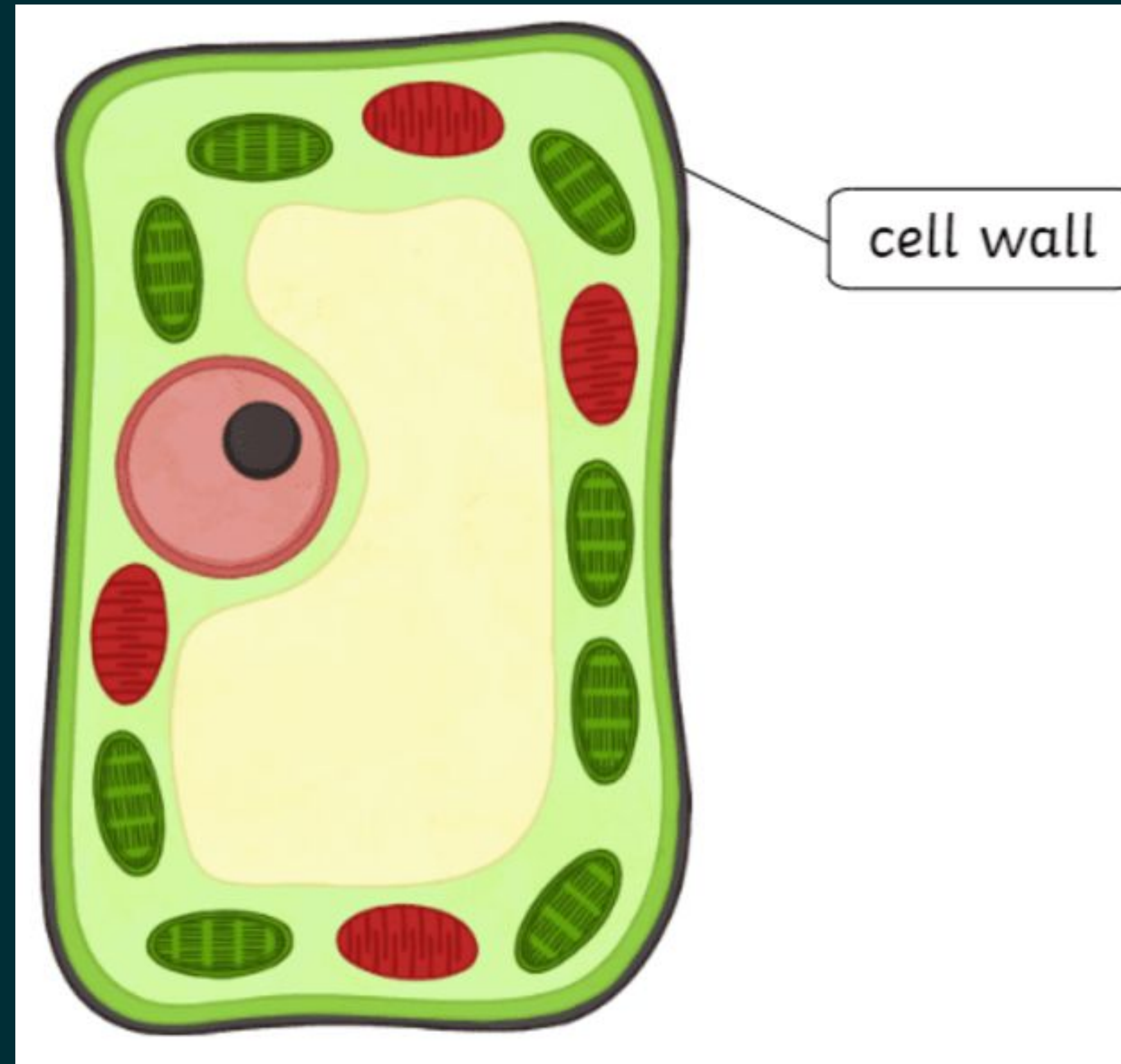
What is the difference between animal and plant cells?





# The Cell Wall

- You might have noticed the different shape of the animal and plant cell. Plant cells have a more rigid structure because they are surrounded by a layer called the **cell wall**.







*Let's Think:*

How does a strainer/colander work?

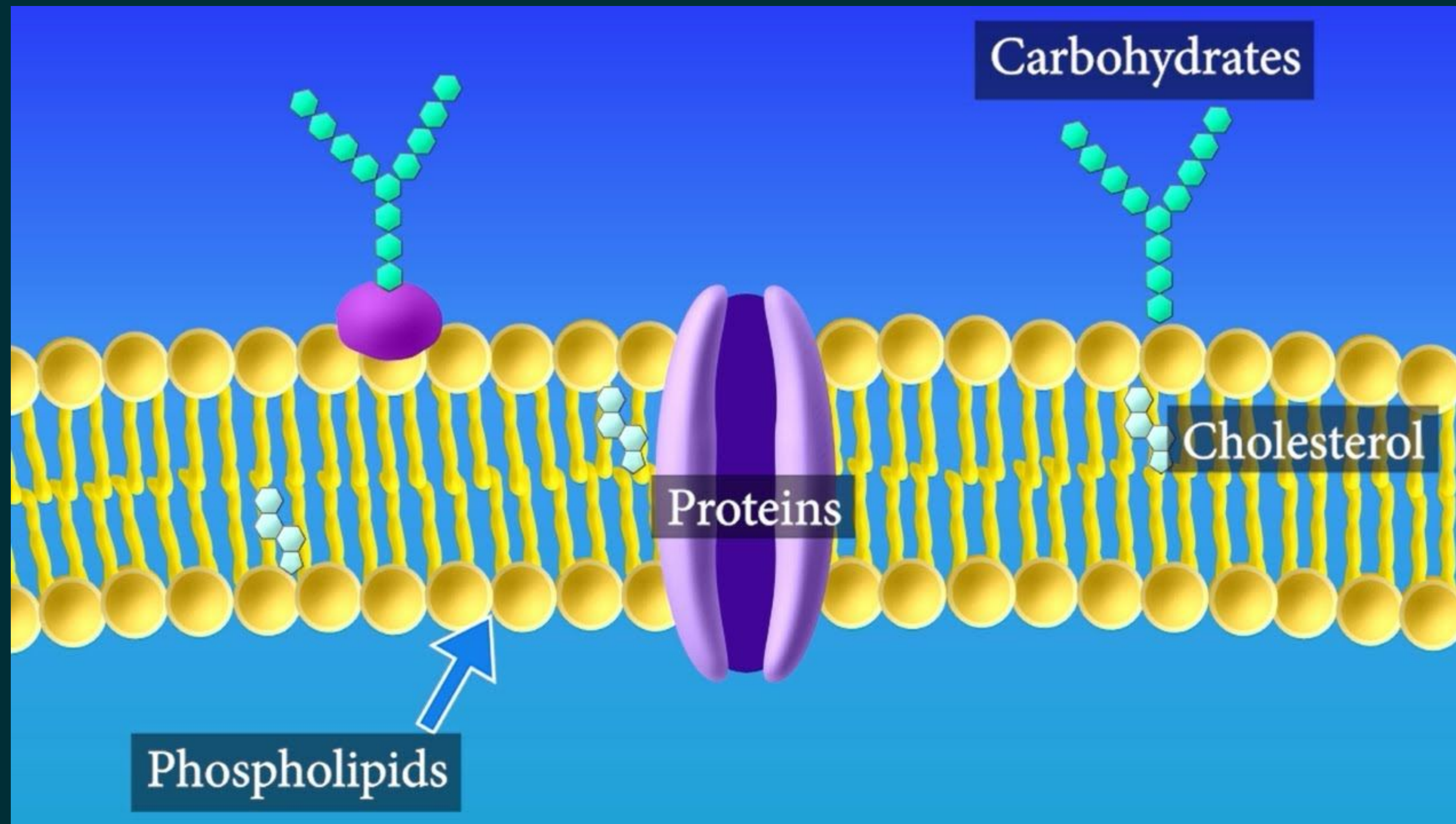




# The Cell Membrane

- Animal cells don't have a cell wall. They are surrounded by a less rigid structure called the **cell membrane**, which we will be learning about through today's experiment.
- The cell membrane is considered a **semipermeable** membrane. This means that some materials like oxygen and carbon dioxide can pass through it, but other materials cannot pass through, keeping the cell protected.
- Just like a strainer, the membrane has small openings which some materials can fit through, but other materials cannot.









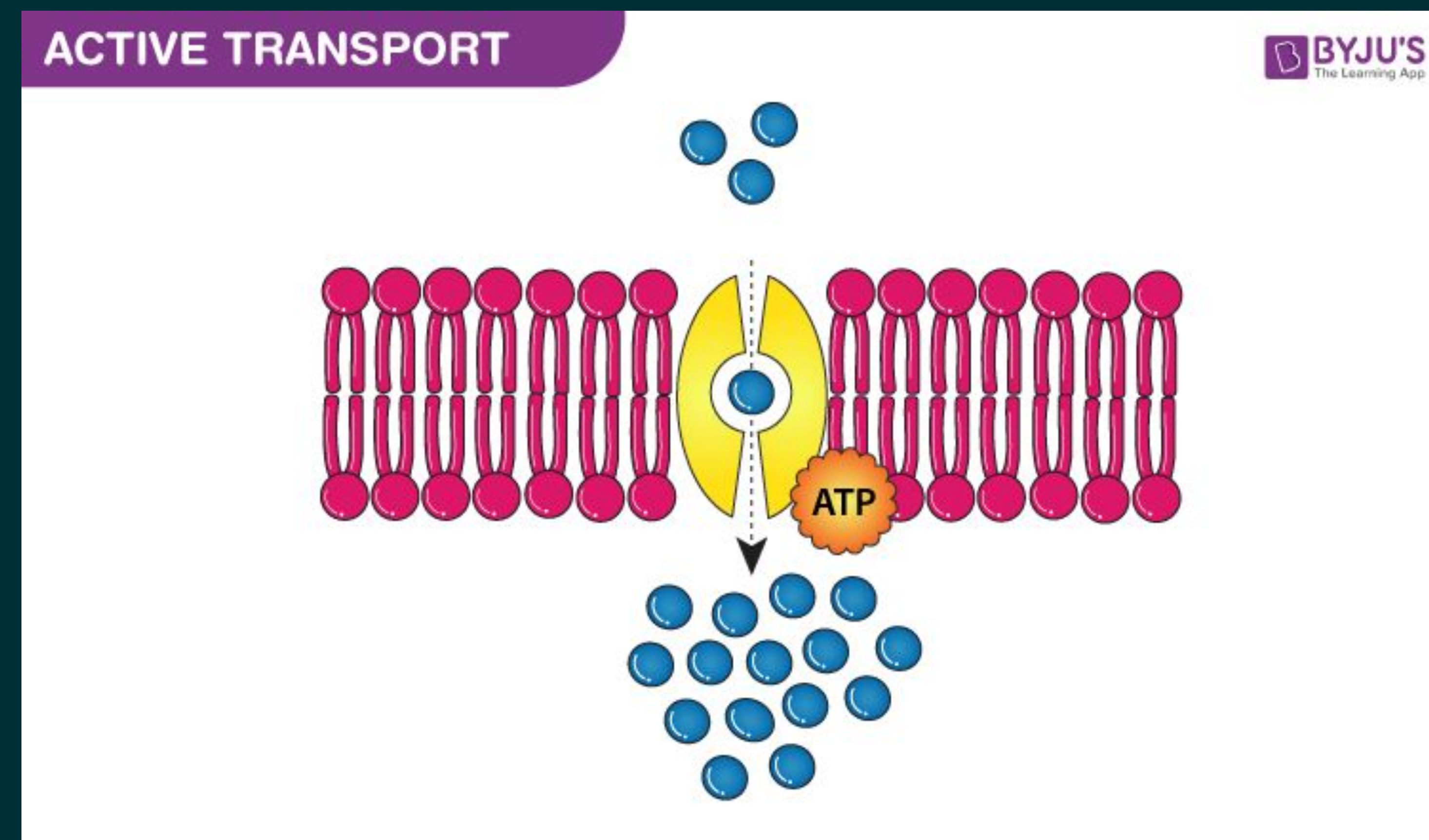
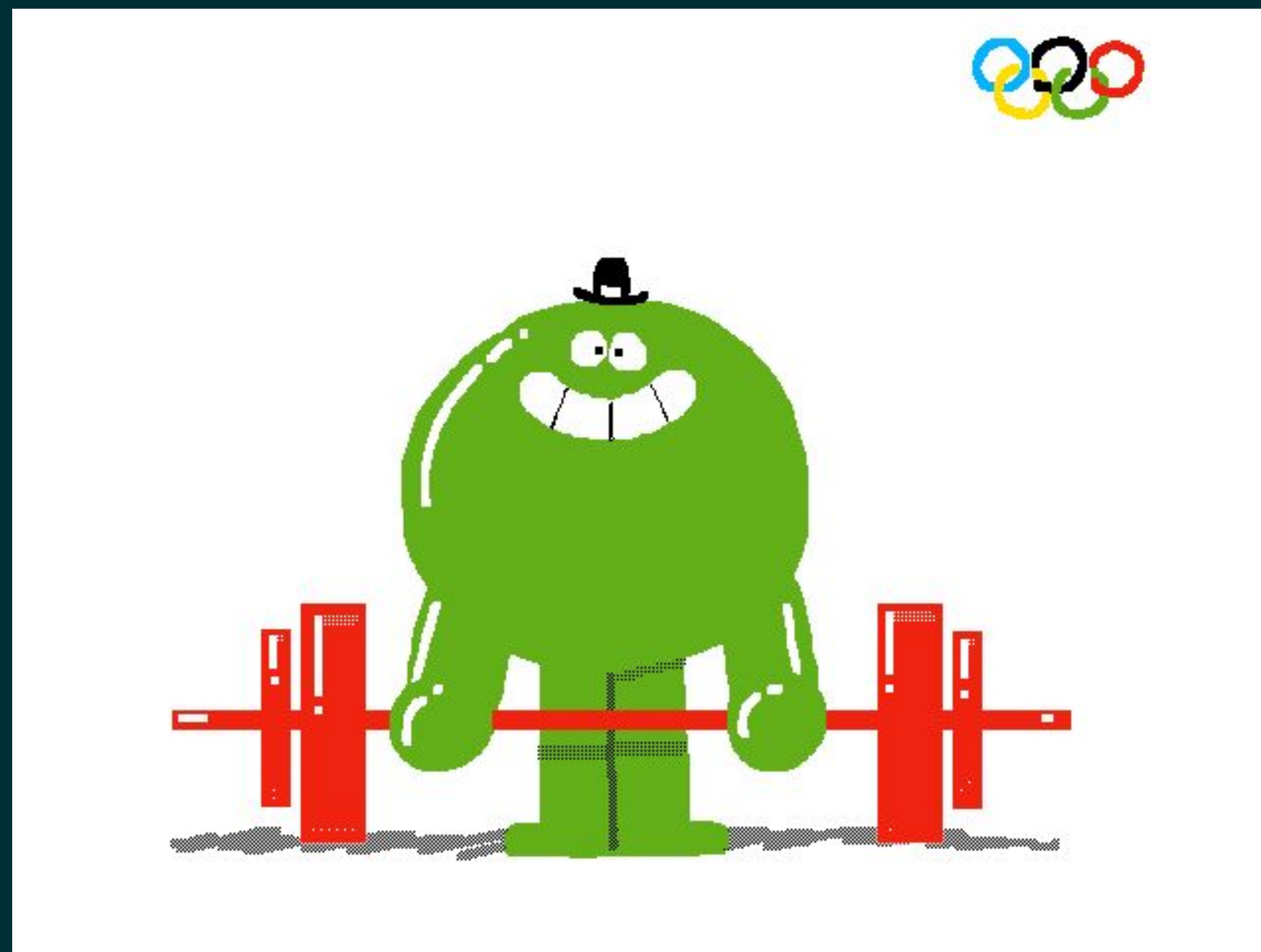
*Let's Think:*

Do you think it is important for material to move in and out of a cell? Why?



# Active Transport

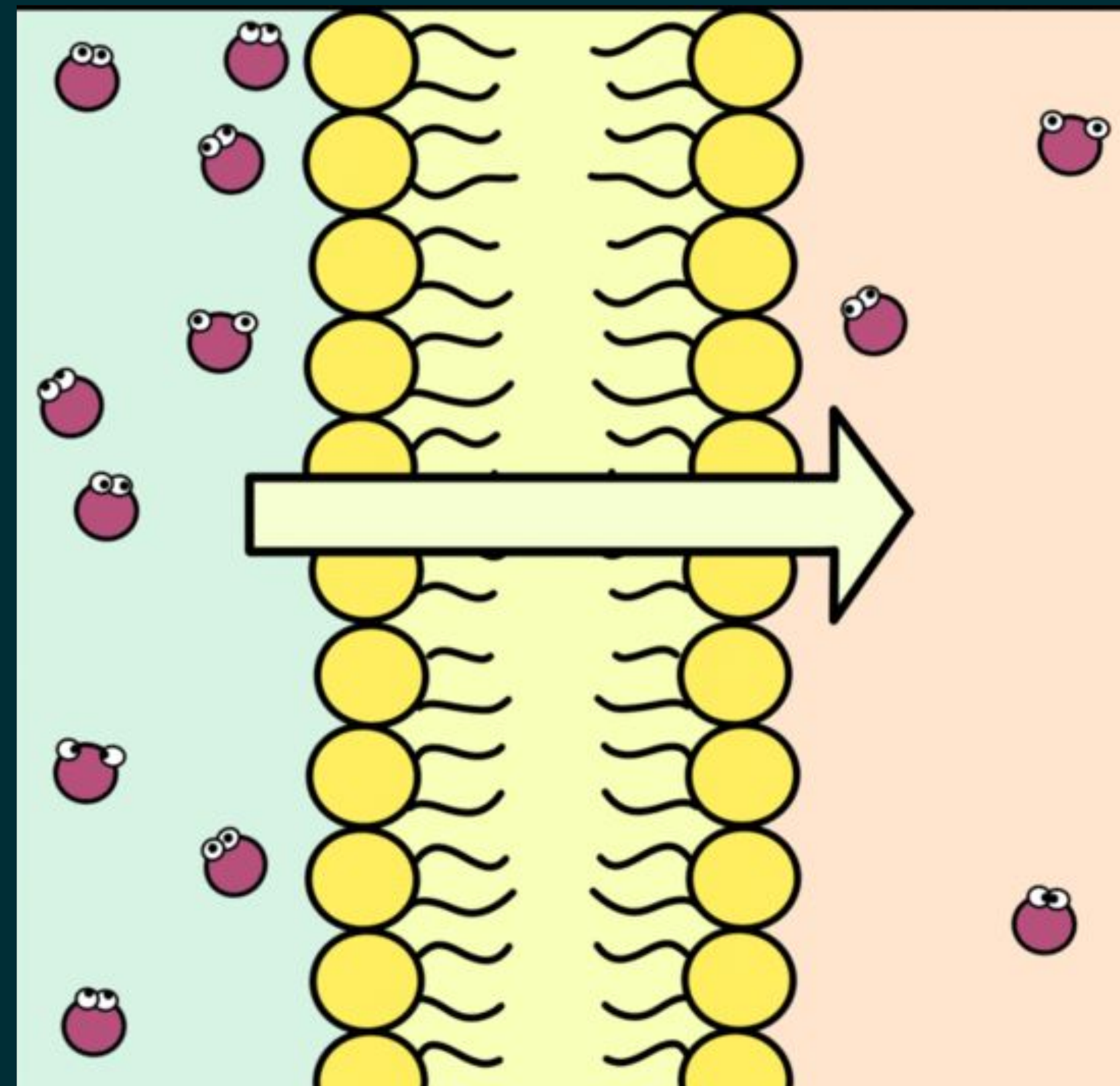
- It is the movement of molecules from areas of **low concentration** to **higher concentration**
- This goes **AGAINST** the “high-to-low” gradient, and so **requires energy** to happen!
- A major example is the creation of energy in our bodies!





# Passive Transport

- This is the movement of particles from a **higher concentration** to a **lower** one.
- This means that this type of transport works **WITH** the “high-to-low” gradient, and does not require extra energy!
- The transfer of oxygen through our cell membranes is an example of passive transport!

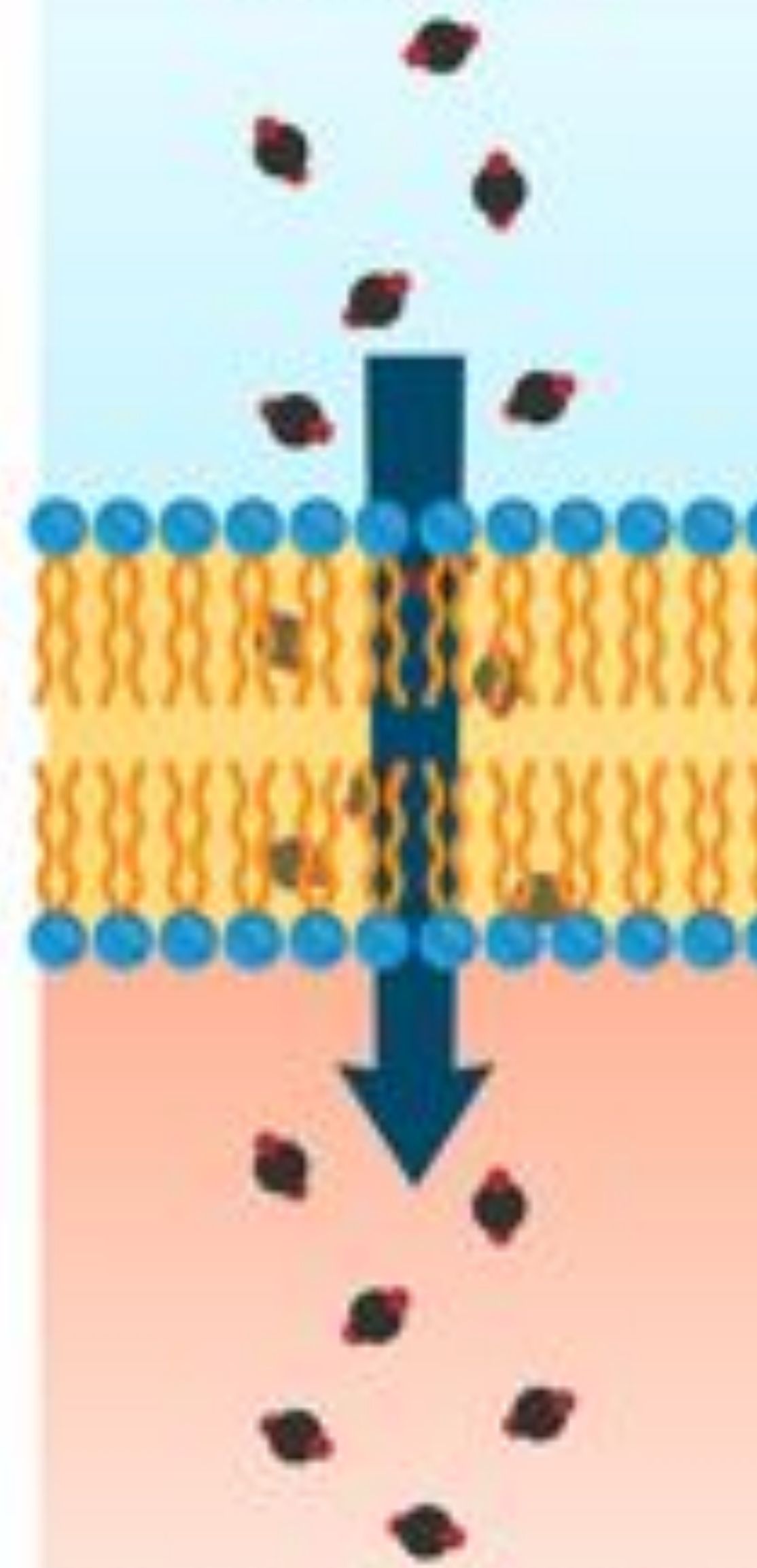




## PASSIVE TRANSPORT

### DIFFUSION

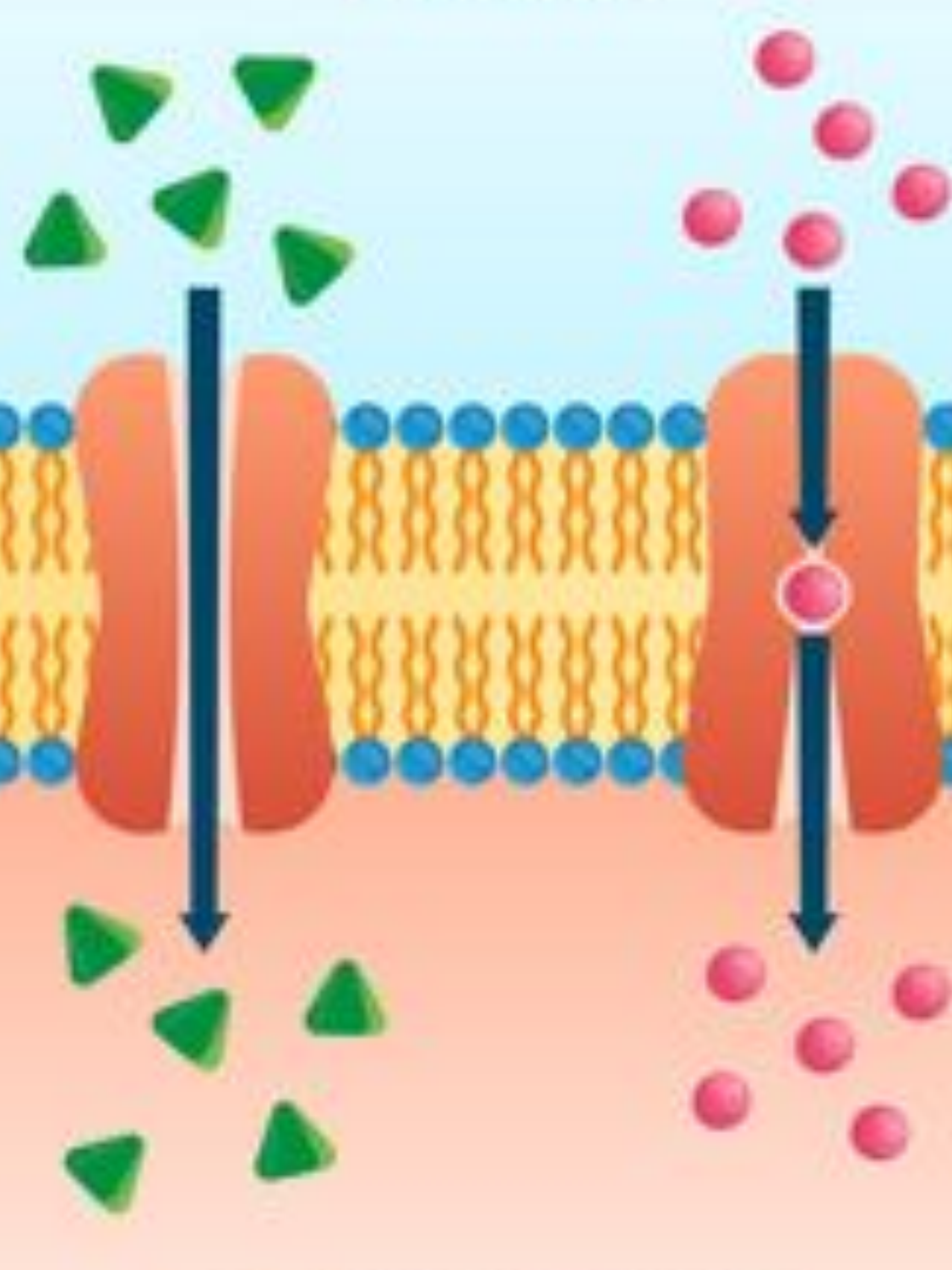
High Concentration  
Gradient



Low Concentration  
Gradient

### FACILITATED DIFFUSION

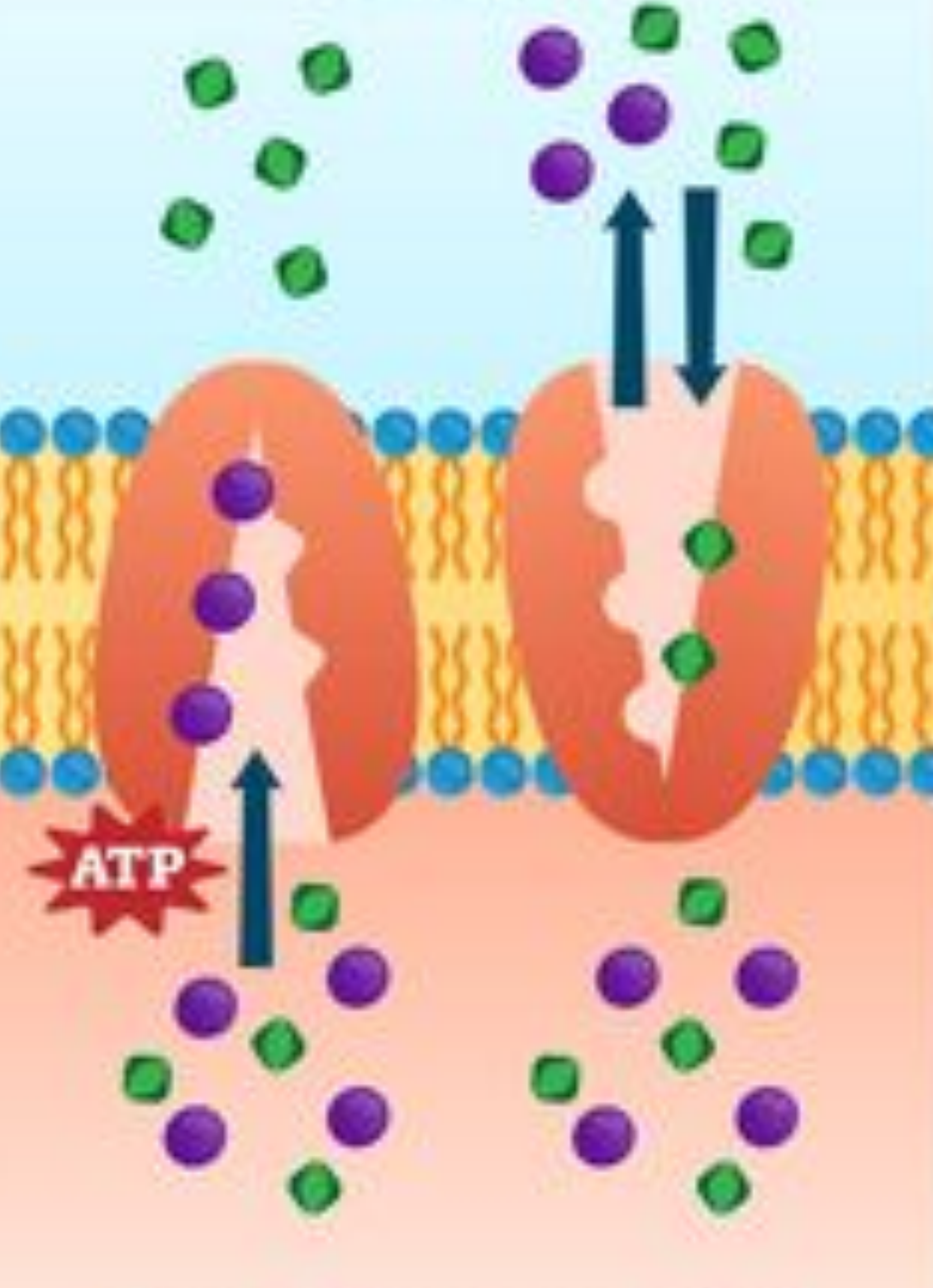
High Concentration  
Gradient



Low Concentration  
Gradient

## ACTIVE TRANSPORT

Low/High Concentration  
Gradient



High/Low Concentration  
Gradient





*Let's Think:*

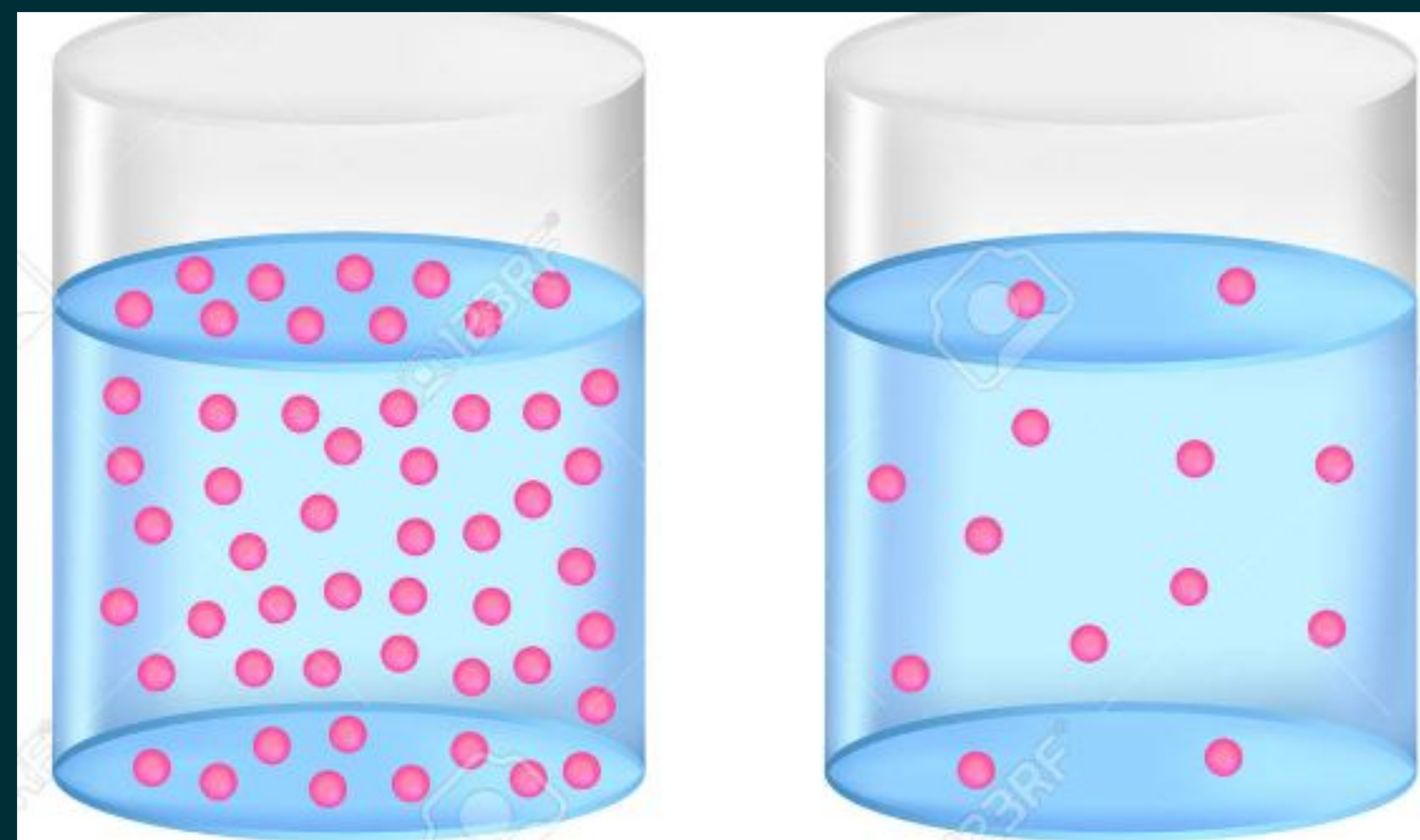
Do you know any types of Passive Transport?





# Diffusion

- Diffusion is the movement of a substance from a **high concentration** to a **low concentration**.
- Concentration is the **amount of substance** in a **specific space**.
- Question: Which one of the beakers below has the HIGHEST concentration of substance?



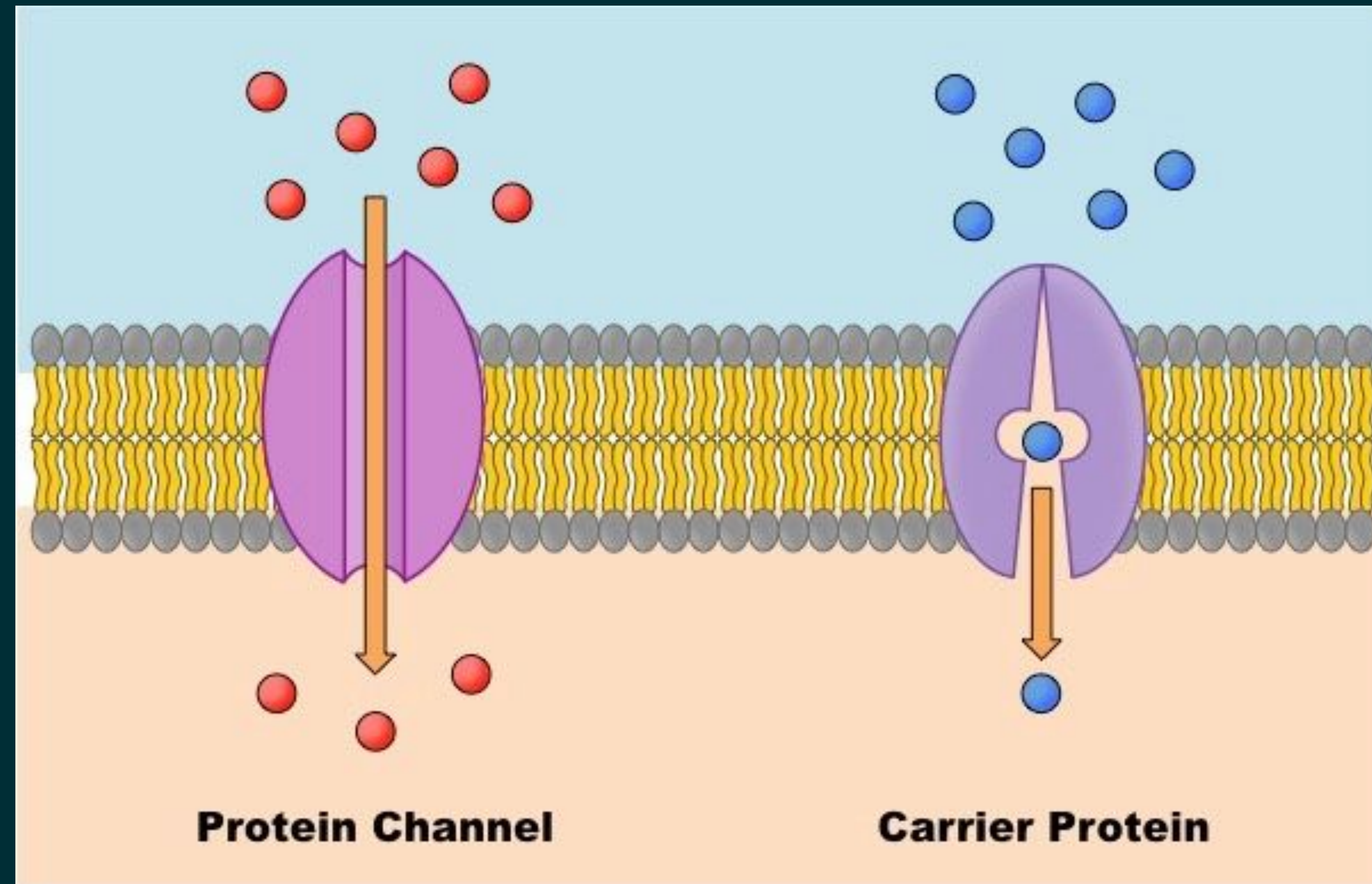


# Types of Diffusion

- There are different types of transport that move particles from **high** to **low concentration**.
- **Simple Diffusion:** Type of transport where particles are simply moved across one semi-permeable membrane. No assistance is required for the particles to move.
- **Facilitated Diffusion:** Type of transport where particles are moved across a semipermeable membrane **WITH** the help of certain cell membrane parts, such as proteins.



# Facilitated Diffusion







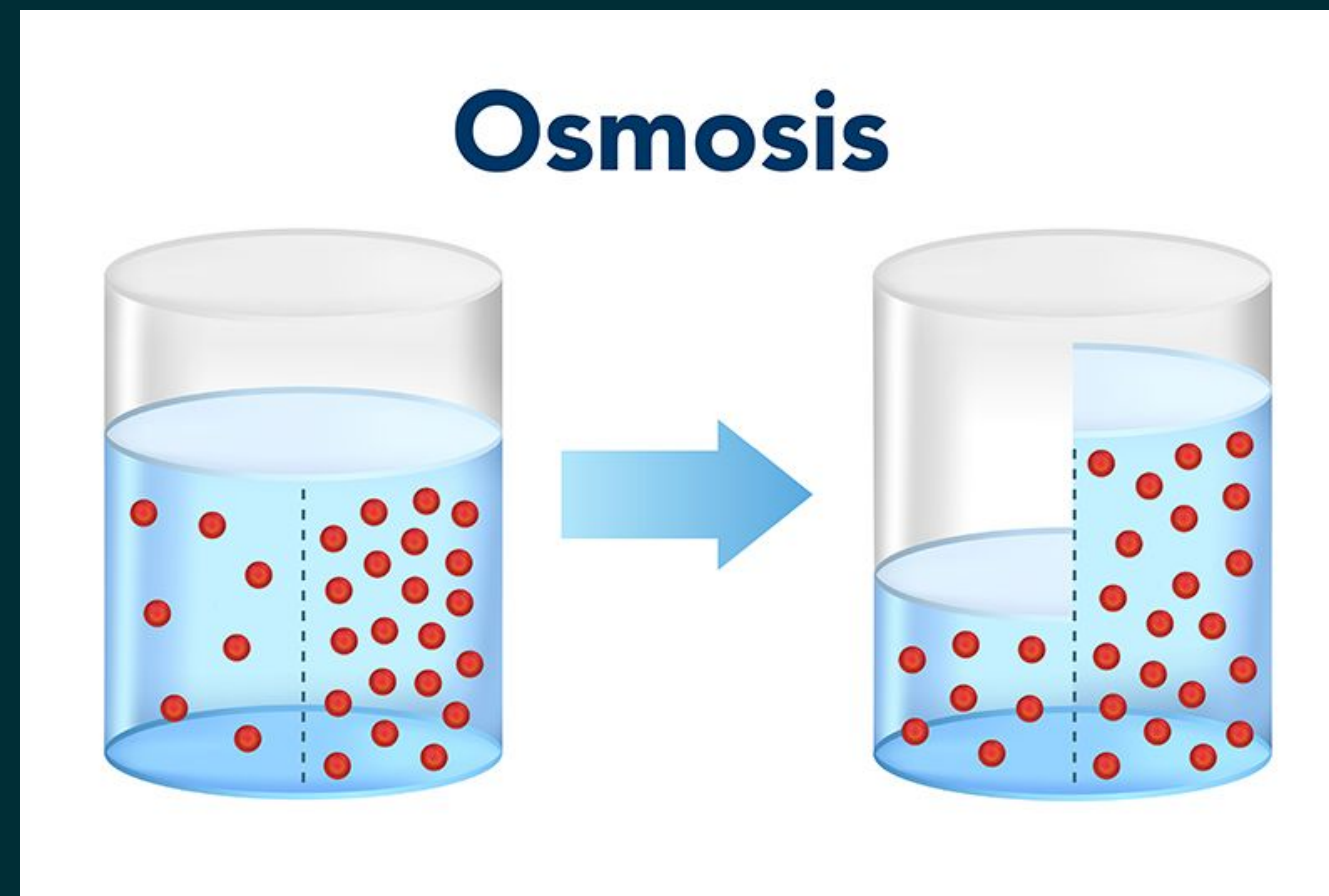
*Let's Think:*

How do you think water moves in and out of our cells,  
through Active Transport or Passive?

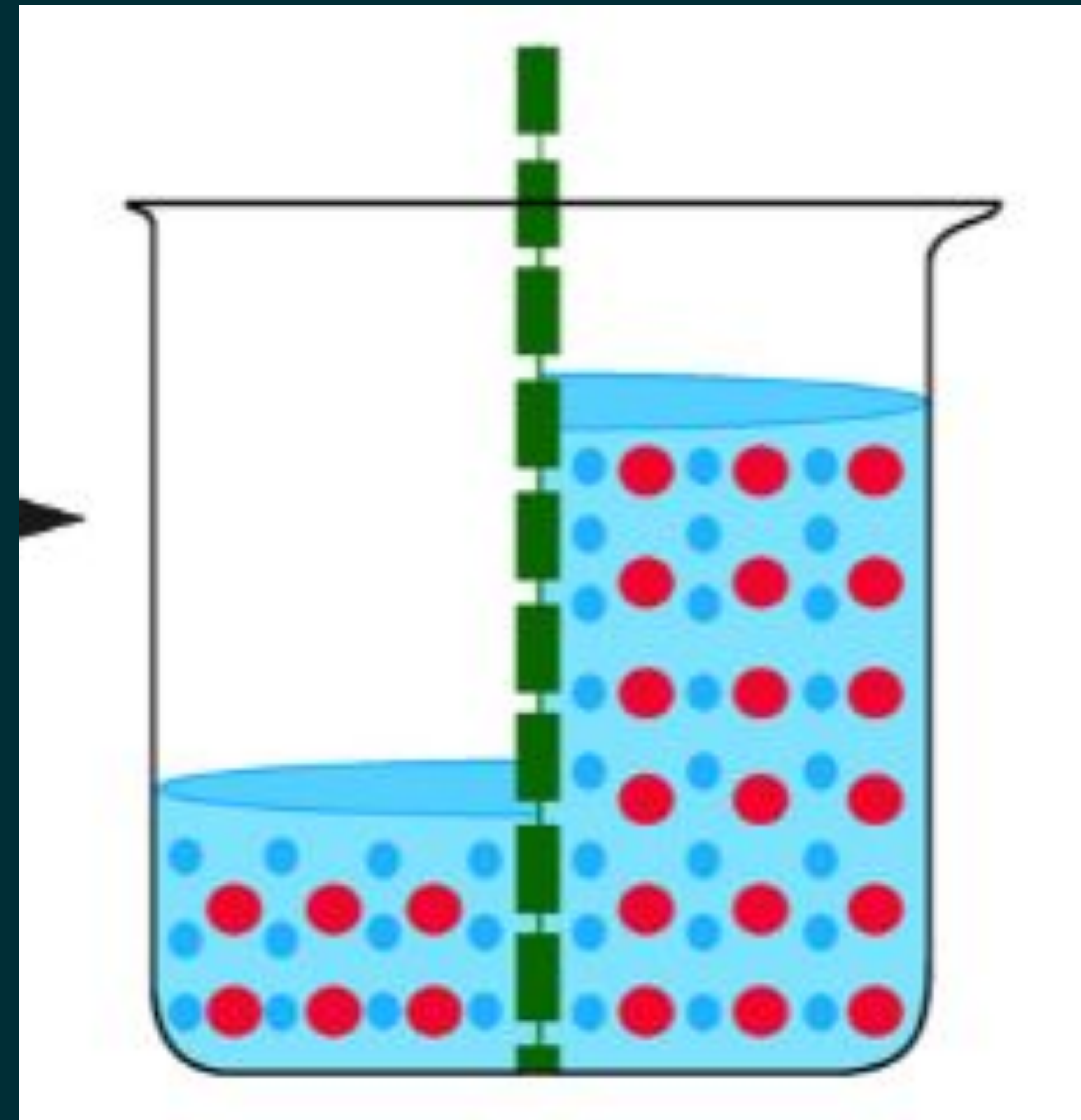
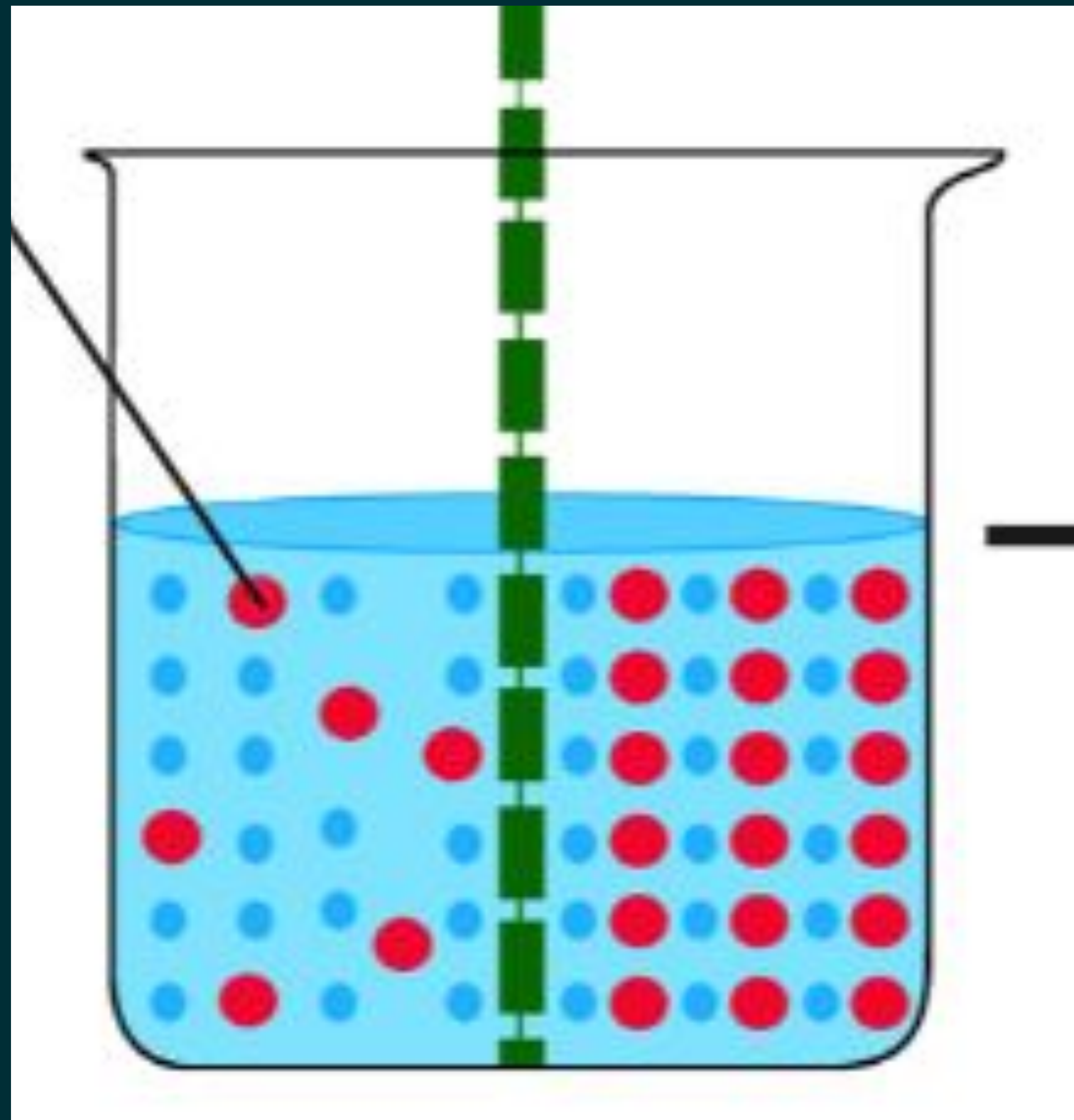


# Osmosis

- The total movement of **water molecules** across a semipermeable membrane from an area of **low SOLUTE concentration** to an area of **high SOLUTE concentration**?
- Remember: Osmosis is the movement of WATER MOLECULES not the particles dissolved in the water!











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# Questions?





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Now let's take a look at our experiment!  
What do you guys see?



This is because the saltwater/sugar has a higher concentration of salt/sugar than the pure water in the potato/strawberry.

So, some water seeps out of the potato/strawberry by osmosis, to balance the concentration inside and outside of the potato/strawberry.





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Now that we've finished our activity,  
we can move onto some Reflection  
Questions!



# Reflection Questions

1. What happened when you placed the potato/strawberry into the salt/sugar solution? Hint: Something to do with Osmosis!
2. What do you think would happen if we used MORE sugar/salt in our solution?
3. How do you think the science we analyzed today is used in the real world?
4. Did you have fun?





**Thank you for attending our classes this year!**

We hope you enjoyed the experiments and learned about new topics in STEM. We believe that you all can use your gift of knowledge to advance our world in the future by being the next generation of scientists!



**Thank you for an amazing session!**

Visit our website, **futureforyoungscientists.org**.

If you have any photos from this week, please share these with us by email ([futureforyoungscientists@gmail.com](mailto:futureforyoungscientists@gmail.com)) or Facebook, as we would like to be able to share everyone's experience.