LESSON 3:
MOVING CELLULAR MATERIAL

STANDARDS

- 7.LS1.2
  - CONDUCT AN INVESTIGATION TO DEMONSTRATE HOW THE CELL MEMBRANE MAINTAINS HOMEOSTASIS THROUGH THE PROCESS OF PASSIVE TRANSPORT.

I CAN...

- DESCRIBE HOW CELLS TRANSPORT MATERIALS.

ESSENTIAL QUESTIONS

- HOW DO MATERIALS ENTER AND LEAVE CELLS?
- HOW DOES CELL SIZE AFFECT THE TRANSPORT OF MATERIALS?

PHENOMENON

- A STUDENT DEVELOPS A MICROSCOPE SLIDE TO OBSERVE THE CELLS OF AN UNKNOWN SUBSTANCE. THEY NOTICE THAT THE CELLS SEEM TO BE CHASING SOMETHING AND THEN THAT MATERIAL DISAPPEARS.

PASSIVE TRANSPORT

- A CELL MEMBRANE IS SEMIPERMEABLE, WHICH MEANS THAT IT ALLOWS ONLY CERTAIN SUBSTANCES TO ENTER OR LEAVE A CELL.
- PASSIVE TRANSPORT IS THE MOVEMENT OF SUBSTANCES THROUGH A CELL MEMBRANE WITHOUT USING THE CELL'S ENERGY.

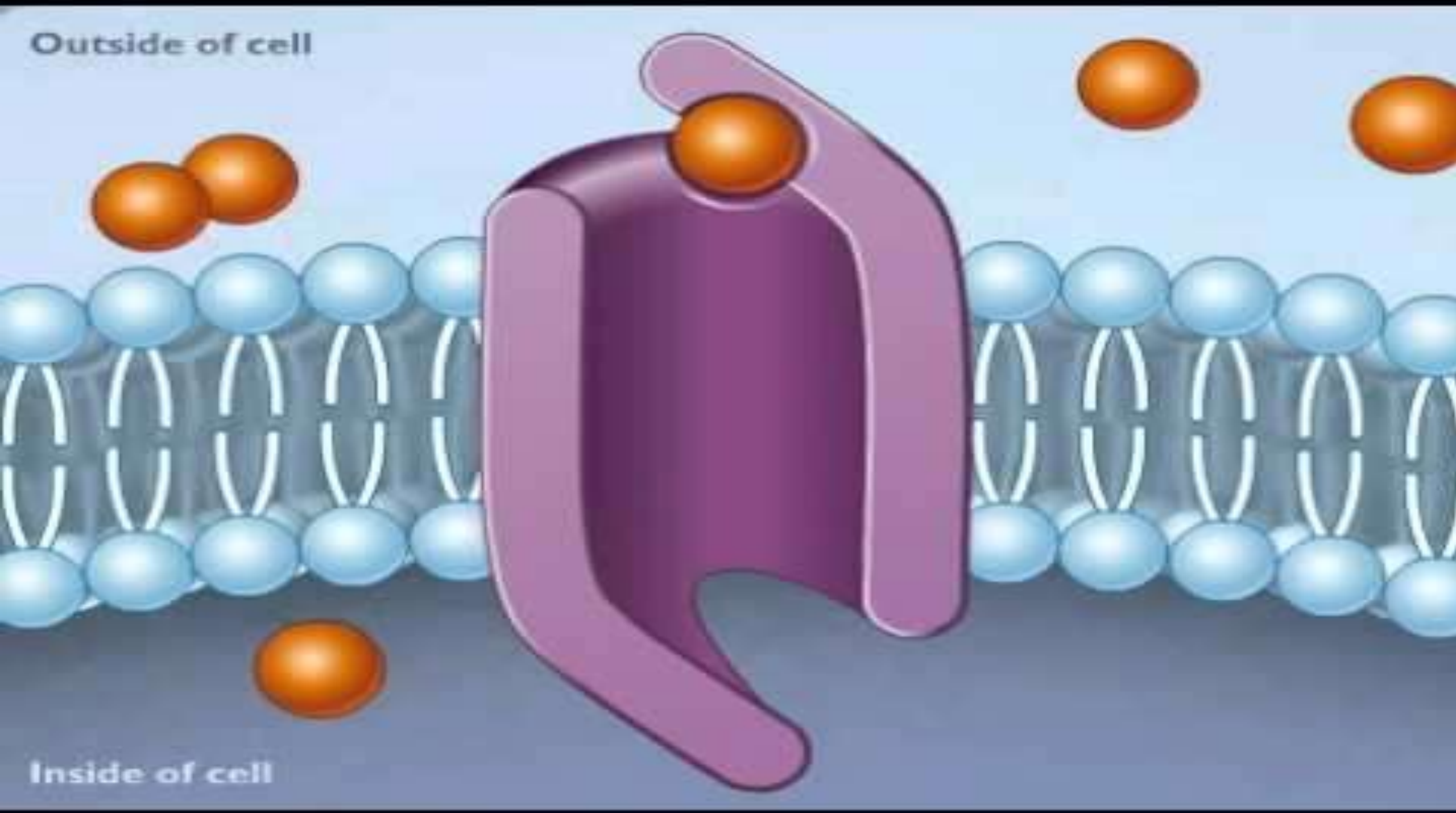
DIFFUSION

- DIFFUSION IS THE MOVEMENT OF SUBSTANCES FROM AN AREA OF HIGHER CONCENTRATION TO AN AREA OF LOWER CONCENTRATION.
- USUALLY DIFFUSION CONTINUES THROUGH A MEMBRANE UNTIL THE CONCENTRATION OF A SUBSTANCE IS THE SAME ON BOTH SIDES OF THE MEMBRANE.

Diffusion

The spread of cats through random motion from regions of higher concentration to regions of lower concentration.

Why can we smell hot food from a distance?

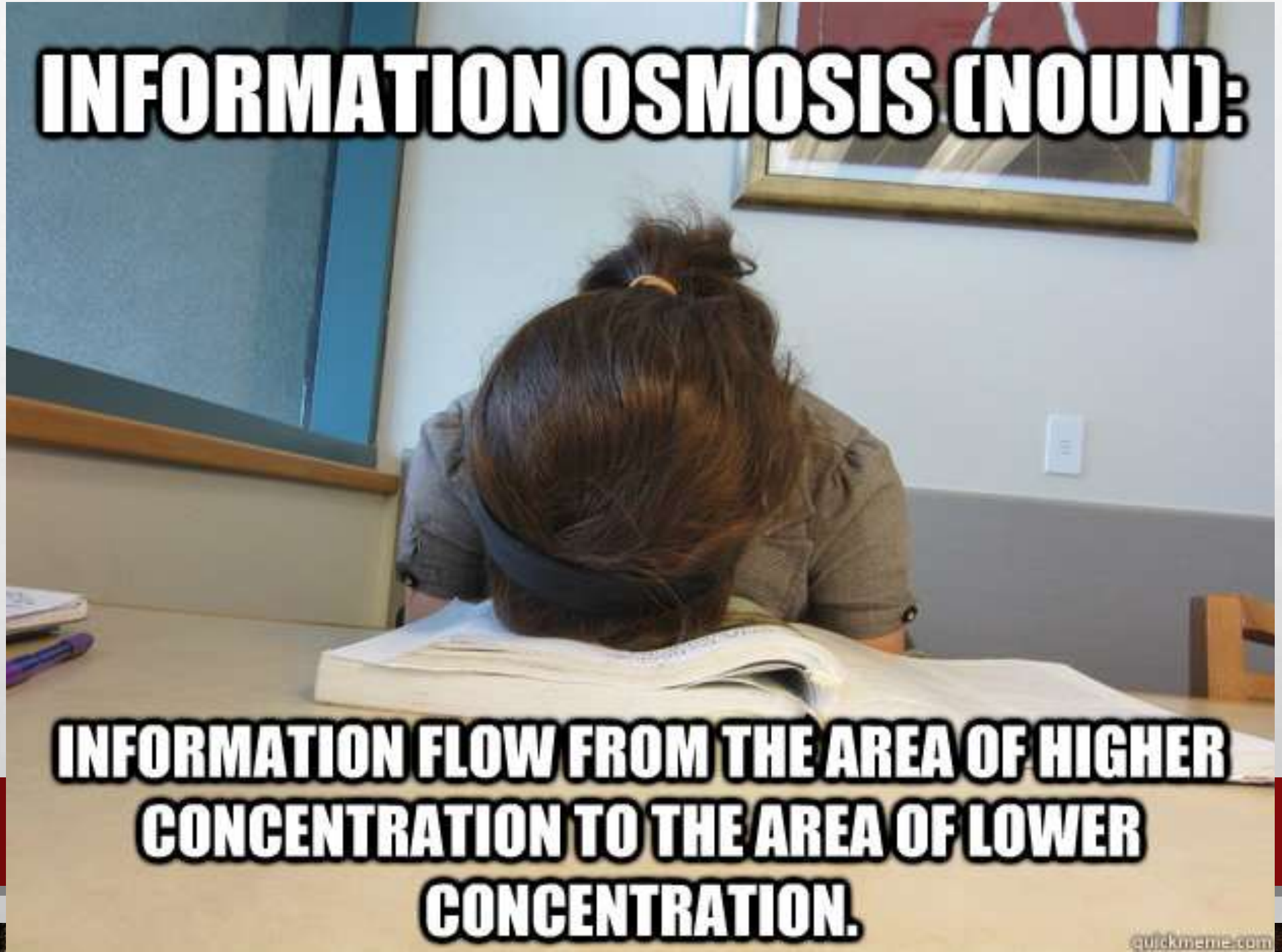

Outside of cell
Inside of cell

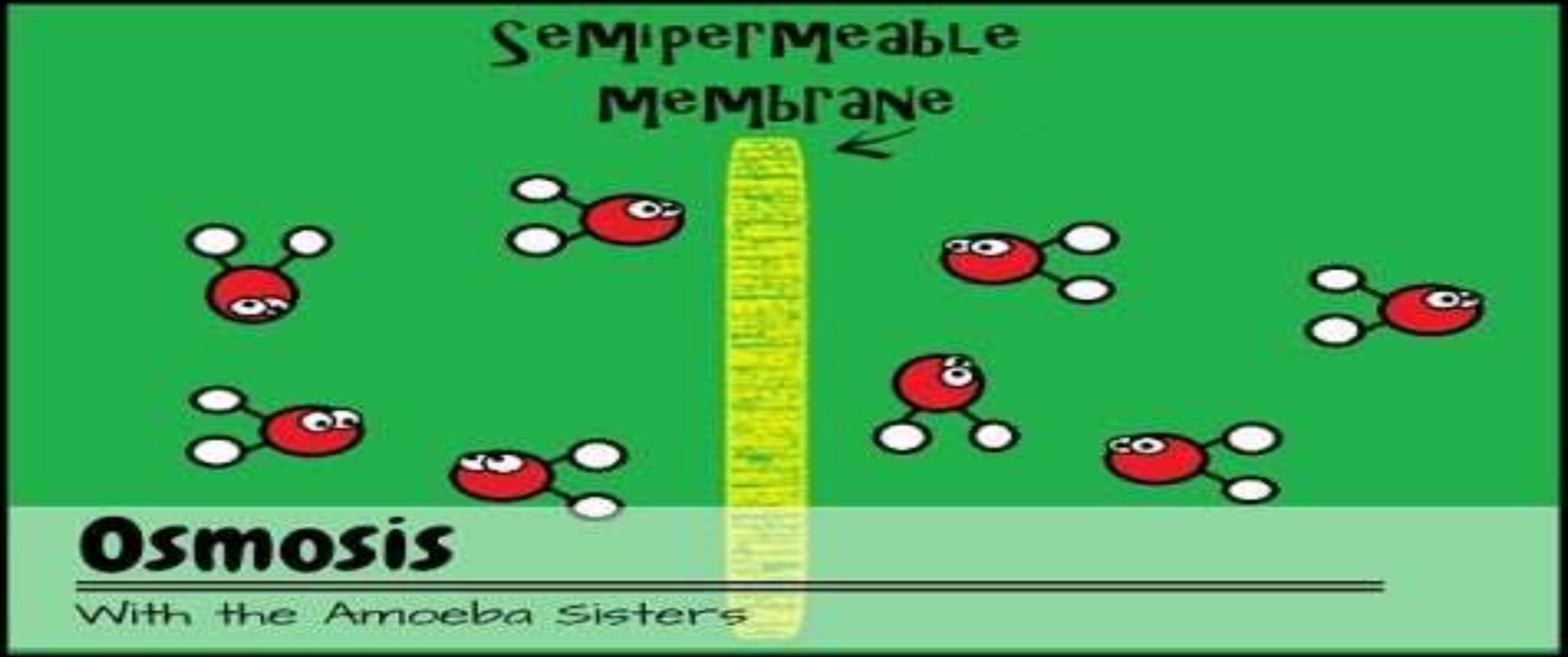
OSMOSIS – THE DIFFUSION OF WATER

- OSMOSIS IS THE DIFFUSION OF WATER MOLECULES ONLY THROUGH A MEMBRANE.
- IF THE CONCENTRATION OF WATER IN THE AIR SURROUNDING A PLANT IS LESS THAN THE CONCENTRATION OF WATER INSIDE THE PLANT'S VACUOLES, WATER WILL DIFFUSE INTO THE AIR UNTIL THE CONCENTRATIONS ARE EQUAL.

OSMOSIS – THE DIFFUSION OF WATER

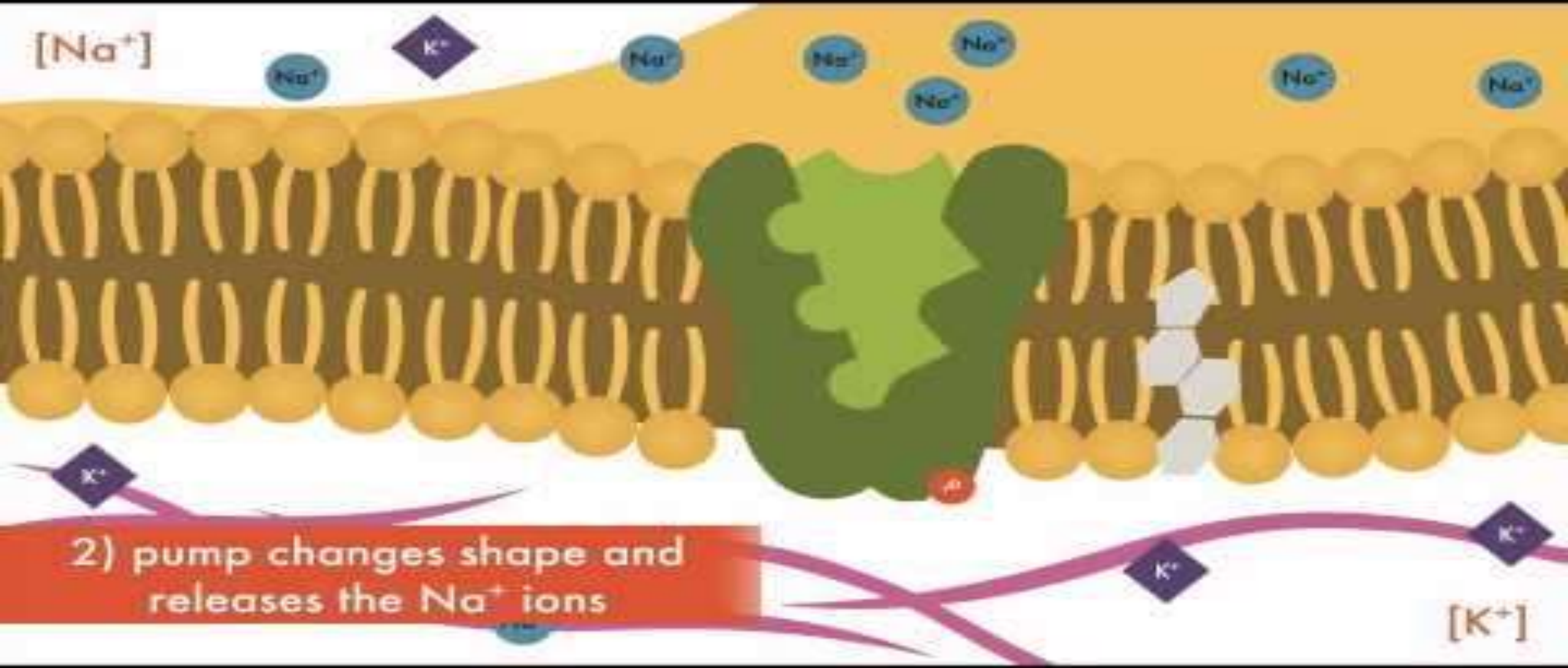
- FACILITATED DIFFUSION ALLOWS MOLECULES TO PASS THROUGH A CELL MEMBRANE USING TRANSPORT PROTEINS.
- CARRIER PROTEINS CARRY MOLECULES THROUGH THE CELL MEMBRANE.
- CHANNEL PROTEINS ALLOW IONS TO PASS THROUGH THE CELL MEMBRANE.


INFORMATION OSMOSIS (NOUN):
INFORMATION FLOW FROM THE AREA OF HIGHER CONCENTRATION TO THE AREA OF LOWER CONCENTRATION.
quickmeme.com


SeMipeRMeaBLe
MeMBRaNe
Osmosis
With the Amoeba Sisters

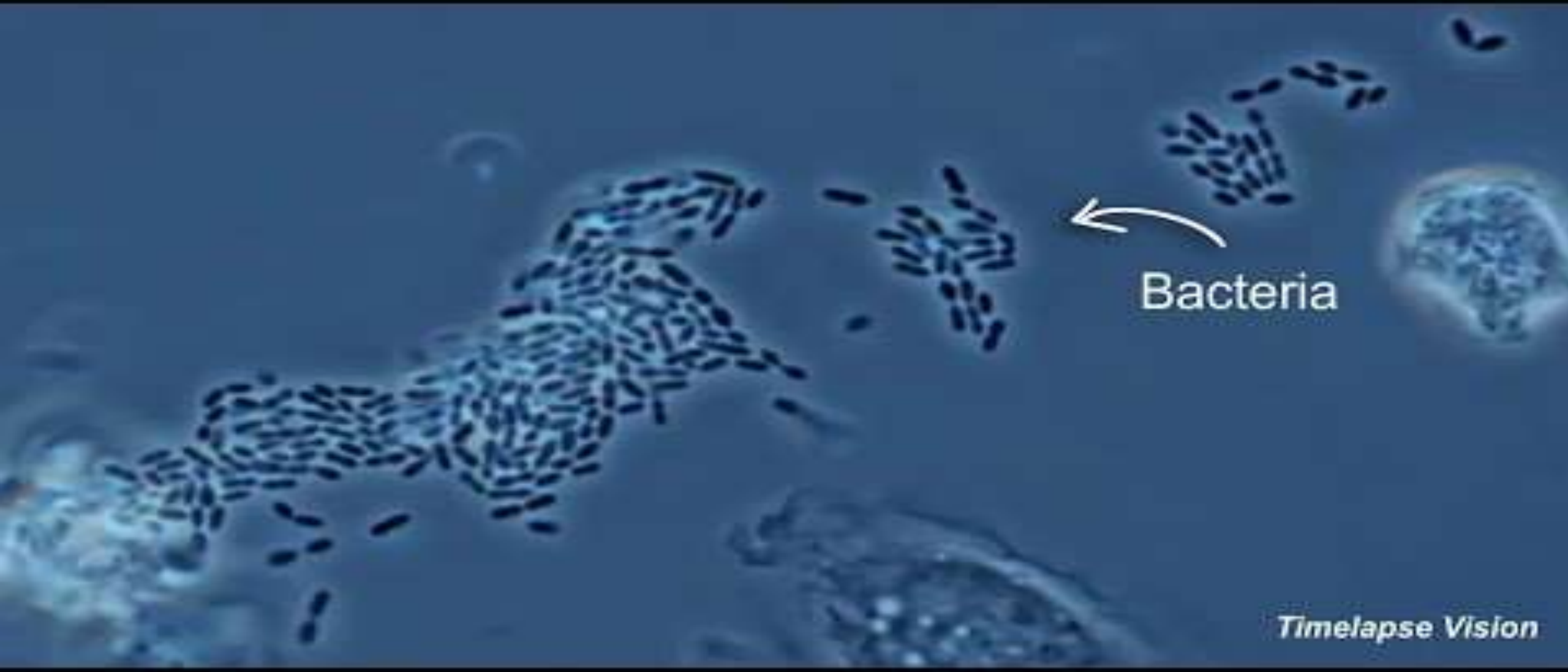
ACTIVE TRANSPORT

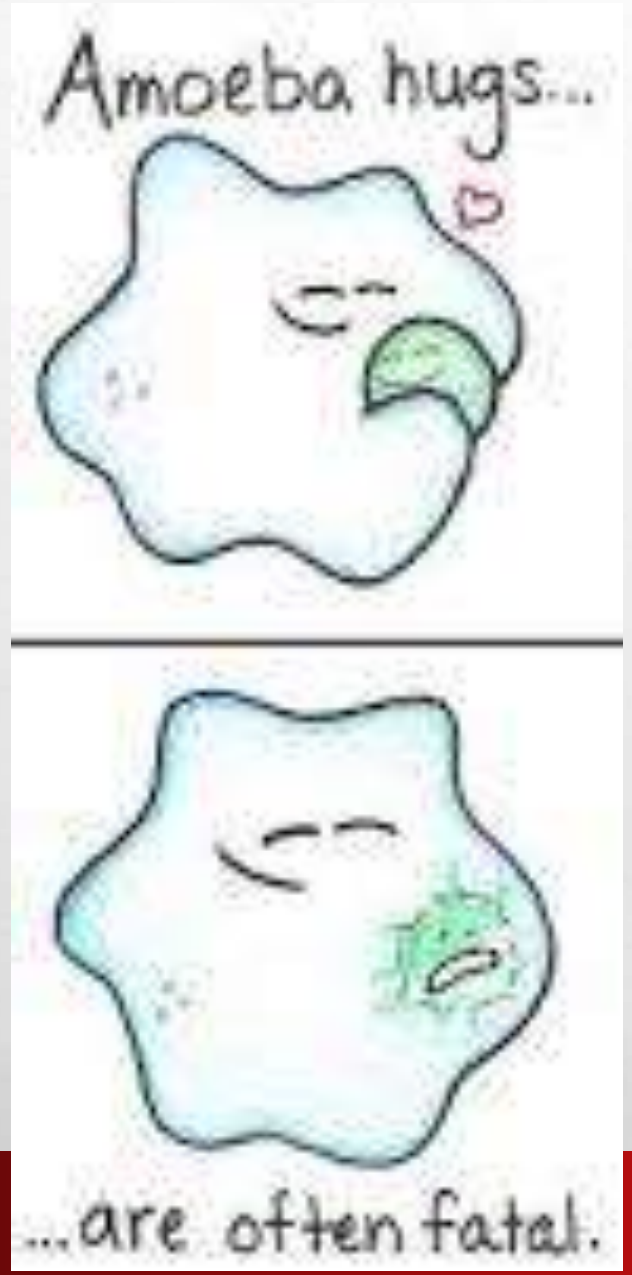
- ACTIVE TRANSPORT USES THE CELL'S ENERGY TO MOVE SUBSTANCES THROUGH A CELL MEMBRANE.
- ACTIVE TRANSPORT MOVES SUBSTANCES FROM AREAS OF LOWER CONCENTRATION TO AREAS OF HIGHER CONCENTRATION.

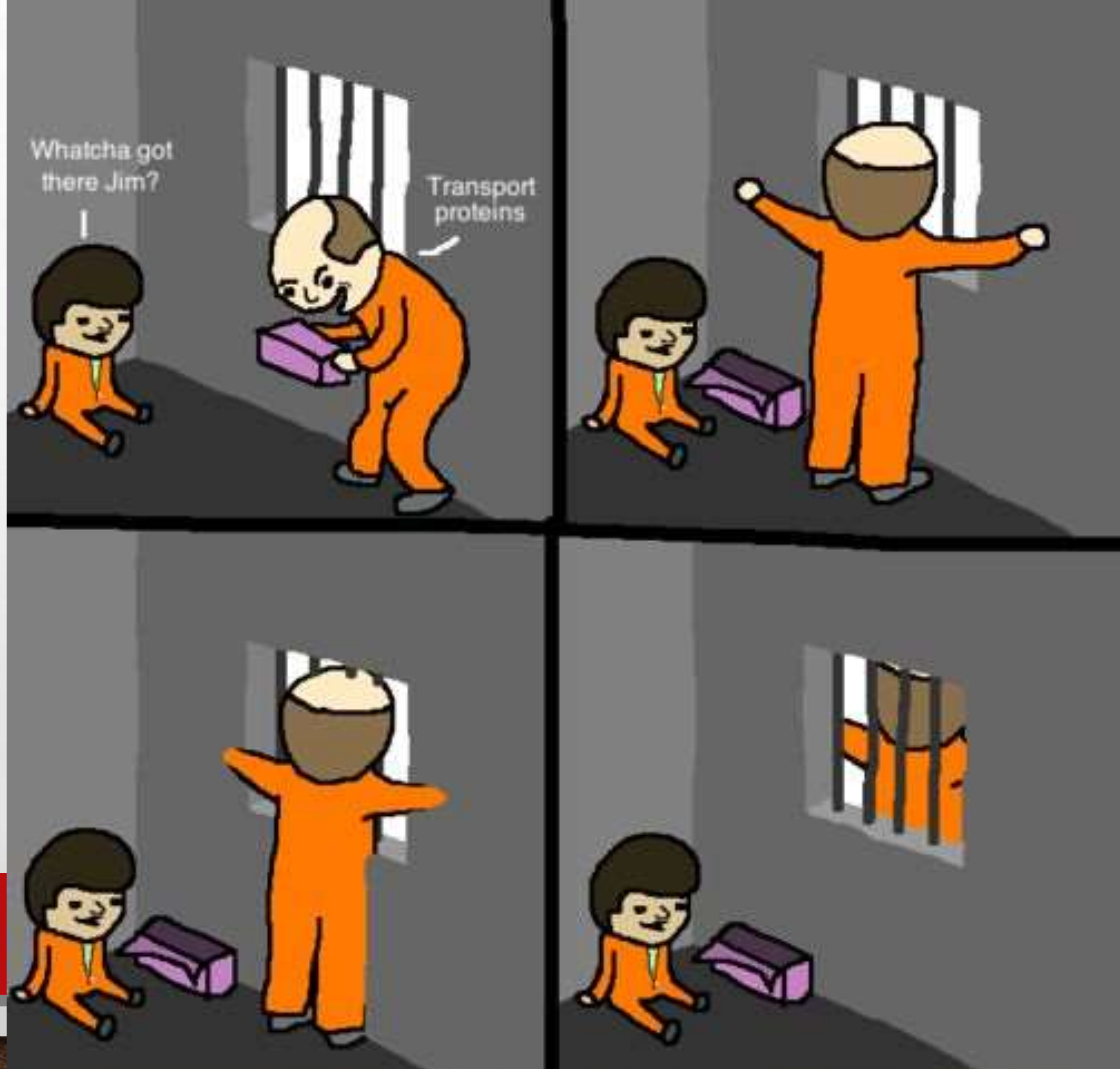

[Na+]
Na+
K+
Na+
Na+
Na+
Na+
Na+
Na+
K+
K+
K+
[K+]
2) pump changes shape and releases the Na+ ions

ACTIVE TRANSPORT

- A CELL USES ENDOCYTOSIS TO TAKE IN A SUBSTANCE BY SURROUNDING IT WITH THE CELL MEMBRANE.
- A CELL'S VESICLES RELEASE THEIR CONTENTS OUTSIDE THE CELL DURING EXOCYTOSIS.

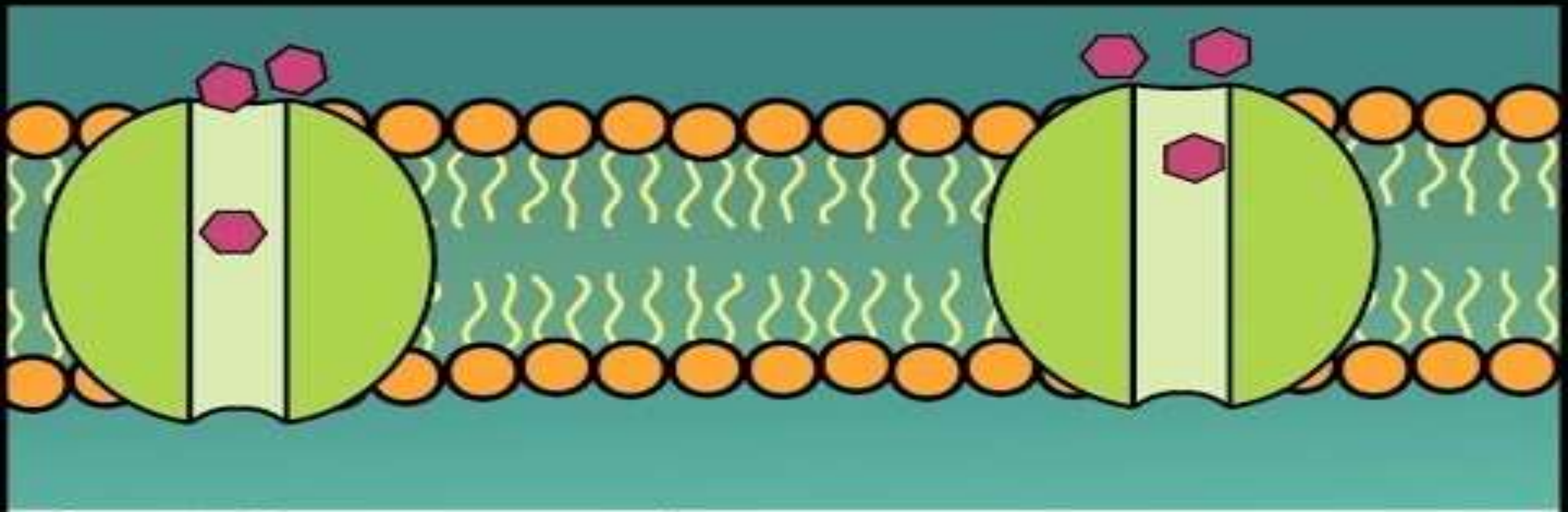

Bacteria
Timelapse Vision


Amoeba hugs...
...are often fatal.


Whatcha got there Jim?
Transport proteins

CELL SIZE AND TRANSPORT

- FOR A CELL TO SURVIVE, ITS SURFACE AREA MUST BE LARGE COMPARED TO ITS VOLUME.
- AS A CELL GROWS, ITS VOLUME INCREASES FASTER THAN ITS SURFACE AREA.



Cell Transport

with the Amoeba Sisters

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