
LIVE
BIOTONIC NEET
NEET 2023 | TERM 2 - CLASS 11TH
Transport in Plants
L-1
MEANS OF TRANSPORT
Vedantu
MASTER TEACHER
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Living a dream, Indian by religion, Teacher by choice, Naturalist by heart, Nomad by spirit. Equaliser by experience, Grateful by divine grace.
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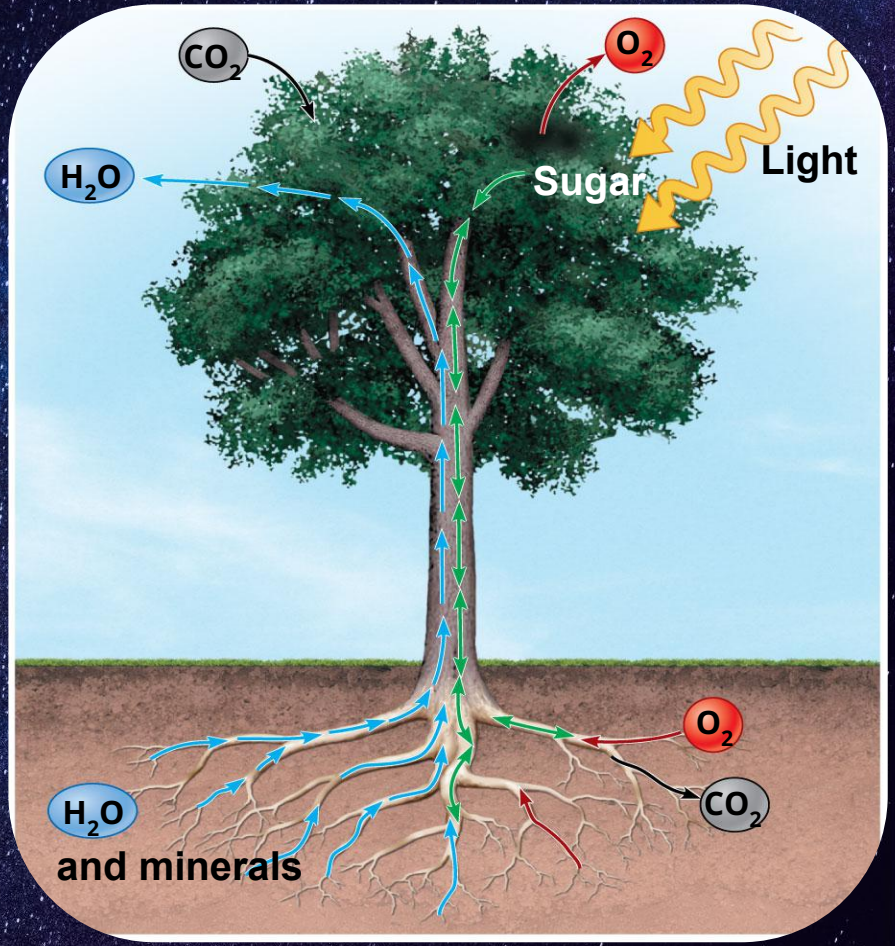
TRANSPORT IN PLANTS

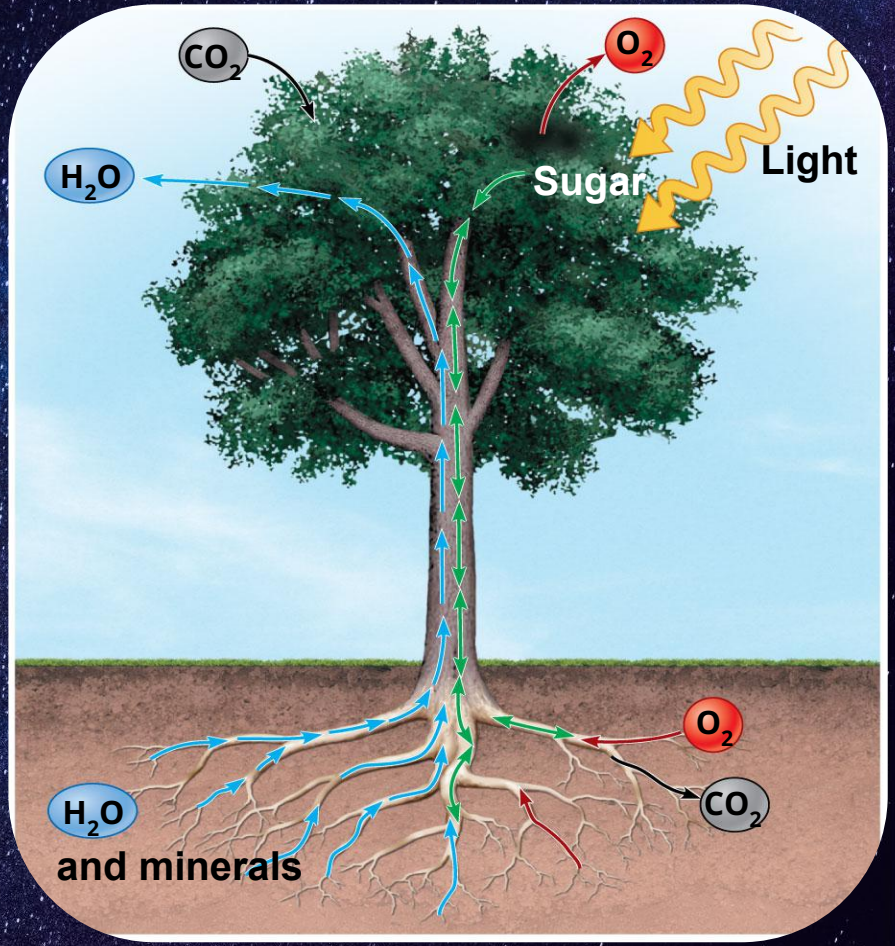
- ✓ **Transportation** is a vital process in plants
- ✓ Plants acquire their **nutrients** from **soil** and **air**
- ✓ As a plant grows
- ✓ Its roots **absorb water**, **minerals,** and some O_2 from the soil
- ✓ Its leaves absorb CO_2 from the air

Stephen Hales (1727) is known as 'Father of plant physiology'.



TRANSPORT IN PLANTS

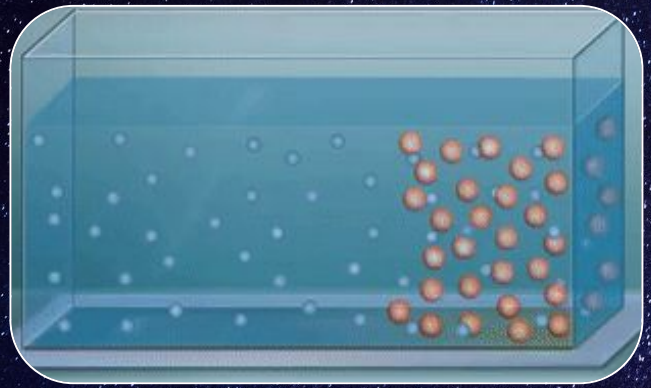
- The sugars made by plants during photosynthesis use **carbon** and **oxygen** from the atmosphere and **hydrogen** from **water.**
- Plants use **cellular respiration** to break some of these **sugars** obtaining energy and **consuming oxygen.**

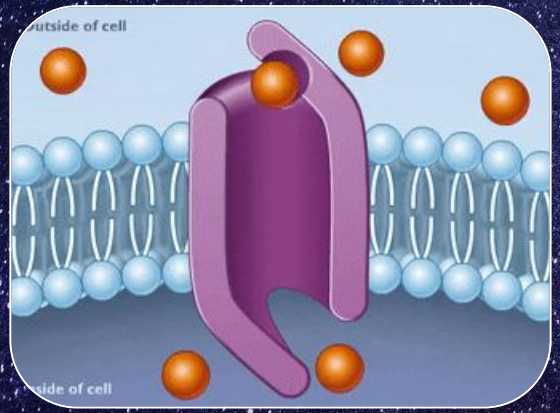


Means of Transportation in Plants

- There are three means of transportation in plants.

Diffusion | **Facilitated Diffusion** | **Active Transport**





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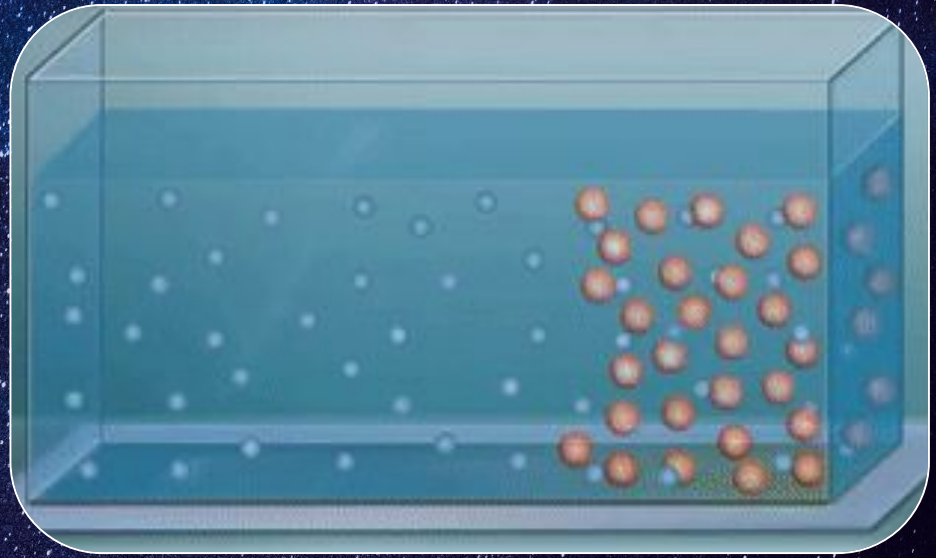
DIFFUSION

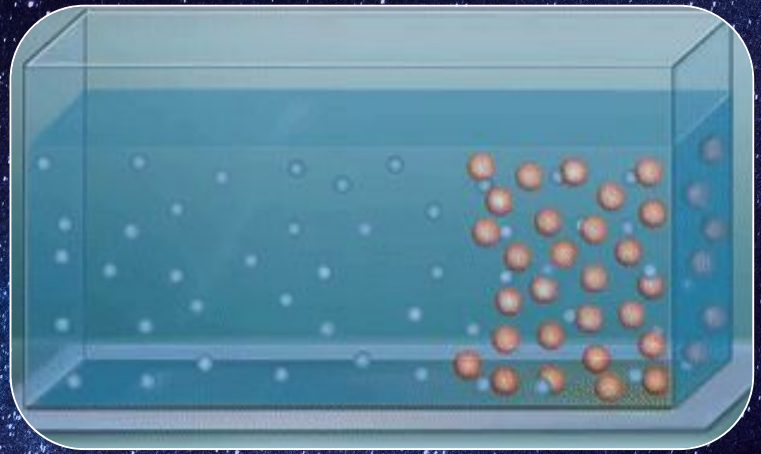
It is passive, slow process, not dependent on living system and it is only means for gaseous movement within the plant and also for short distance movement.

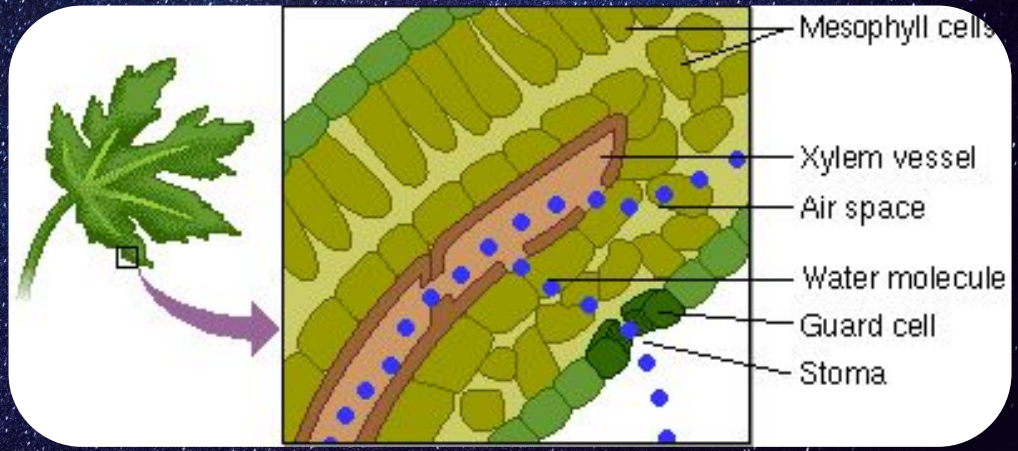
The movement of molecules of gases, Liquid & solid from the region of higher concentration to the region of lower concentration is called diffusion.



DIFFUSION

- The diffusion is the only means of transport for gases in case of plants.
- The rate of diffusion depends on the temperature, pressure, and mainly on a gradient of concentration.





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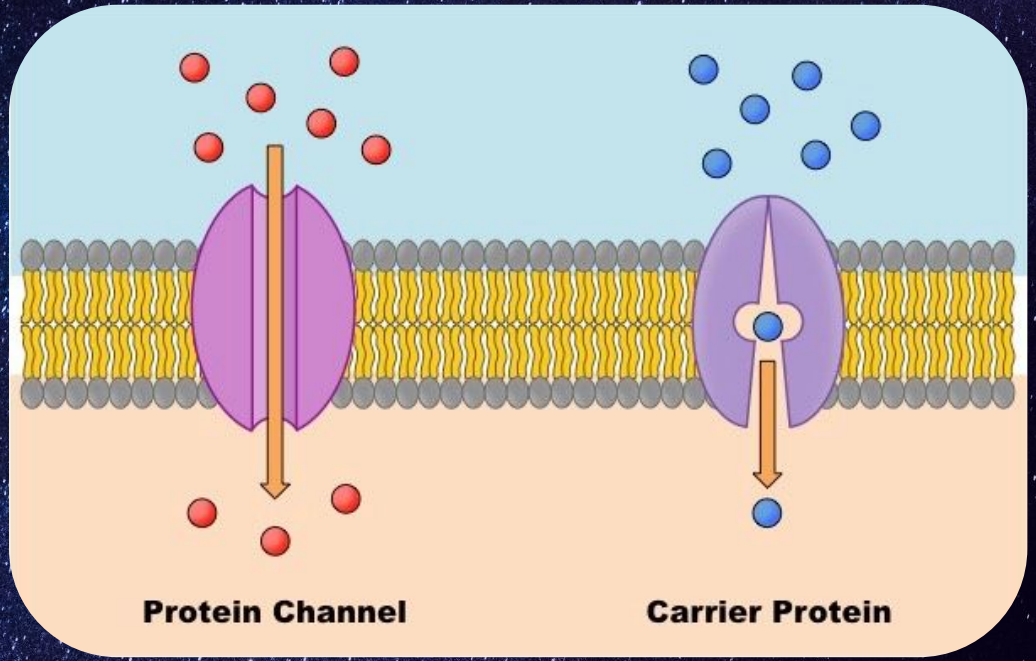
SIGNIFICANCE OF DIFFUSION

- ✓ The exchange of gases (O_2 & CO_2) takes place through diffusion.
- ✓ Passive absorption of ions of mineral substances in plants.
- ✓ Evaporation of water from intercellular spaces during transpiration through diffusion.
- ✓ Distribution of hormones in plants through diffusion.
- ✓ Osmosis is a special type of diffusion.

FACILITATED DIFFUSION

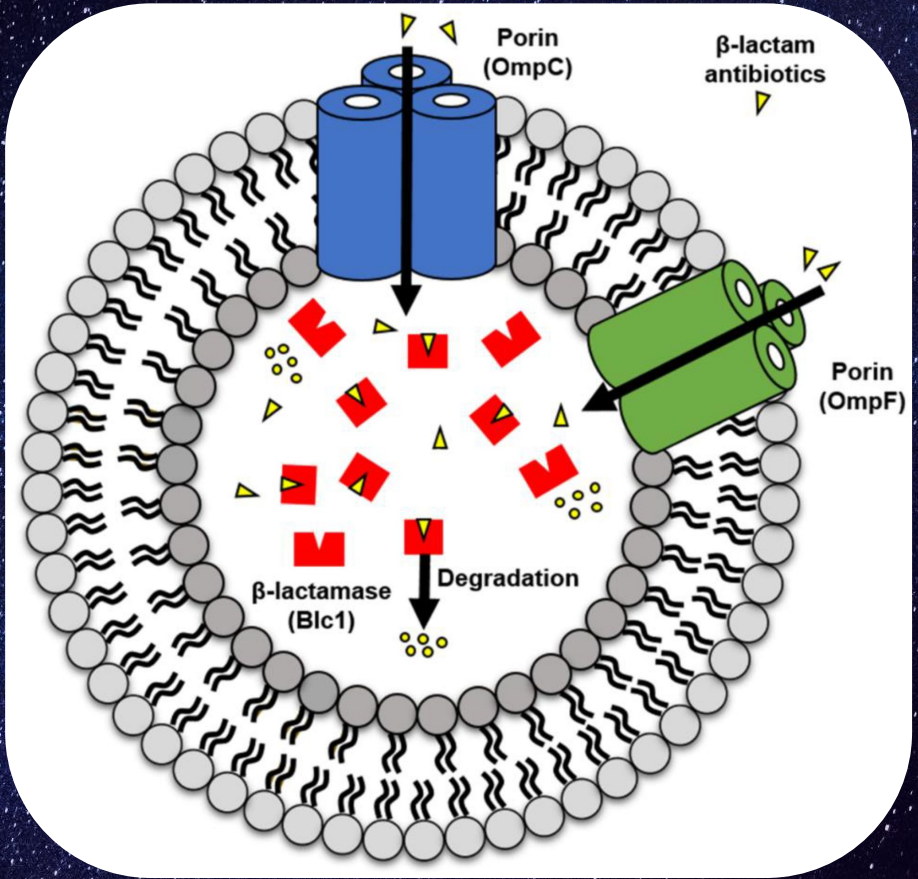
- **Facilitated diffusion** is a process by which molecules are transported across the **plasma membrane** with the help of **membrane proteins.**
- It takes place **without** the **expenditure of energy.**
- **Membrane proteins** are specific for the substance that is being transported.



FACILITATED DIFFUSION

Porins

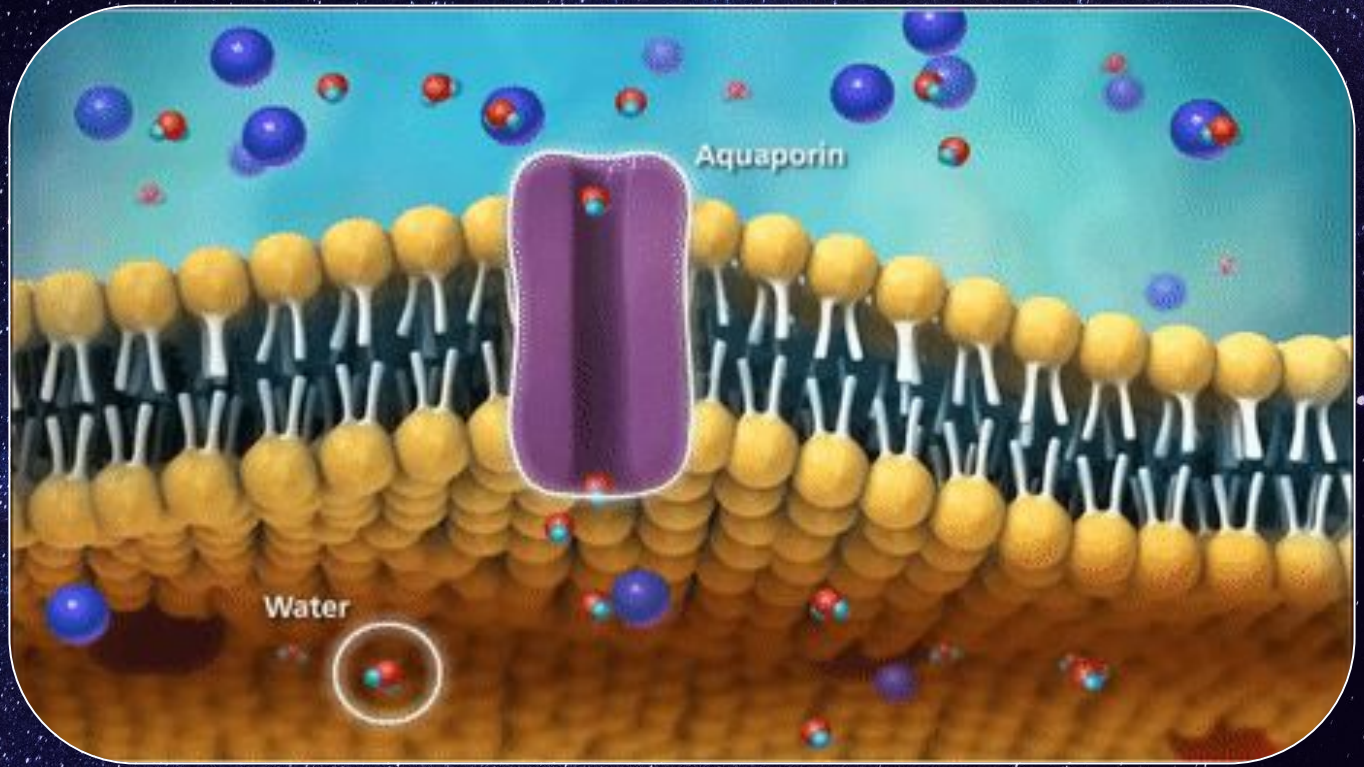
- Form huge **pores** in the outer membranes of the **plastids, mitochondria and some bacteria** allowing molecules up to the size of small proteins to pass through.



Facilitated Diffusion: AQUAPORINS

Aquaporins (AQP)

Are integral membrane proteins that serve as channels in the **transfer of water** across the membrane.



NEET
PRO-SUBSCRIPTION

11

2 YEARS COURSE DETAILS

NEET	SUBJECTS	LANGUAGE WITHIN VARIANT	CHAPTERWISE /MICRO COURSES	CRASH /REVISION JAN-FEB
GRADE 11 1 YEAR	PHY /CHEM /BIO	ENGLISH /HINDI	UNLIMITED	YES
GRADE 12 1 YEAR	PHY /CHEM /BIO	ENGLISH /HINDI	UNLIMITED	YES

COMPLEMENTARY – CBSE + NEET + KVPY CRASH COURSE

SESSIONS DETAILS

	SESSIONS PER WEEK	DURATION OF EACH SESSION
GRADE 11 1 YEAR	10	2 hrs
GRADE 12 1 YEAR	8	2 hrs

VANI MA'AMS CLASSES

	NUMBER OF BOOKS	MEDIUM OF BOOKS	MODE- PHYSICAL / E - BOOKS
GRADE 11 1 YEAR	14	ENGLISH	PHYSICAL BOOK & CHAPTER WISE VIDEOS-QR CODE
GRADE 12 1 YEAR	13	ENGLISH	PHYSICAL BOOK & CHAPTER WISE VIDEOS-QR CODE

MORE THAN 10K Q&A WITH SOLUTION VIDEOS-VIA QR CODE

PRACTICE TESTS

	GRADE – 11	GRADE – 12
NO. OF TESTS	20	20
PARTWISE	10	10
FULL SYLLABUS	10	10
FREQUENCY OF TEST E.G #WEEKLY	1 TEST EVERY 15 DAYS	1 TEST EVERY 15 DAYS

ASSIGNMENT AFTER EACH SESSION – OBJECTIVE

BATCH DETAILS

	SECTION SIZE- CT (LOWEST TOUCH POINT)
GRADE 11 1 YEAR	**150**
GRADE 12 1 YEAR	**150**

PERSONALISED ATTENTION OF CT

IN - CLASS DOUBT

POST CLASS - VIA CHAT

DOUBT TIME	NO. OF DOUBTS
8:00 AM - 11:00 PM	50 PER DAY

INDIA'S MOST INNOVATIVE LIVE LEARNING SYSTEM

WHAT YOUR CHILD GETS IN CLASS

LIVE INTERACTIVE CLASSES
(Innovative LIVE classes to create a healthy peer learning environment)

STUDENT

ENGAGING 3D CONTENT
(Dynamic 3D imagery providing an immersive experience)

VERBAL INTERACTION
(LIVE communication between students and teachers)

INTERACTIVE QUIZZES & TESTS
(Fun learning elements to keep students engaged)

WHAT YOUR CHILD GETS AFTER CLASS

DOUBT SUPPORT
(Solve doubts on our Doubt App)

REGULAR ALL-INDIA MOCK TESTS
(Test pattern based on actual exams & previous years' papers)

ASSIGNMENTS
(Objective & Subjective)

REVISION CLASSES
(Extra classes, YT, Webinars & Micro Courses)

RECORDED CLASSES
(Video Recordings of classes for additional support)

HANDWRITTEN CLASS NOTES BY MASTER TEACHERS
(Downloadable)

TATVA BOOKS
(Offline study & practice material)

PARENT TEACHER MEETINGS
(Virtual sessions to discuss progress)

NEET - PRO SUBSCRIPTION PRICES

ONE MONTH PRICE

~~₹1,700~~ — ₹750

NEET PRO SUBSCRIPTION PRICES

TOTAL PRICE - 750/month

8 hrs x 2 hrs = 16 hrs/week

4 weeks

16 hrs x 4 = 64 + 12 = 76 hrs

750/₹
76 hrs

2 Test/month

3 hrs x 2 = 6 hrs x 2 = 12 hrs

1 test in every 15 day

NEET PRO SUBSCRIPTION PRICES

Doubt — 8:00 am to 11:00 am

15 hrs x 30 = 450 hrs

450 hrs + 76 = 526

$$\frac{750/rs}{526} = 1.42₹/hrs$$

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Facilitated Diffusion: AQUAPORINS

Uniport

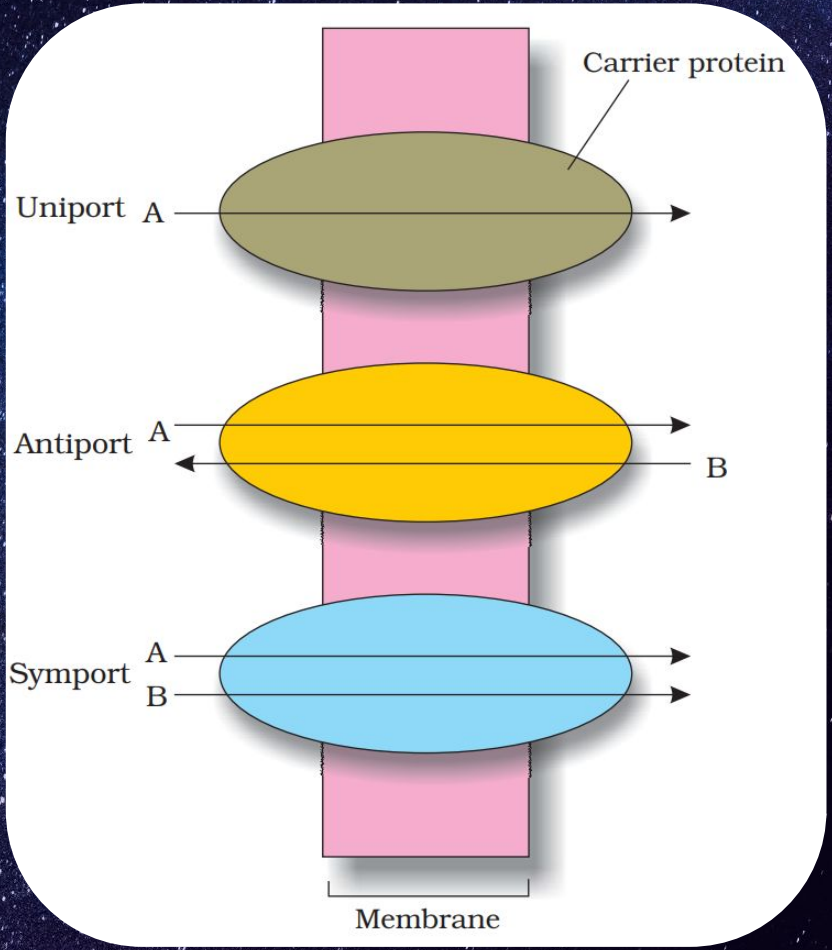
- A protein involved in moving only one molecule across a membrane

Symport

- Proteins that move two molecules in the same direction across the membrane

Antiport

- If two molecules are moved in opposite directions across the membrane



ACTIVE TRANSPORT

- Transport proteins, can move solutes **against** their **concentration gradients**
- Active transport requires **energy**, usually in the form of **ATP**
- It is performed by **specific proteins** embedded in the membranes
- Active transport allows cells to maintain **concentration gradients that differ from their surroundings**

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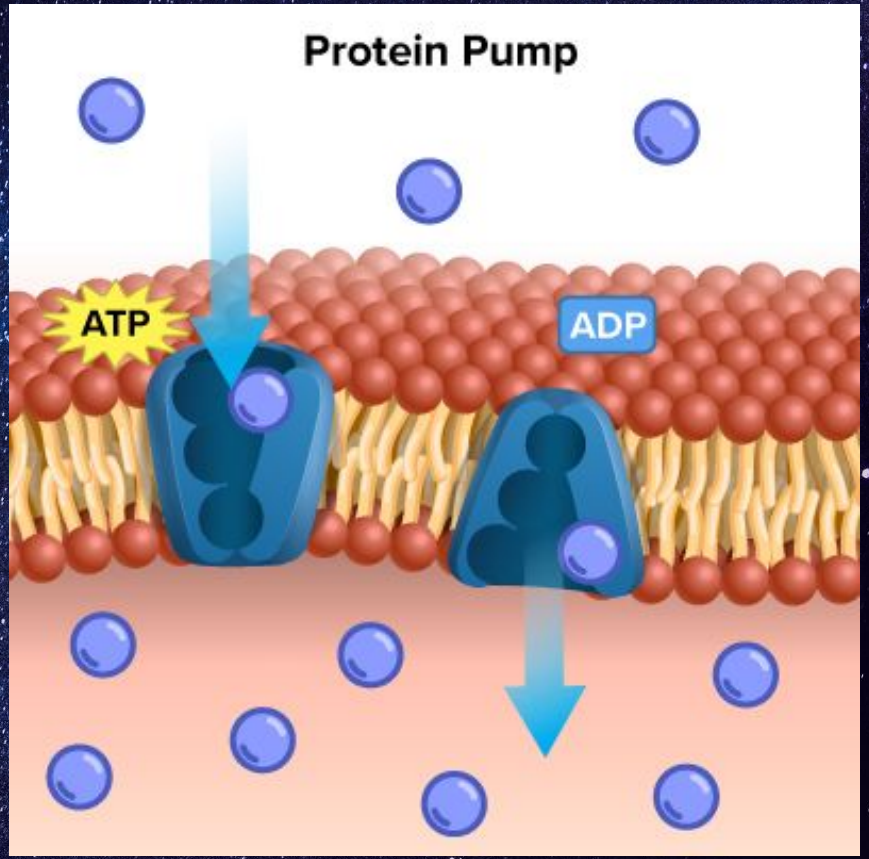
ACTIVE TRANSPORT

- It is carried out by membrane-proteins.
- Pumps are proteins that use energy to transport substances across cell membrane **(uphill' transport).**
- Transport rate reaches a maximum when all protein transporters are being used (saturated).
- The carrier protein is very specific. These are sensitive to inhibitors that react with protein side chains



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COMPARISON OF DIFFERENT TRANSPORT PROCESSES

Property	Simple Diffusion	Facilitated Transport	Active Transport
Requires special membrane proteins	No	Yes	Yes
Highly selective	No	Yes	Yes
Transport saturates	No	Yes	Yes
Uphill transport	No	No	Yes
Requires ATP energy	No	No	Yes

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PERMEABILITY

Exchange of different substances from plasma membrane is called permeability. On the basis of permeability, membranes are of four type

- **Permeable membrane:** It is permeable for the both solute and solvent e.g. cellulosic cell wall.
- **Impermeable membranes:** They inhibit the diffusion of both solute & solvent particles through them. e.g. cutinised or suberised cell walls.

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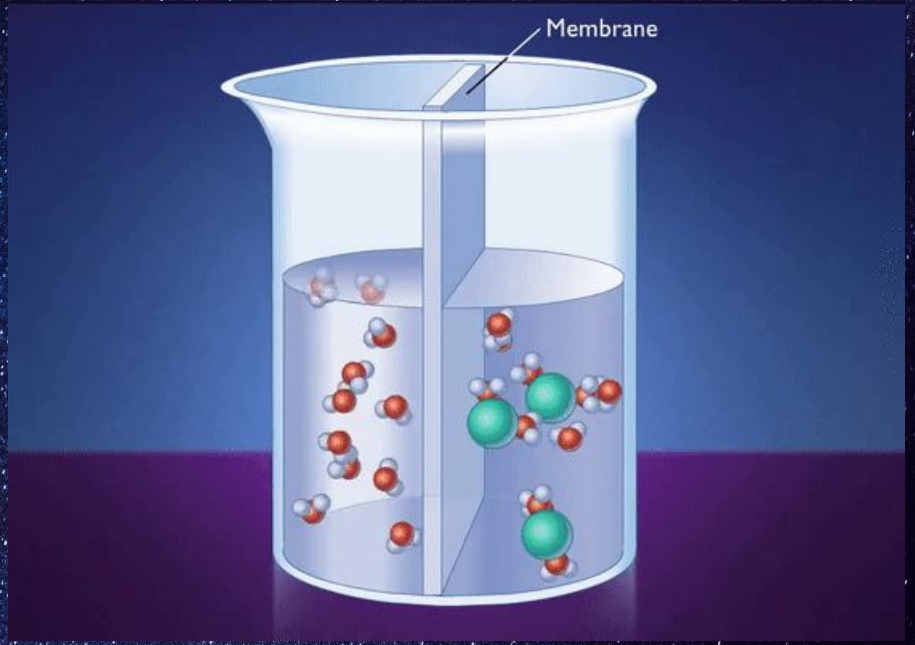
PERMEABILITY

Exchange of different substances from plasma membrane is called permeability. On the basis of permeability, membranes are of four type

- **Semi-permeable membrane:** It is impermeable for solute and permeable for solvent e.g. Copper ferrocyanide membrane, Cellophane.
- **Selectively permeable membrane:** This membrane is permeable for some solute along with solvents. e.g. Plasma membrane is permeable for Alcohol, Ether, water, gases, but impermeable for phospholipids, polysaccharides and protein.

OSMOSIS

When two solution of different concentration are separated by means of semipermeable membrane, the diffusion of solvent from a region of high chemical potential to a region of low chemical potential until equilibrium is reached is called osmosis.



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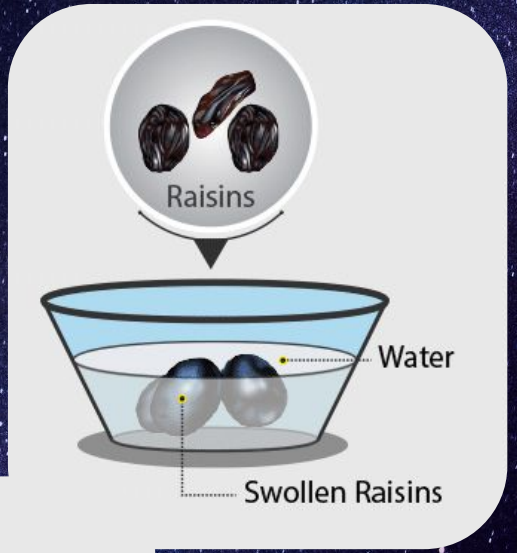
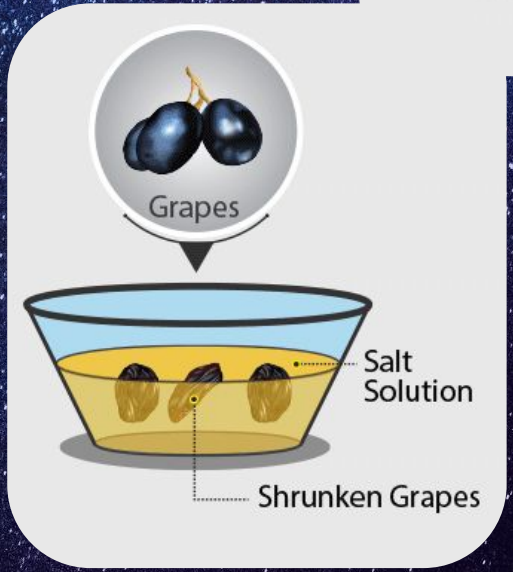
TYPES OF OSMOSIS

Endosmosis: Intake of water molecules into the cell sap through osmosis, is called endosmosis.

e.g. If dry raisins are dipped in water for sometime, they swell up due to endosmosis.

Exosmosis: Exit of water molecules from cell is called exosmosis. e.g. If fresh grapes are dipped in hypertonic solution (like strong sugar solution) they show shrinkage after some time due to exosmosis.





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SIGNIFICANCE OF OSMOSIS

- ✓ Root hairs absorb water from soil through osmosis.
- ✓ Exchange of soluble substances & water from one cell to another cell by osmosis.
- ✓ Osmosis cause turgidity in plants which is helpful to maintain the definite shape of leaves, stem and flowers.
- ✓ It also provides mechanical support to the plant.
- ✓ Opening and closing of stomata, germination of seeds, dehiscence of sporangium. Seismonasty in Mimosa pudica occurs due to osmosis.
- ✓ The resistance of plants to drought and frost increases with increase in osmotic pressure of their cells.


THANK YOU