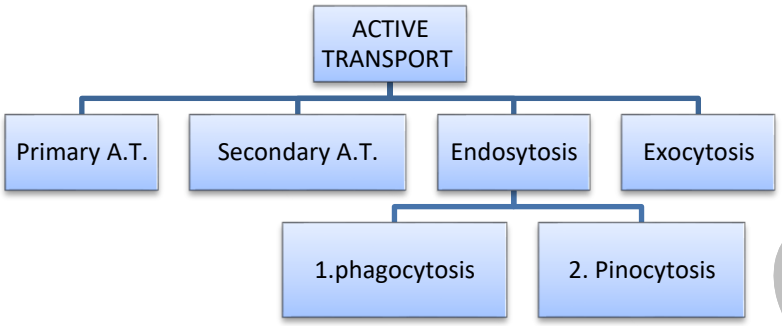
The topic of this lecture :

1. An overview on the previous lectures .
2. To complete talking about active transport .




1. **Phagocytosis** (cell eating) : the process by which large {macro} particles are transported inside the cell without (ECF) .
2. **Pinocytosis** (cell drinking) : macro particles are transported into the cell containing (ECF) .

Mechanism of pinocytosis : (FROM HAND OUT !!!)
1. Attachment of the substance to a specific receptor on the cell membrane. The receptors are concentrated in smali pits called coated pits .
2. The entire pit invaginates inwards by action of contractile elements.
3. The borders of the invaginated pit close over the attached substance with some ECF and form a vesicle (pinocytic vesicle).
4. The vesicle separate from the cell membrane and pass to the cytoplasm .

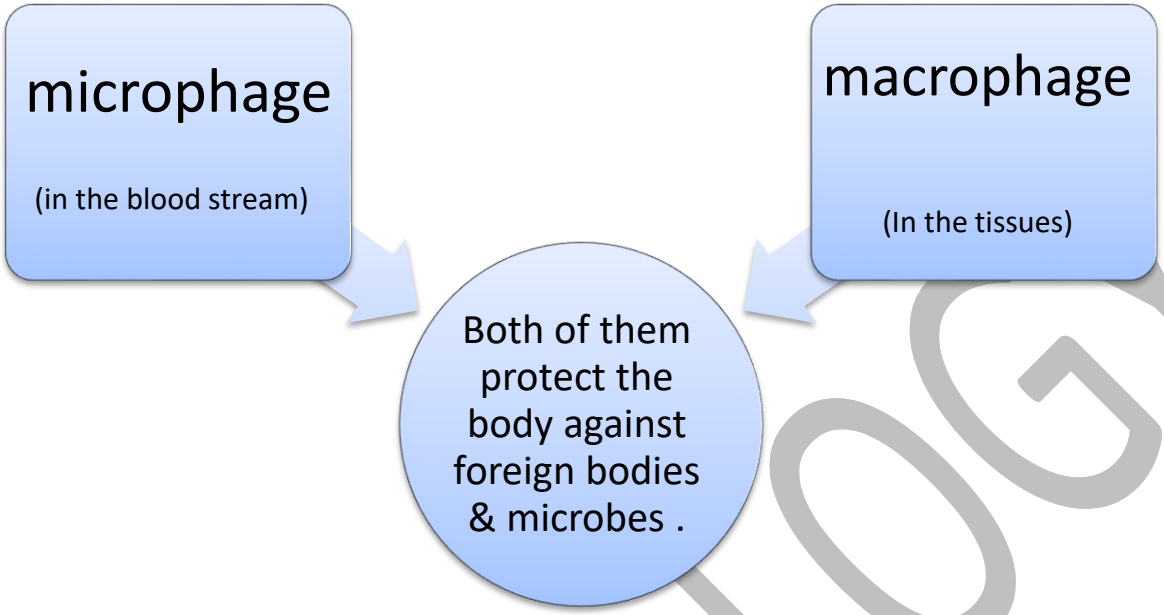
**Phagocytosis :** → (eating) → foreign bodies .

**It happens in specfic cell** :

- White blood cells : (1.microphages , 2.macrophage.) .
- tissue macrophage .

NOTE !!!

-About **WBC:**

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* Let's suppose that the bacteria is a foreign body → WBC have **receptors** that receive any foreign body → **invagination** → lysosomes are gonna be activated (**H2O2** produced , **proteoletic enzyme** too) → they both will kill the foreign body and destroy it's membrane .

* if there was an injury in any part of the human body , the immune system will go through a fight against the microbes and the bacteria to defend the body , in some causes WBS's die through that "fight" which will result in (puss cells) .

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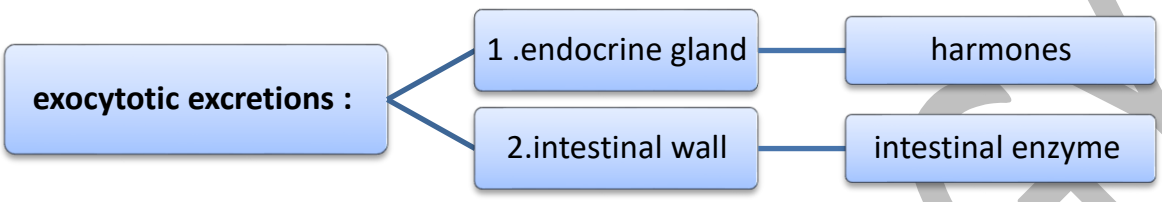
Last tybe of AVTIVE TRANSPORT :

**EXOCYTOSIS** (Cell excretion) **:** macro molecules & large particles are transported outside the cell

Example of exocytosis :

Nucleus ( it has DNA ) → **it produces** RNA → **converted to** sequence of amino acid → **move to** golgi apparatus → **gets out in the form of** vesicle → **gets through** cell membrane .




ملاحظة !! 1.Endocrine gland &2.intestinal wall ← أماكن خروج الإفرازات .

**NOTE !!**

Endocytosis & exocytosis are specific for macro molecules.

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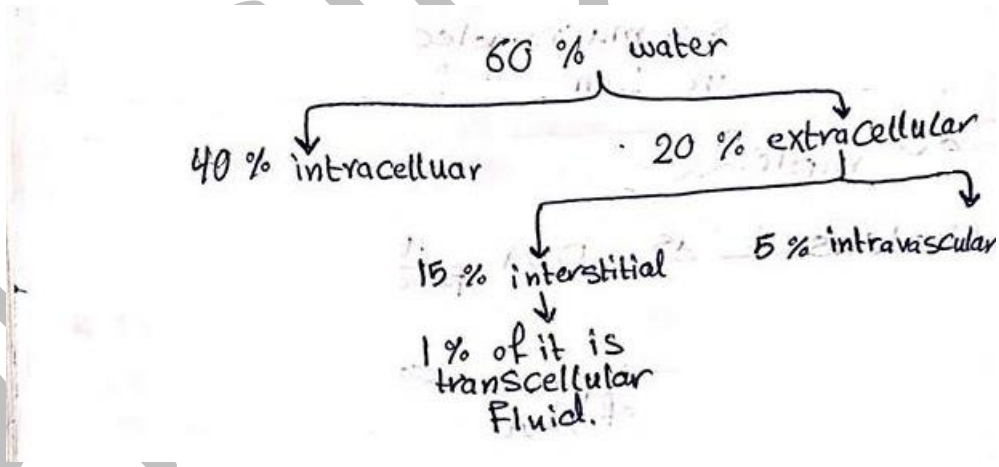
**REVISION of TBW :**




***Measurement of body water** → we want to use substances that have this direction .

**Intravascular** → diffusion inter stetial → cell membrane → get out of them

Such as : **1.antipyrine , 2.deutrium oxide .**

$$Volume\ of\ compatment = \frac{amount\ of\ substance\ injected}{concentration\ of\ the\ substance\ in\ blasma\ *}$$

*Why in plasma ? – because it has spread equally between the cells.

*How about if we want to measure ECF ONLY ?

- We use a substance that has this direction .

Plasma → ISF → do NOT penetrate cell membrane

( ECF عشان تضل برا ونطلع الـ)

Such as : **inulin .**

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*How to measure intravascular fluid ?

Let's first review the components of blood → plasma + celss

Plasma components →

1. 90% water .
2. 7% protein ( plasma protein can't penetrate capillary wall , remains in the intravascular domain .
3. The rest is some other material .

* so if we want to measure intravascular fluid we should use a substance like the plasma protein (e.g. **radio active albumin**) .

ICF = TBW – ECF

ISF = ECF – Plasma

***Why is it important to study all the previous calculations ?

- because , sometimes disturbance happen in water content among compartments.

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*** OSOMOSIS FRAGILTY :** the ability of a cell to breakdown when its put in different solution .

**- Iso-osmotic** → nothing happens to the cell .

- **hypo-osmotic** → the cell rupture and explodes .

**- hyper-osmotic** → the cell shrinks .

NOTE : Increase in the size of ISF will cause **edema** .

(( ICF : intracellular fluid \ TBW : total body water \ ISF: intestinal fluid \ ECF: extracellular fluid ))

* How water is filtered ? and how ISF&IVF are made ?

- starting mechanism it has 4 laws :

**1) capillary hydrostatic pressure** : the pressure caused by the blood that affects the capillary wall .

(the higher it is , the higher filtration)

**2) tissue hydrostatic pressure** : pressure placed upon the capillary and caused by the surrounding tissue .

ملاحظة : 1&2 عكس بعض ..!!

*let's go back o plasma proteins a little bit , plasma proteins such as : albumin , attack (Na) ions which is also know as (donann effect) , their pressure in the plasma will "**absorb**" water which will work **against** filtration . Known as :

**3) capillary osmotic(oncotic) pressure** (capillary OP) .

4) **tissue osmotic pressure** : tissue proteins.

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- Capillary hydrostatic pressure (+)→ with filtration .

-tissue hydrostatic pressure (-)→ apposite filtration .

-capillary OP (-) .

-tissue OP (+) .

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** Reflection co-efficient : it's the number between (0-1) . ( علامة للتمييز !! )

* if the r.c.o for molecule =1 → **can't** cross semi-permeable membrane → the molecule sucks water towards it .

Like : **albumin.**

*if the r.c.o for molecule =0.1 (close to zero) → **gonna** cross

semi- permeable membrane .

Like : **uria .**