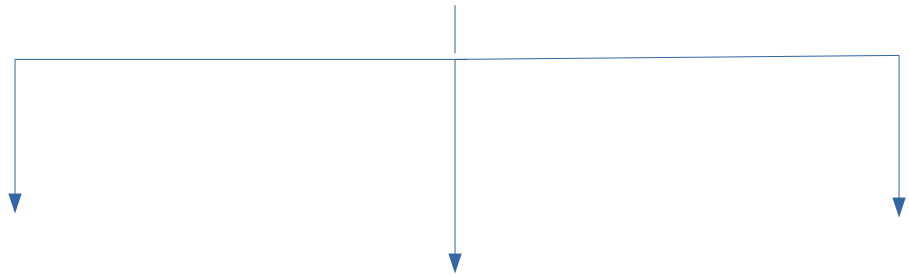
اليوم:الخميس **بسم الله الرحمن الرحيم**

المادة : فسيولوجي **محاضرة 2** التاريخ: 31/1/2018

**special types of passive transport :**

**1) osmosis** :- it's the diffusion of water (the solvent) from:



**1. more** solvent → **less** solvent **2.** more **H2O** → less **H2O**

**3. low** concentrated solution → **high** concentrated solution

**also osmosis :- diffusion water from hypo tonic solution to hyper tonic solution**

**hypo tonic** : less solute , more solvent (water)
**hyper tonic** : more solute , less solvent (water)

* In osmosis t**he granules** don't diffuse through the semipermeable membrane ,but the **solvent** does .

* osmotic pressure :- It's the pressure needed to stop osmosis , also depends on number of molecule rather than the size
* osmosis take place through passing lipid bilayers and protein channel ( aqua porins).

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**2)filtration (bulk flow):-** the diffusion of fluid through a membrane that is caused by difference in hydrostatic pressure .

**EXAMPLE :**
1. The hydrostatic pressure at on artery is higher than the hydrostatic pressure at a vien so that leads to the diffusion of some fluid at the capillary systemic ends forming the interstitial fluid .

**edema is caused due to excessive filtration

**3)solvent drag**

* the diffusion of solute fallowing of it's solvent through the membrane (solvent drags solute after it)

**EX:**

Kidney is made of collection of nephrones that contain the glumerulus which is a cluster of capillaries around the end of kidney tubules.

*When the blood goes through glomerulus a glomerular filtrate is made by filtration process.
* filtrate contains usefull materials so it must be reabsorbed.

* when we reabsorb water it will drag urea with it so it will be reabsorbed too.

*****reabsorbtion of urea after H2O reabsorbtion in renal tubules ***** ← تلخيص مهم

**Active transport :-**

- **occurs against electro chemical gradient (up/hill)**
- **need energy (atp)**

**Active transport :-**

**primary Active transport** — **secondary Active transport**

by the carrier that has **ATP pase** activity
that hydrolyze **ATP** and produce energy

**EX:**

**1. Na*-k pump (kind of integral protein)**

- it pump 3 Na* outside cell and 2 k* inside the cell by **ATP pase** activity which does conformational change to the shape of the pump allowing it to function .

عملية إدخال **2k*** وإخراج **3ca*** يؤثر على شحنة الخلية(charge of th cell ) لذلك سميت هذه العماية (active transport)

**K*** should be inside cells because if the level of (K*) in blood increase that will alter the **cells electricity** like in the heart cell → **arrythmia** → which may cause death

**causes**

**Na*** accumulation in cell may cause cell rapture so it must go outside cell

**2. calcium pumps**

* calcium in cytoplasm should be stored in **endoplasmic reticulum** to not move freely
* 2 pumps are present :
-in the cell membrane : pumps **Ca*2** to outside cell
-in mitochondria : pumps **Ca*2** to inside of mitochondria

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**3. H* pump**

**H* PUMP** pumps H* out side the cell against – electrochemical gradient

**EX:**

mainly found in → **stomach cell** : to make **HCL**
→ **renal tubules** (pumps **H*** from cell to tubular lumen)

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**SECONDARY ACTIVE TRANSPORT :**

The carrier doesn't have **ATP pase activity** and it transports the substance against it's electro-chemical gradient .

**EXPLANATION :-** the **Na*-K*** ((pump which an example of primary active transport)) pumps **Na*** outside the cell ...Na ions goes to type of port which transports **2** substance either at the same direction (**symport**) or at the opposite direction (**antiport**)

* Now the Na* ions bind at a receptor ( symport or antiport) and another substance bind at another receptors at the same port either outside the cell like **Na*** ions or inside the cell ((**opposite to the Na* ions**)) .

* Now the **Na*** ions gets transport passive ((with it's electro – chemical gradient)) and other substance ((which may go inside the cell like in the symport or it may go outside with the anti port )) will be transported against it's electro – chemical gradient activity ..and that is why we consider this process a secondary active transport .

* **symport (co – transport)** in which **2** substances are transported in the same direction .

EXAMPLE ….From note.

***antiports ( counter transport )** in which **2** substances are transported at opposite directions.
*it's **(S)** SHAPE PORT
EXAMPLE …..from note.

نسأل المولى التوفيق لنا ولكم جميعا .
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