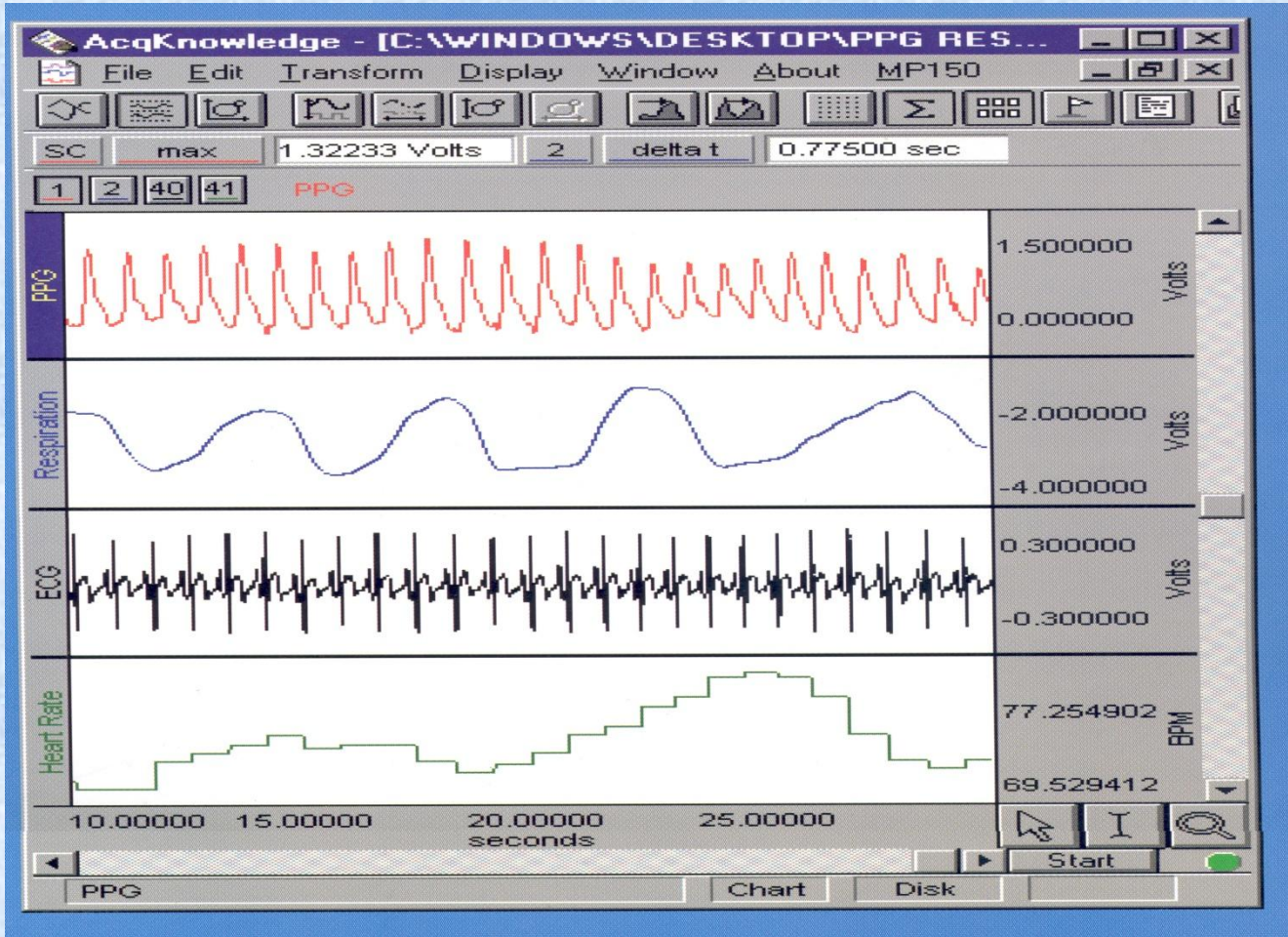


ELEKTROFIZYOLOJİ

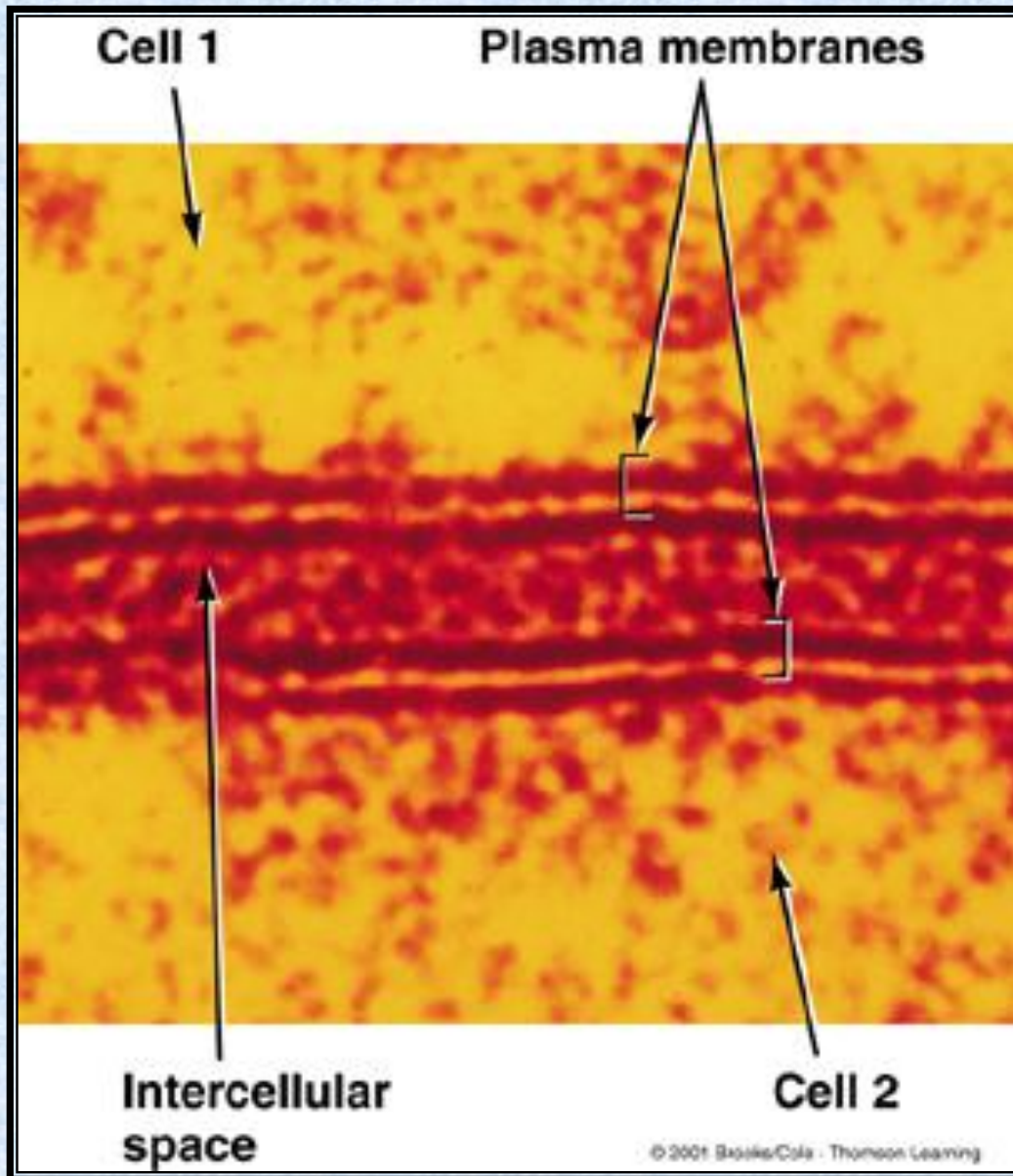


Dr. Behzat NOYAN
Fizyoloji Abd.

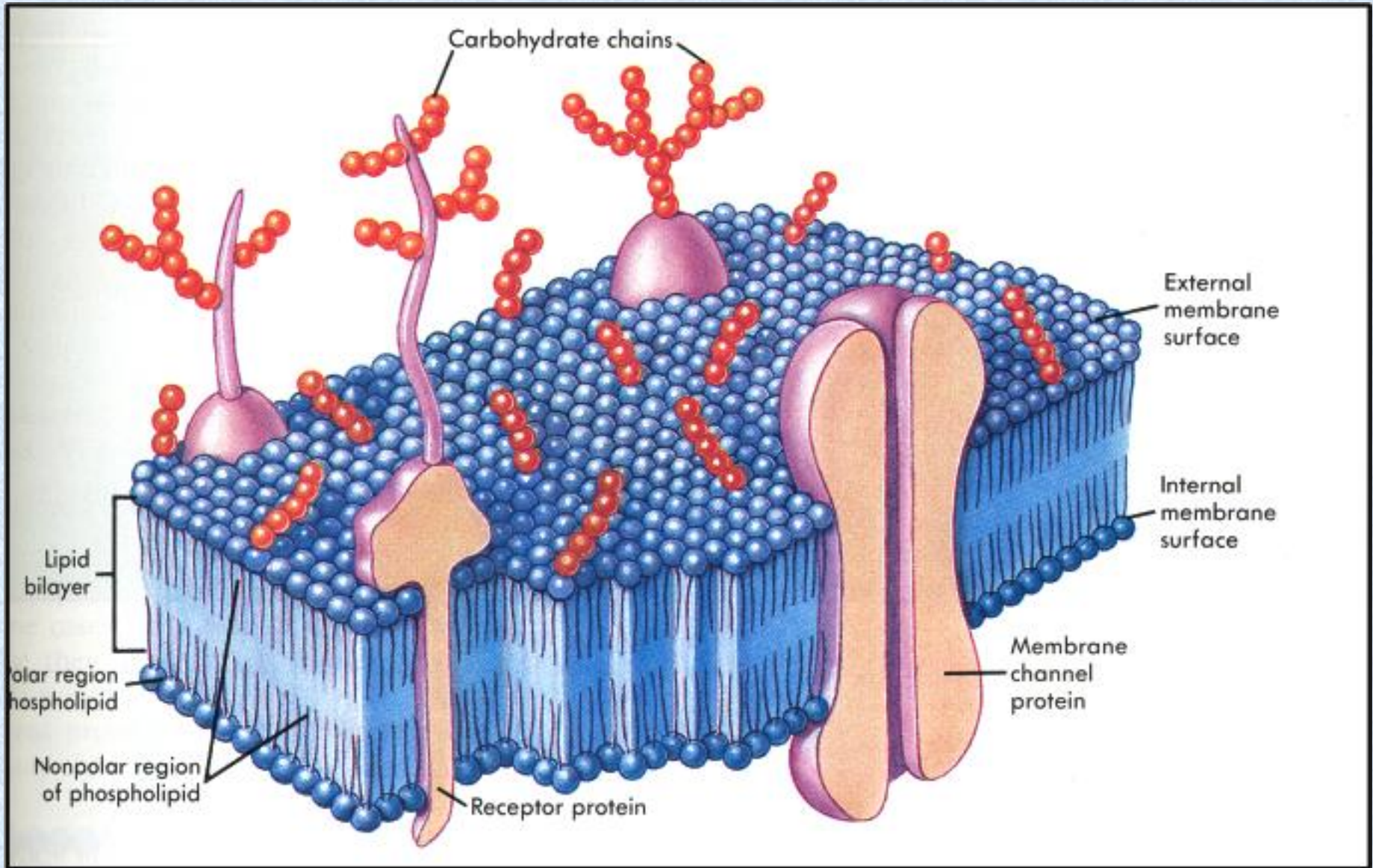
ELEKTROFİZYOLOJİ (TIP-2073)

KONULAR;

- Giriş ve hücre membranı fonksiyonları
- Membran potansiyeli ve aksiyon potansiyeli
- Voltaj ve Patch klamp teknikleri
- Elektrik ve bioelektrik uygulama araçları
- Elektronik ve digital devreler
- Kan basıncı ve kan akımı ölçüm teknikleri
- EKG (elektrokardiografi) ve fonokardiyografi
- EDA (elektrodermal aktivite), GSR (galvanik deri cevabı)
- EMG (elektromiyografi)
- NCV (sinir ileti hızı) ölçümü
- EEG (elektroensefalografi)
- EEG ve epilepsi
- EP (uyarılmış potansiyeller)
- EP-ERP (uyarılmış potansiyeller-olaya ilişkin potansiyeller)



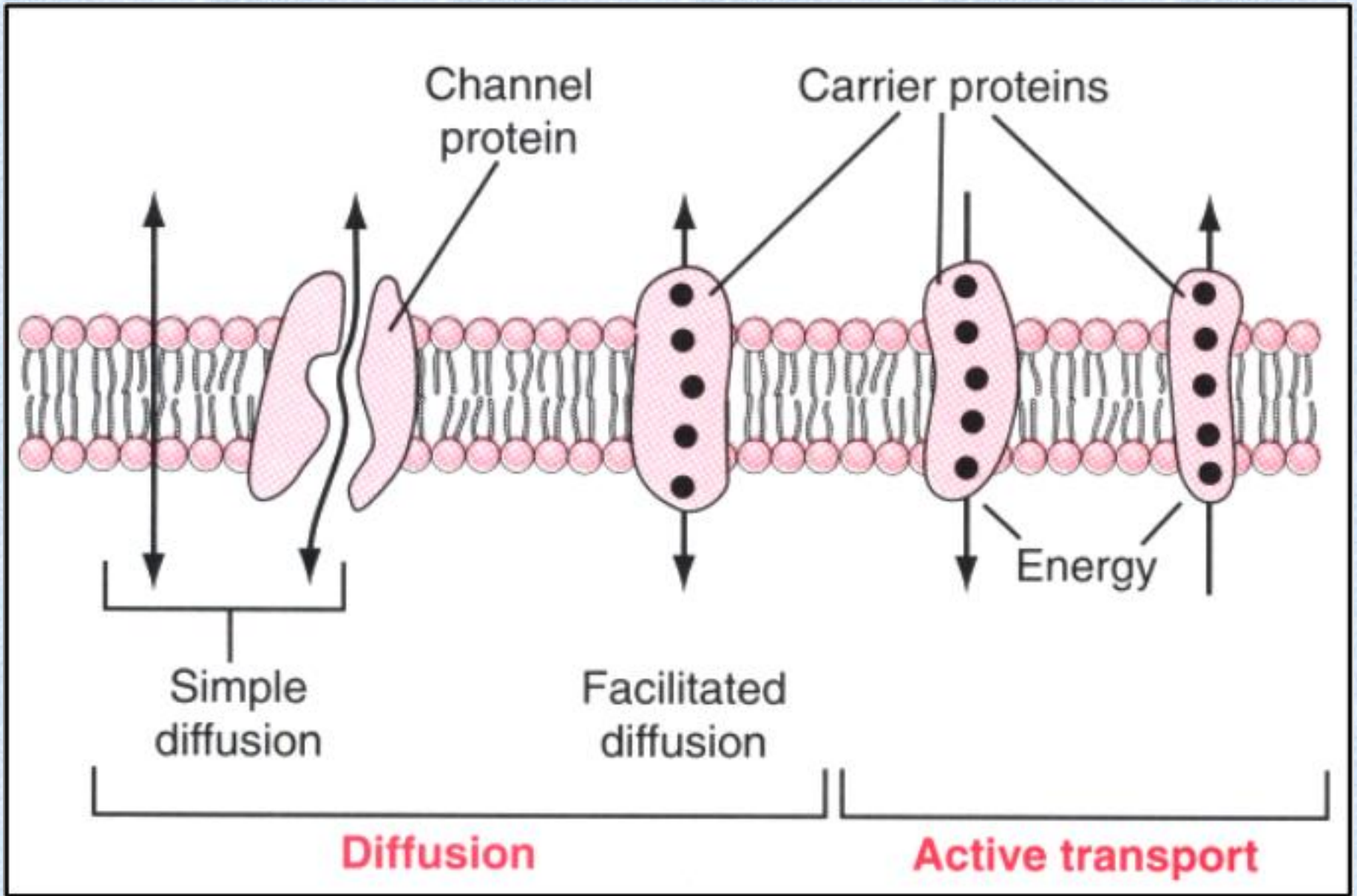
Hücre Membranları



Hücre Membranının Yapısı

Extracellular fluid		Intracellular fluid	
Na ⁺	142 mEq/L	10 mEq/L	
K ⁺	4 mEq/L	140 mEq/L	
Ca ⁺⁺	2.4 mEq/L	0.0001 mEq/L	
Mg ⁺⁺	1.2 mEq/L	58 mEq/L	
Cl ⁻	103 mEq/L	4 mEq/L	
HCO ₃ ⁻	28 mEq/L	10 mEq/L	
Phosphates	4 mEq/L	75 mEq/L	
SO ₄ ⁻	1 mEq/L	2 mEq/L	
Glucose	90 mg/dl	0 to 20 mg/dl	
Amino acids	30 mg/dl	200 mg/dl ?	
Cholesterol			
Phospholipids	0.5 g/dl	2 to 95 g/dl	
Neutral fat			
PO ₂	35 mm Hg	20 mm Hg ?	
PCO ₂	46 mm Hg	50 mm Hg ?	
pH	7.4	7.0	
Proteins	2 g/dl	16 g/dl	
	(5 mEq/L)	(40 mEq/L)	

Intrasellüler ve Extrasellüler Sıvı İçerikleri



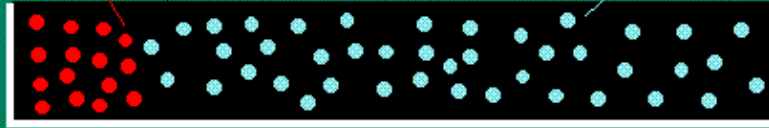
Hücre Membranından Taşınım Yolları

Diffusion

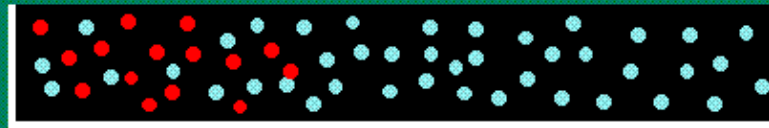
dye molecules

water molecules

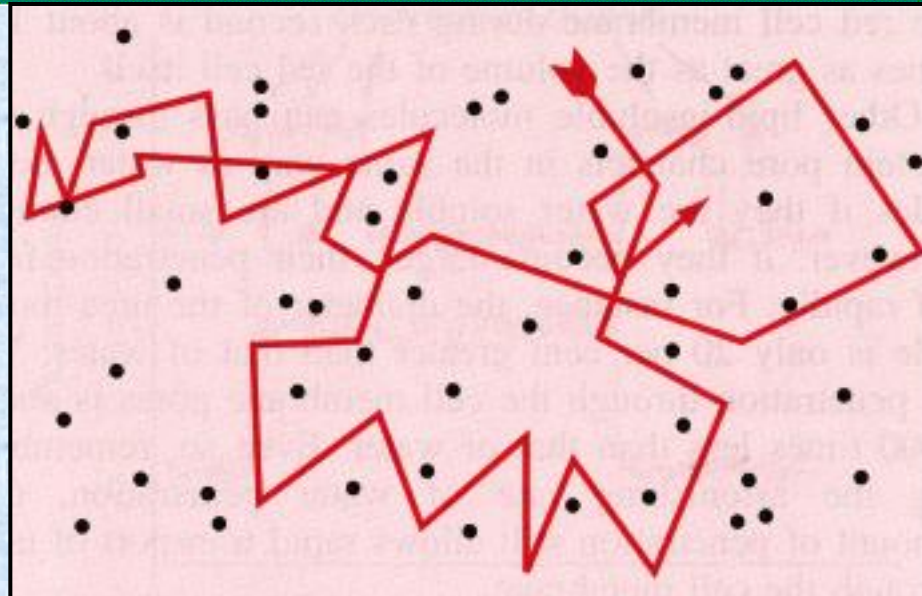
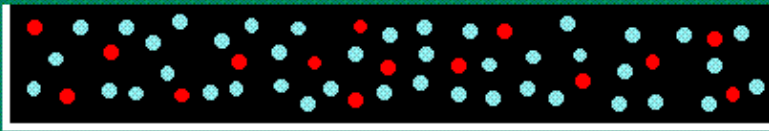
at the outset:



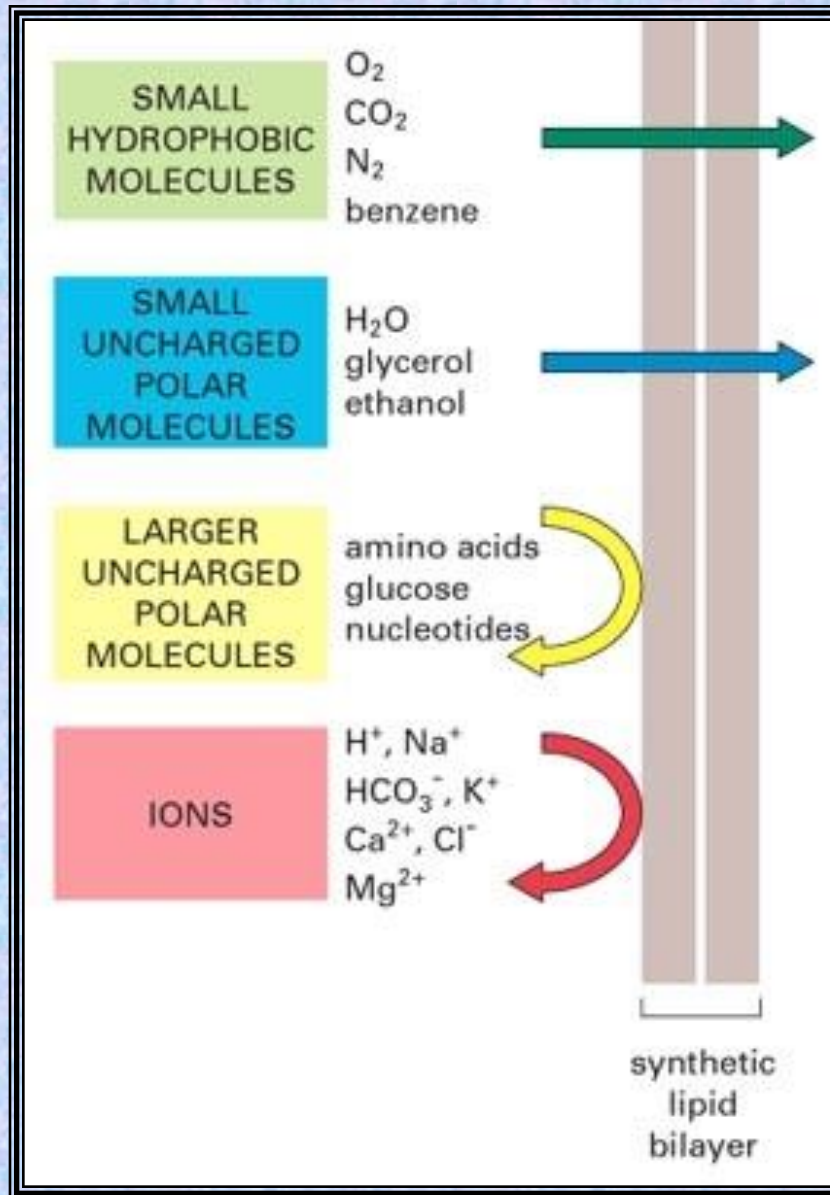
later:



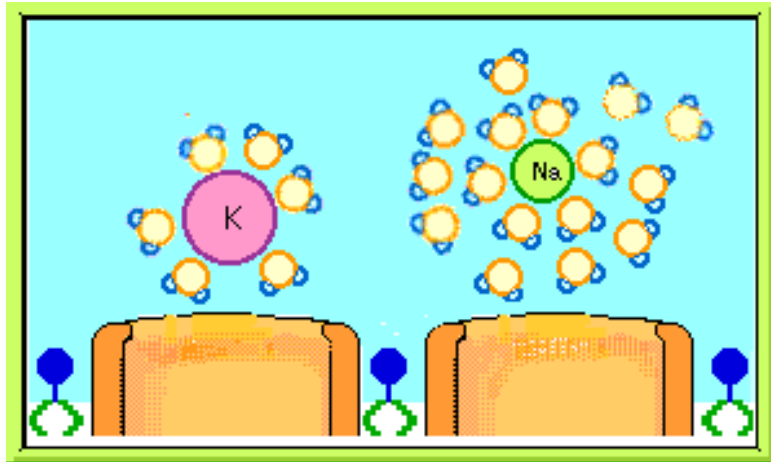
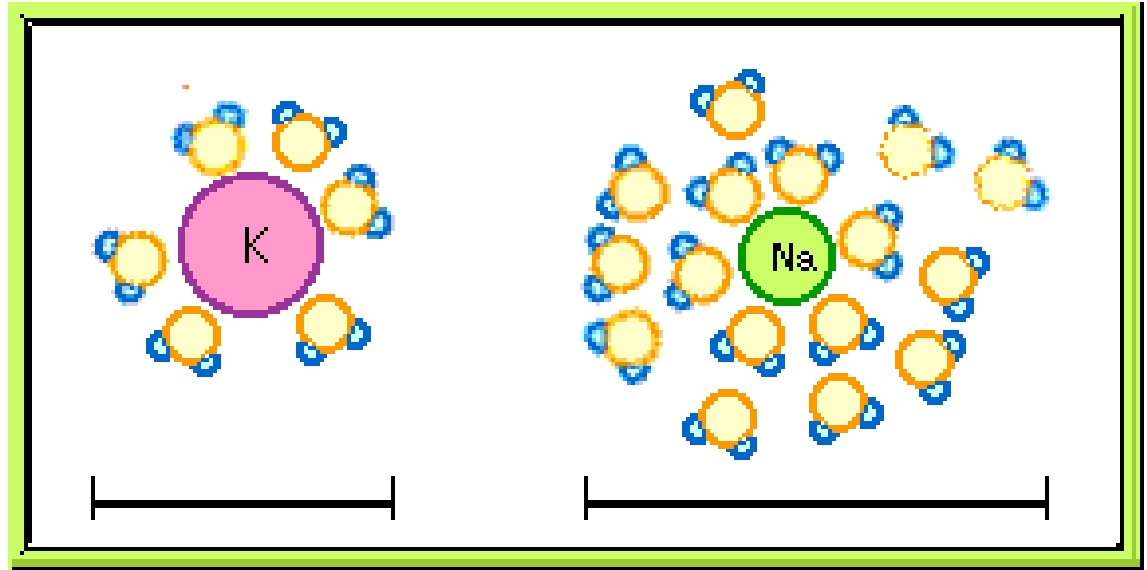
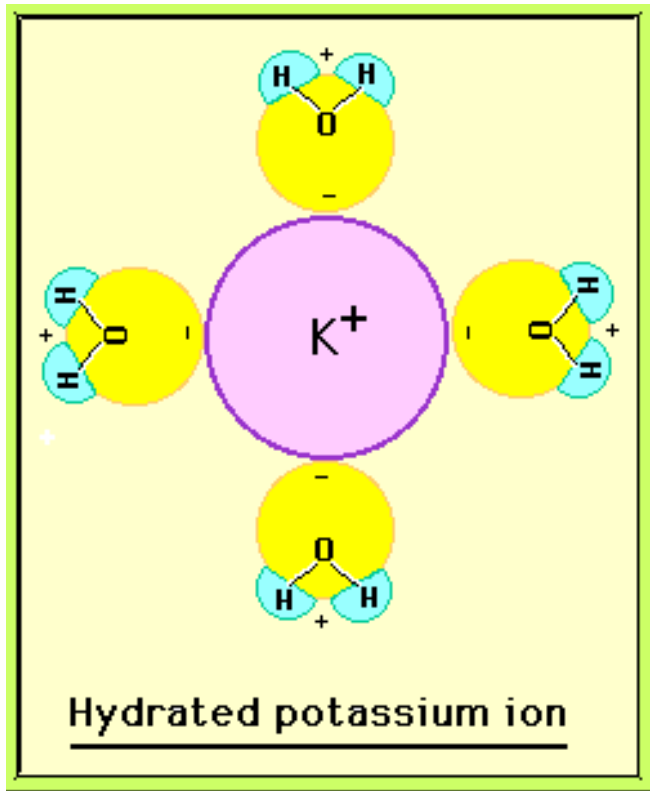
later still:



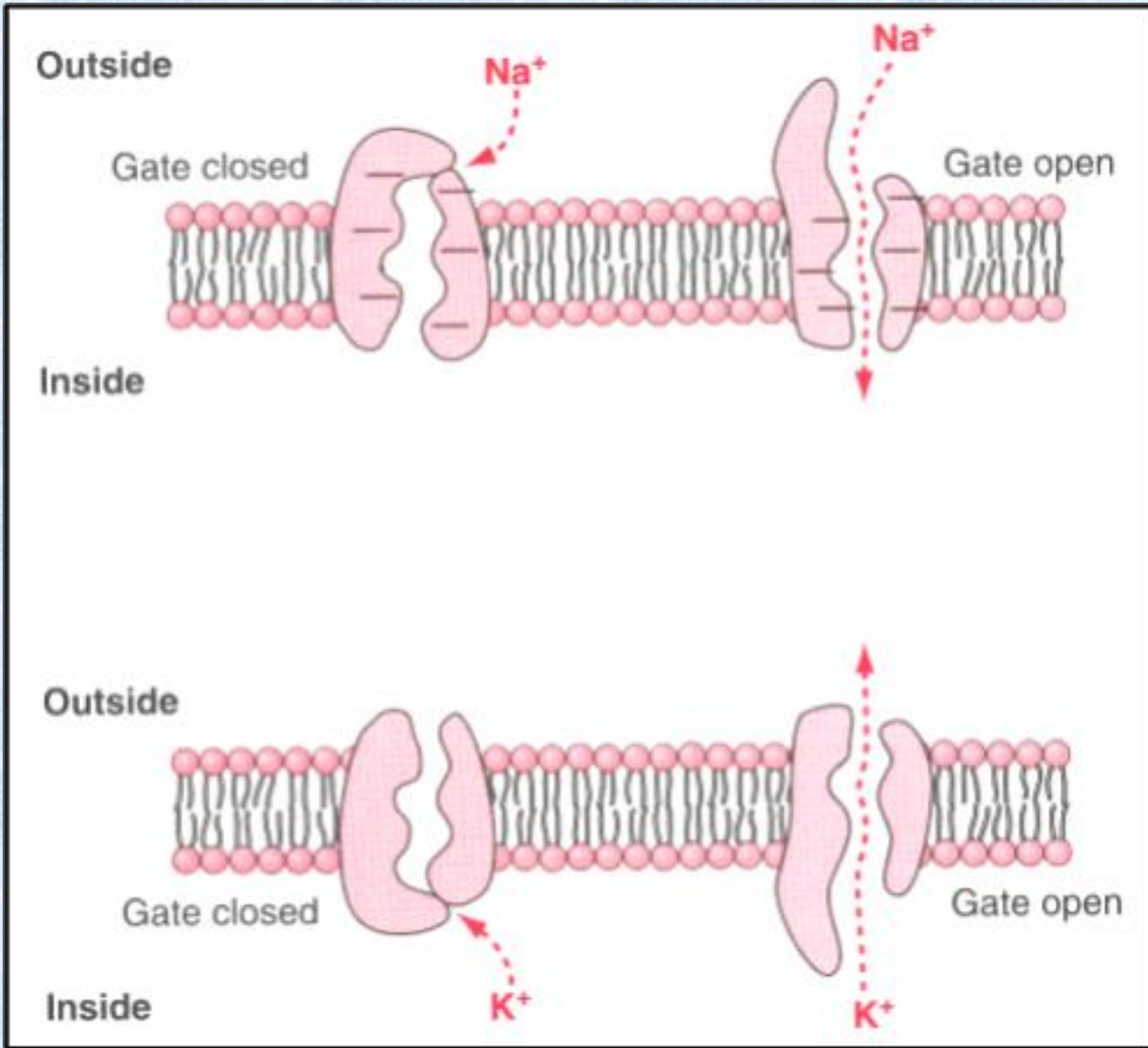
Diffüzyon



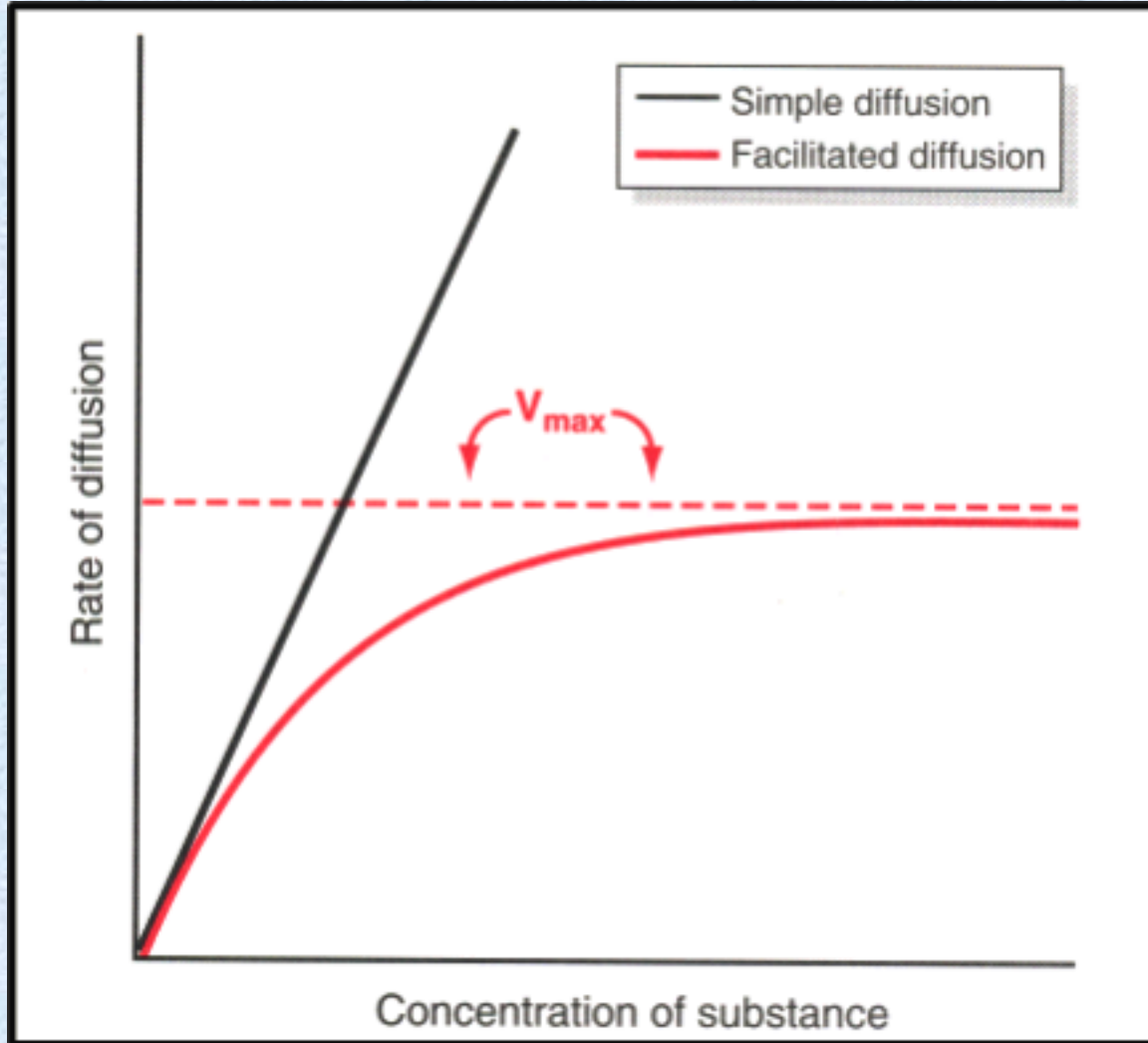
Lipid tabakadan diffüzyon



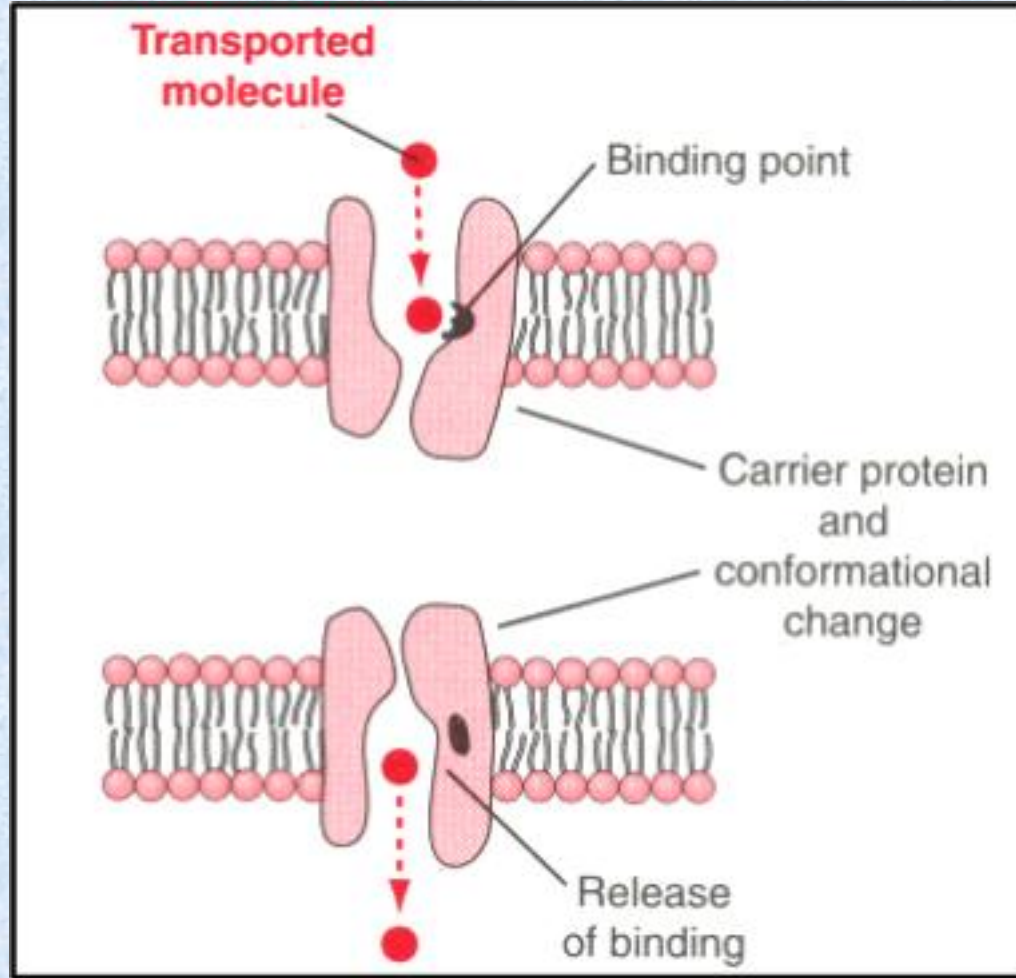
Potasyum ve sodyum iyonlarının hidrate formları



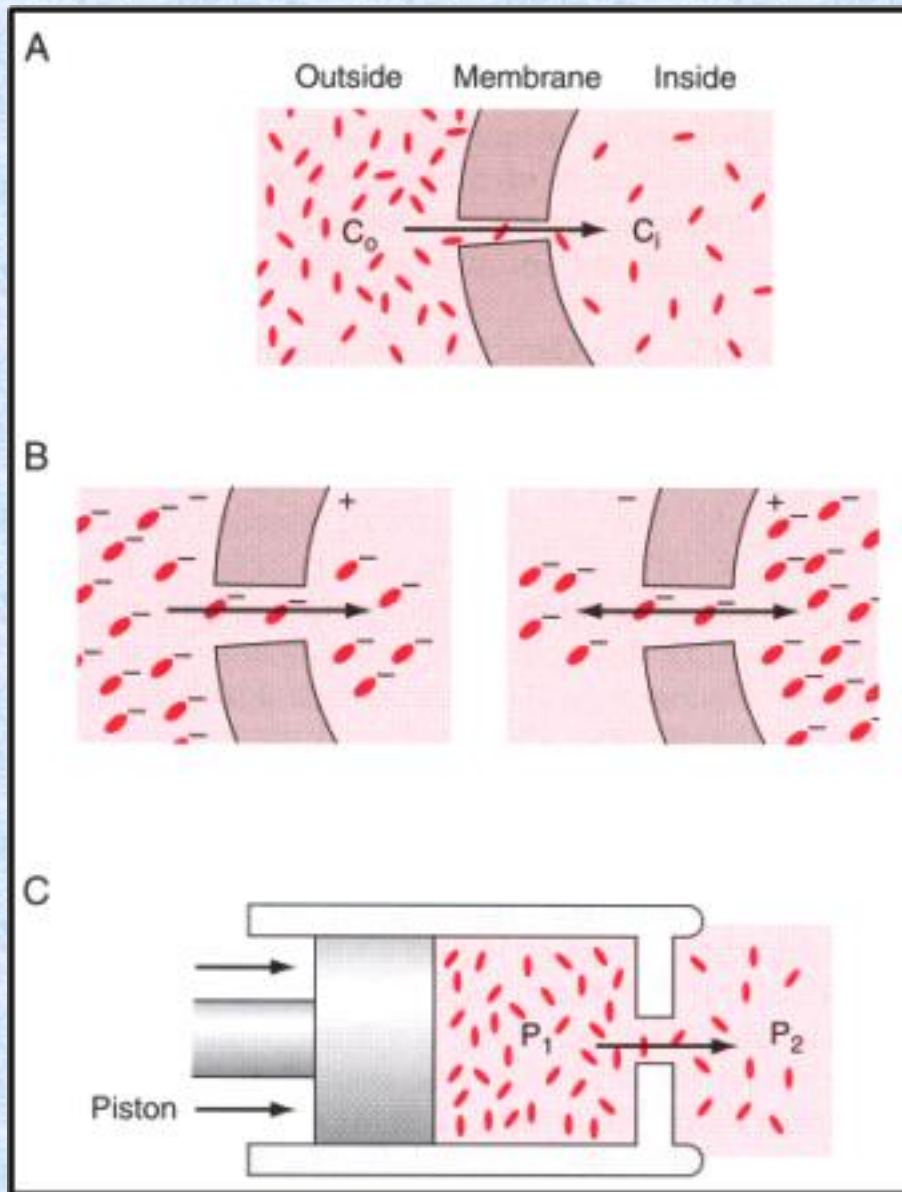
Na^+ ve K^+ iyonlarının kanal proteinlerinden taşınımı



Basit ve kolaylaştırılmış diffüzyon



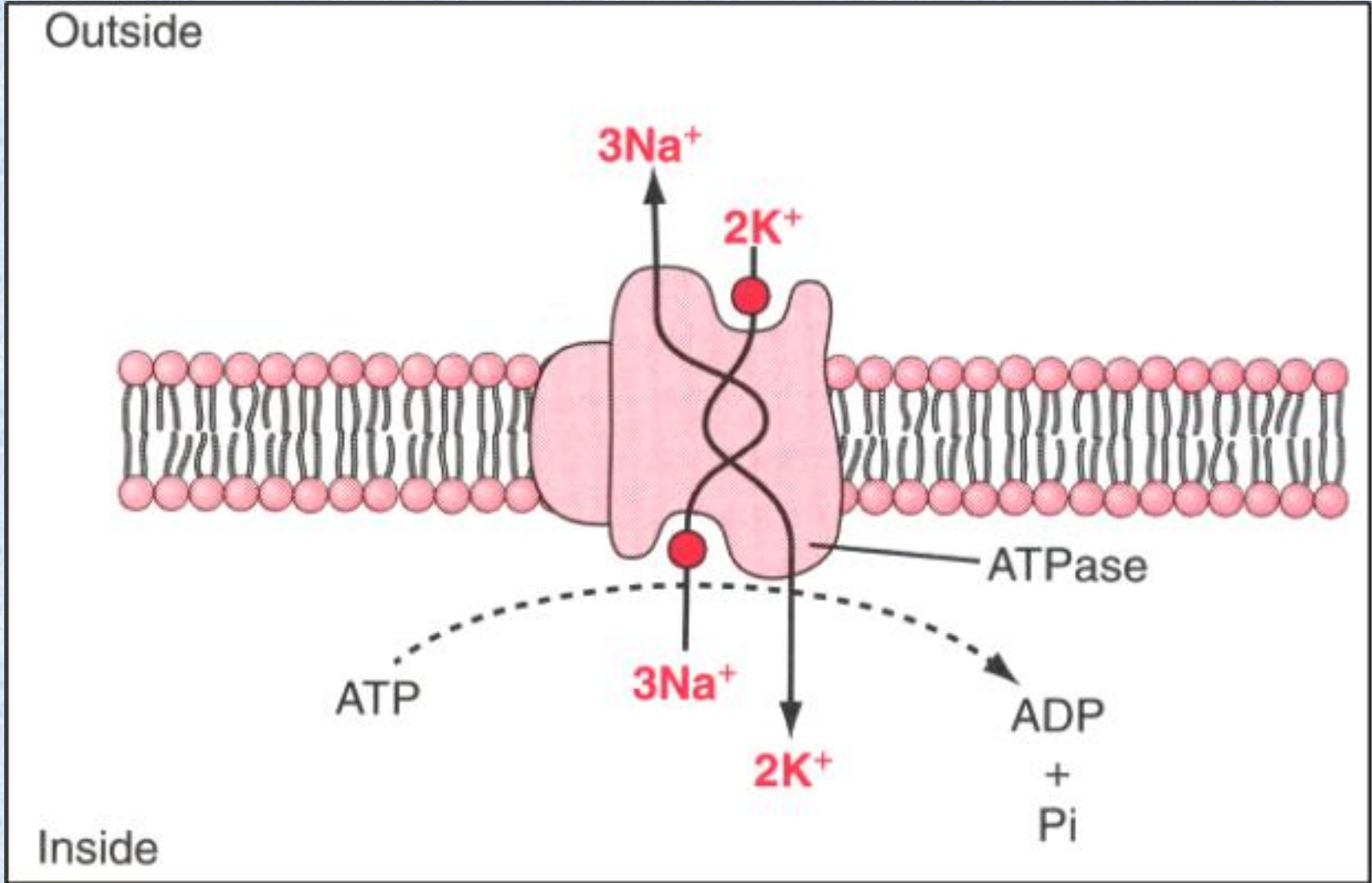
Kolaylaştırılmış diffüzyon mekanizması



Net diffüzyon üzerine, konsantrasyonun, elektriksel farkın ve basıncın etkileri

Aktif Transport Mekanizmaları

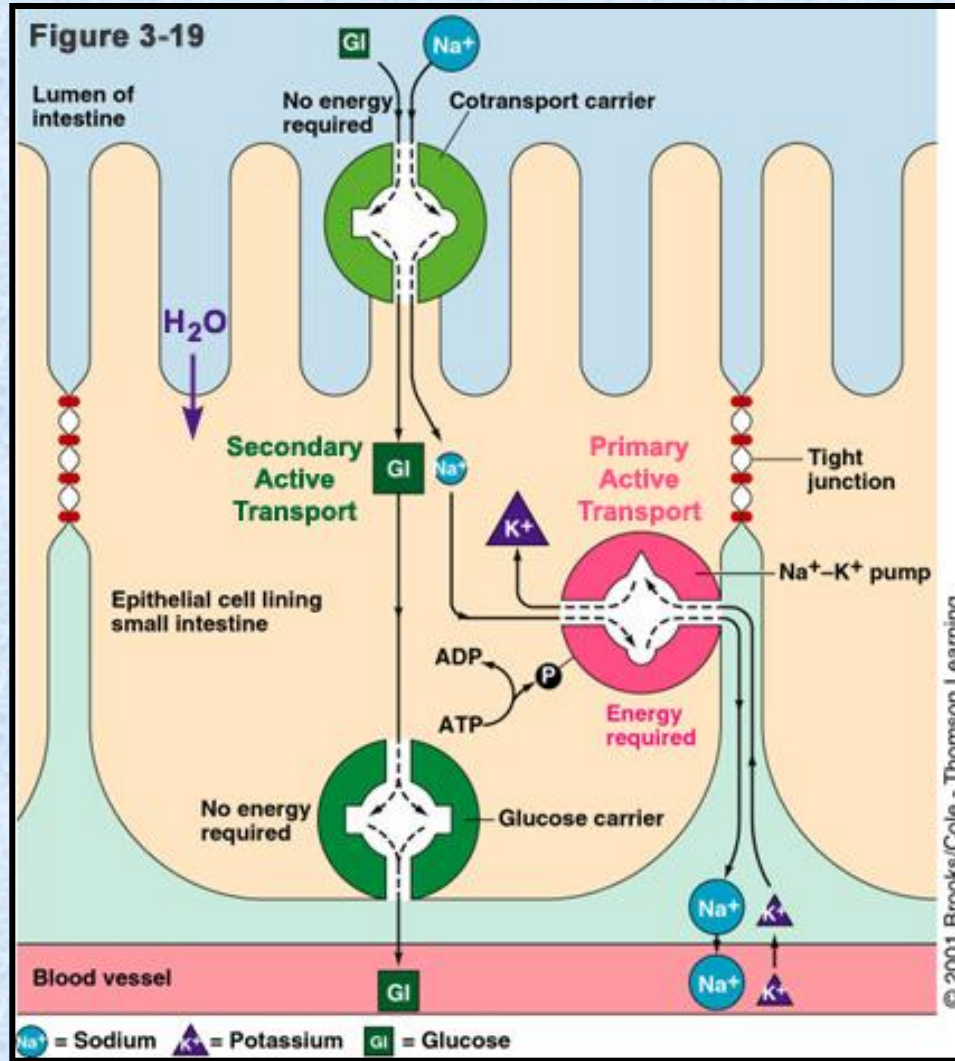
Na^+ - K^+ pompası, Ca^{++} pompası, H^+ pompası



Na^+ - K^+ Aktif Transport Proteini ve Taşınımı

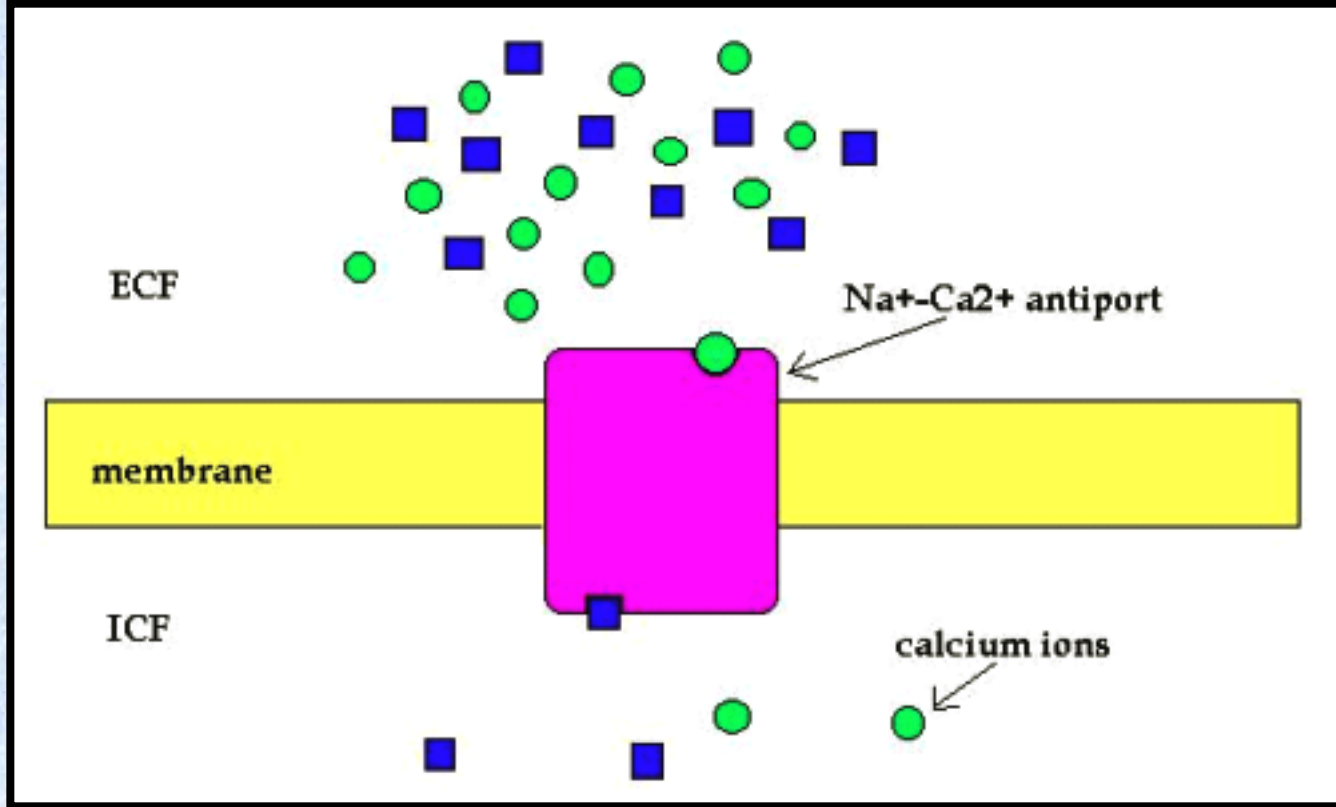
Vücutta birlikte taşınım çeşitleri

Na^+ -Glikoz, Na^+ -Aminoasitler, Na^+ - K^+ - 2Cl^- , K^+ - Cl^-



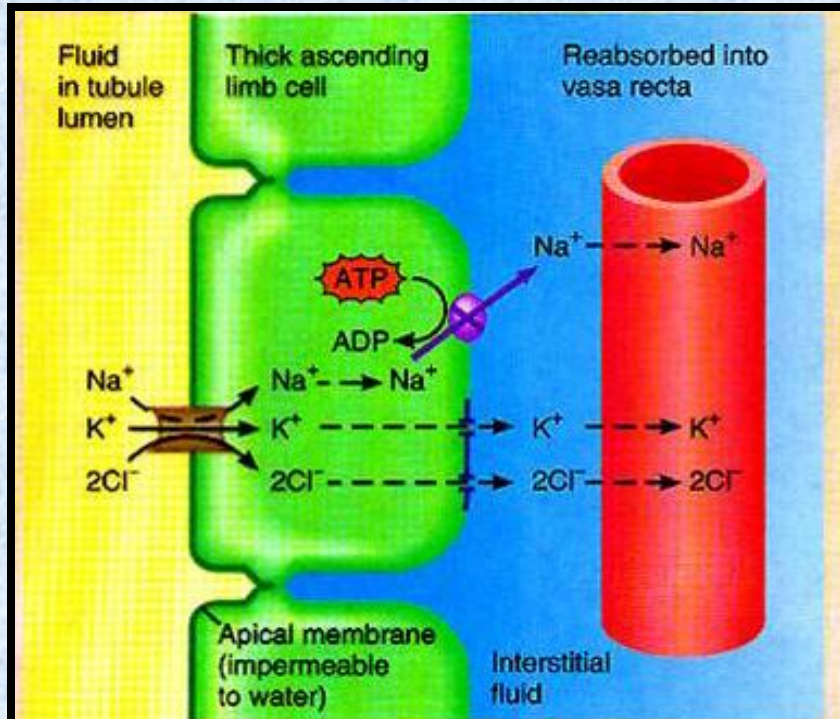
Sekonder Aktif Transport (Co-transport, symport, birlikte taşınım)

Vücutta Zıt Taşınım Çeşitleri $\text{Na}^+ - \text{Ca}^{++}$, $\text{Na}^+ - \text{H}^+$



Sekonder Aktif Transport (Counter-transport, antiport, zıt taşınım)

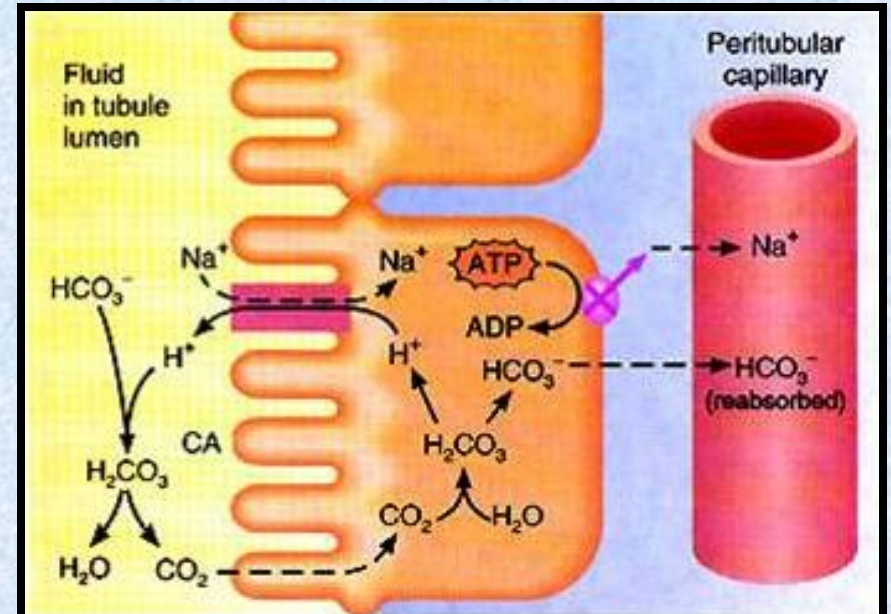
Böbrek Tubuluslarında Sekonder Aktif Transport



Key:

- $\text{Na}^+-\text{K}^+-2\text{Cl}^-$ symporter
- Secondary active transport
- Passive diffusion
- Sodium pump
- Leakage channel

Birlikte taşınım

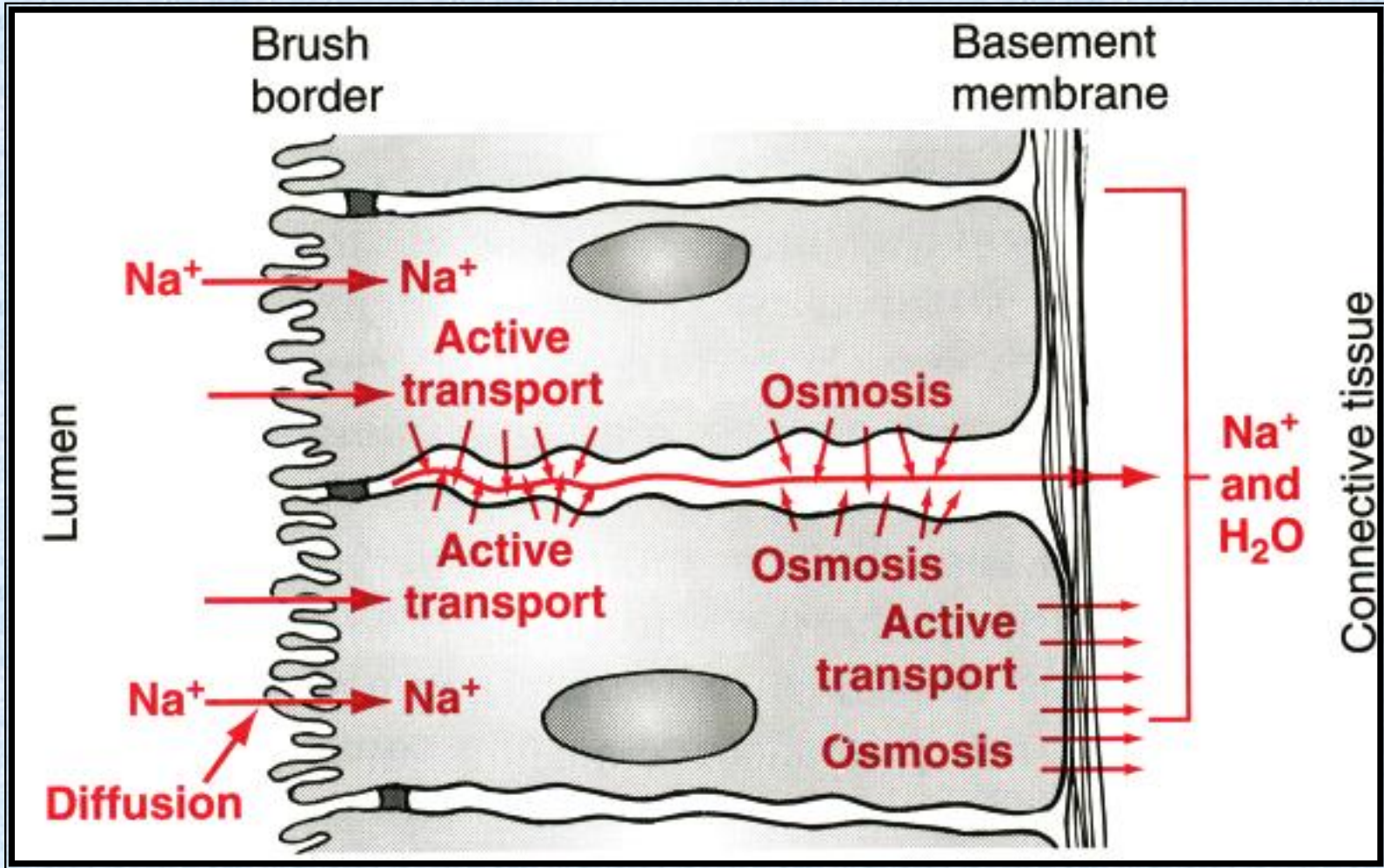


(b) Reabsorption of HCO_3^-

Key:

- Na^+/H^+ antiporter
- Secondary active transport
- Simple diffusion
- Sodium pump
- Primary active transport
- CA** Carbonic anhydrase

Zıt taşınım



Maddelerin Hücre Tabakalarından Aktif Taşınımı