Crossing Membranes

Tuesday, February 10, 2026 9:31 AM

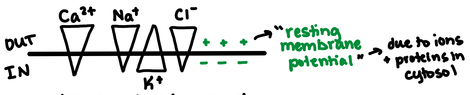
Ion Transport

- membrane characteristics:
  - selectively permeable
  - heterogeneous
  - two leaflets (asymmetry)
- Rules of Ion Movement:

1. Move down concentration gradient
2. Charge

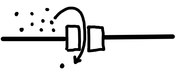
Na^+

- concentration vs. electrochemical gradients



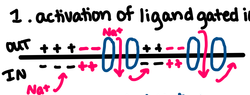
- passive vs. active transport

- Channels
  - narrow pores in membrane
  - selective
  - only passive transport
  - fast!
  - weakly interacts
  - two types:
    1. ungated
       - ↳ always open
       - ↳ fix small imbalances
    2. gated

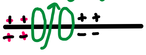


- Action Potential

1. activation of ligand gated ion channel



2. Voltage-gated Na^+ channels
   - depolarization
   - fast!
3. Voltage-gated K^+ channels



   - a lot slower than Na^+ channels!
   - repolarization
4. Na^+/K^+ pump (requires energy!) → 3 Na^+ out, 2 K^+ in

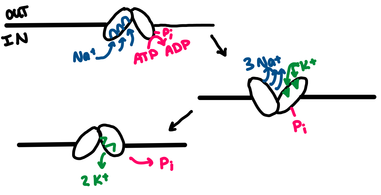
- Na^+ - dependent Glucose Transport

- high $[Na^+]$ outside cell
- cooperative binding event

} net movement of glucose in

- no energy required!
- slower than channels

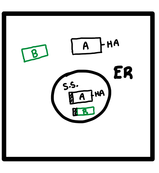
- Pumps
  - active transport
  - slowest!
  - ↳ conformational change
  - ↳ use energy



Protein Transport

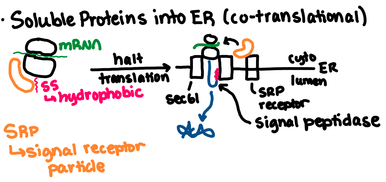
1. Gated Pores
2. Transmembrane Transport
3. Vesicles

- Signal Hypothesis
  - signal sequence (15-60 amino acids)
  - sorting receptors

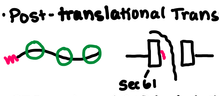


necessity + sufficiency experiments

- Soluble Proteins into ER (co-translational)



- Post-translational Transport



  - BIP grabs w/ ATP hydrolysis!