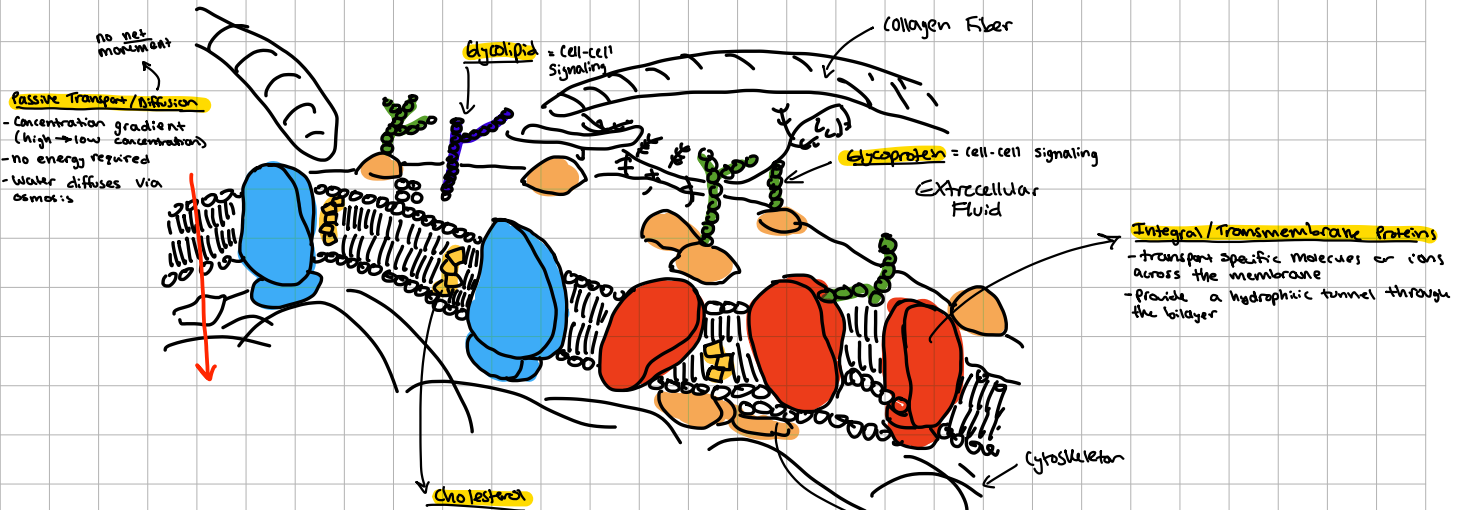
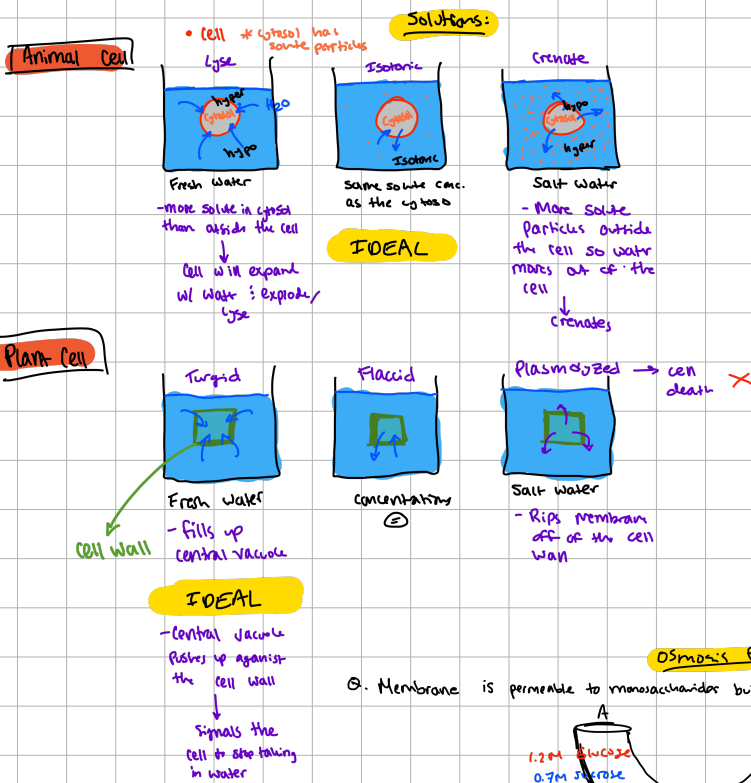


Chapter 5 - Membrane Transport & Cell signaling



Selective permeability - Some substances can cross the membrane & others can't

- Nonpolar / hydrophobic molecules, small molecules, gases can pass through easily
- Polar / hydrophilic molecules as long as they're small can pass
- large polymers or molecules or charged ions cannot pass w/o proteins



Osmosis = diffusion of water

Osmosis Barrier

Q. Membrane is permeable to monosaccharides but not to disaccharides for example



* Whatever can go across the membrane will reach equilibrium

Initially: Side A is hypotonic to Side B

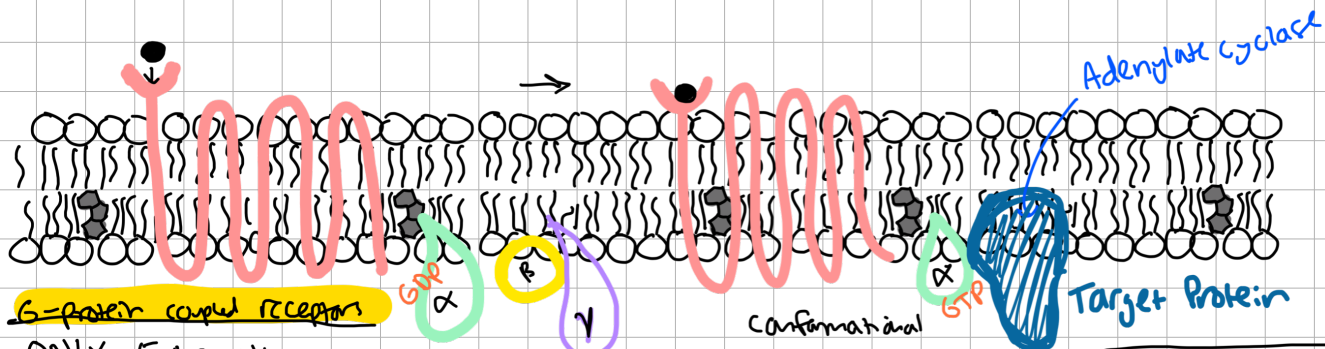
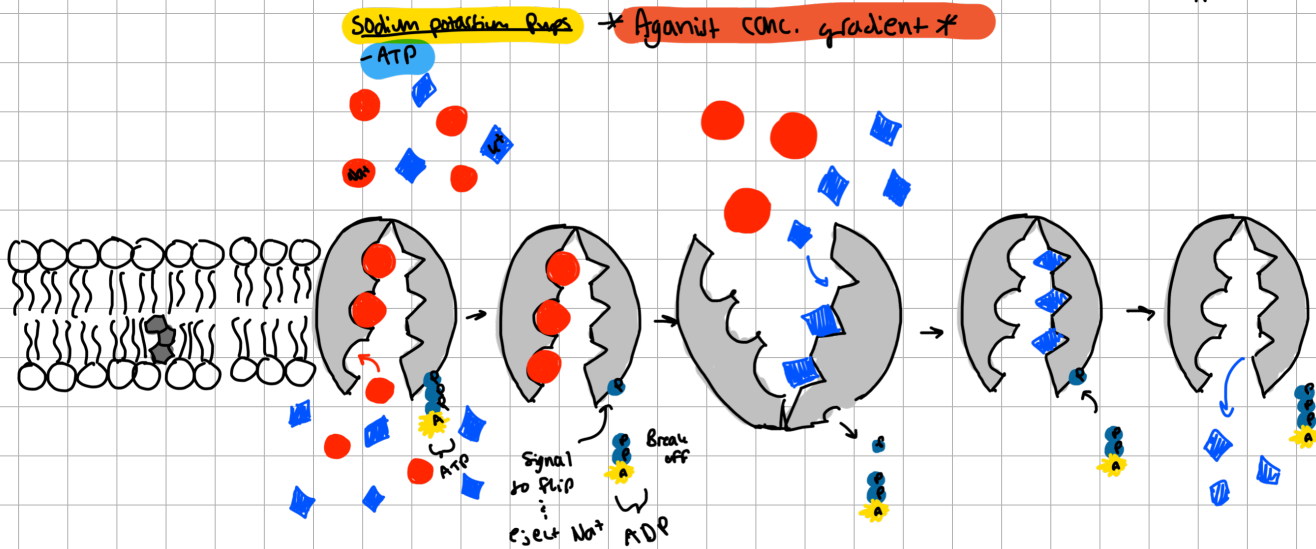
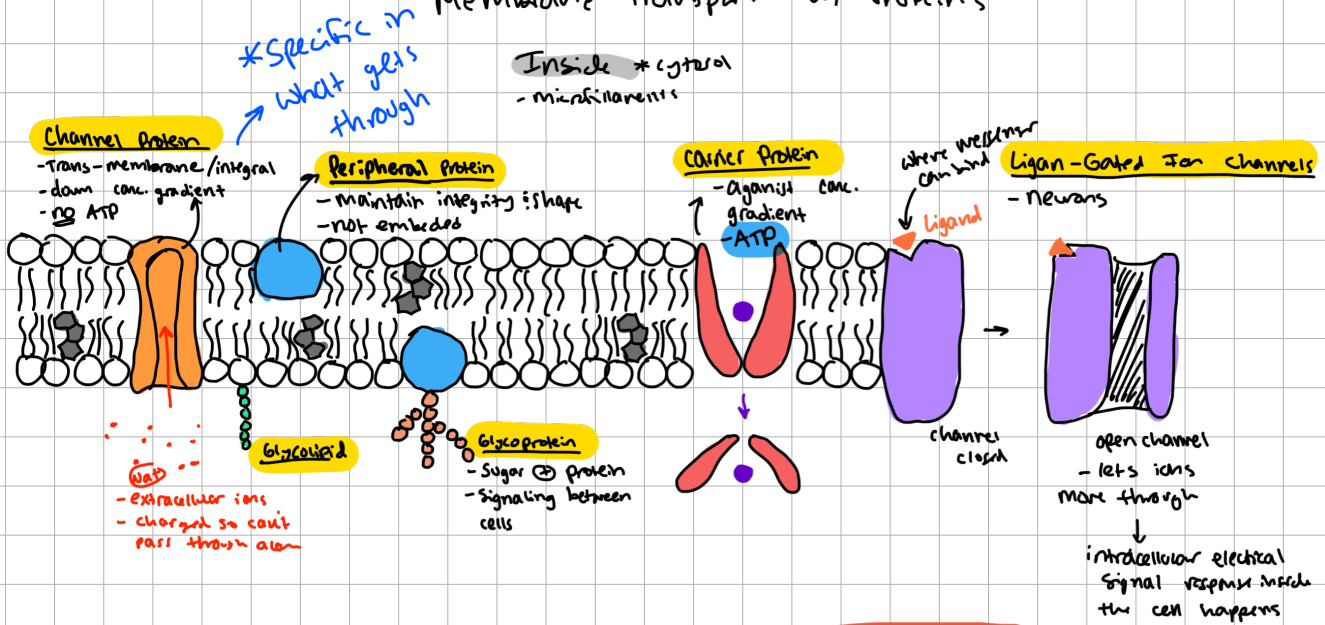
After Incubation: (Let water sit for 3 hrs)

- Ignore glucose since it is a small monomer that can go across the mem & will reach eq.
 - water will move to where there is more sucrose in side A $\rightarrow$ Side A is hypertonic to Side B since A has $\uparrow$ conc. of solute



In-Depth Look at Proteins:

Membrane Transport w/ Proteins



- ONLY Eukaryotic
- growth, senses, immune responses
- interact w/ G proteins

Bind GDP $\leftrightarrow$ GTP

1. Ligand binds
2. conformational change
3. α subunit exchanges GDP for GTP
4. α sub. dissociates & regulates target proteins
5. target protein relays signal via 2nd messenger
6. GTP loses a phosphate & becomes GDP, then leaves, back to normal

6 Functions of Membrane Proteins:

1. Transport

2. Enzymatic Activity ; metabolic pathways / sequence of chemical rxns



3. Signal Transduction

receptor ex. hormones ; proteins (can't come through the membrane alone)
- steroids (can't go through hydrophobic zone)

4. Cell-cell recognition recognizes self from other cells ; transplanted organs problem

5. Intercellular Joining Hook via glycoprotein



6. Attachment to Cytokeleton ; extracellular matrix

; gap, tight junctions ; pinna dermator
how it sticks to plasma membrane

Bulk Transport:

• **Exocytosis** → transporting macromolecules from a cell by vesicles fusing w/ the plasma membrane
- vesicle buds off from ER or Golgi and travels to the plasma membrane
- used by secretory cells to export things such as insulin or neurotransmitters

• **Endocytosis** → transportation by forming vesicles from the plasma membrane
- vesicle forms from the plasma membrane pinching inward
- used to incorporate extracellular substances

↳ **Phagocytosis** "cellular eating" = a cell engulfs a particle & pinches off in a food vacuole

↳ **Pinocytosis** "cellular drinking" = endocytosis of fluid ; with that fluid can flow in other substances / particles

↳ **Receptor-mediated endocytosis** = importing macromolecules into the cell by inward budding

Local vs. Long-Distance Signaling:

Paracrine Signaling

- growth factors
- one cell sends a signal to a neighboring cell

Synaptic Signaling

- nerve cell releases a signal into the synapse
- hormones

3 Stages of cell signaling

1. Signal reception

- a signal molecule / ligand which binds to a receptor on the surface of the cell

2. Signal Transduction

- the binding changes the receptor in some way

3. Cellular Response