

KEYSTONE REVIEW SESSION #2

Cytology
Homeostasis
Transport (Passive & Active)

UNIT 4: CYTOLOGY

- Compare cellular structure and functions in prokaryotic and eukaryotic cells.
- Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell.
- Compare the mechanisms that transport materials across the plasma membrane (passive transport-diffusion, facilitated diffusion, osmosis; active transport- pumps, endocytosis, exocytosis)
- Describe how membrane-bound cellular organelles (ER, Golgi) facilitate transport of materials within a cell.

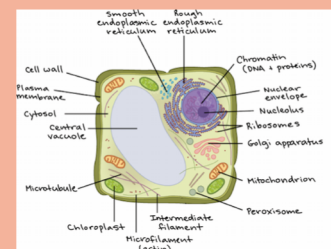
PROKARYOTIC VS. EUKARYOTIC

Eukaryotic	Prokaryotic
Plants, Animals, Fungi, Protists	Bacteria (eubacteria & archaeobacteria)
Nucleus contains DNA	Cytoplasm contains DNA (nucleoid)
Multiple, linear chromosomes	Single, circular DNA
Have membrane-bound organelles	Lack membrane-bound organelles
Mostly mitosis and meiosis	Binary Fission
Multicellular and some unicellular	Unicellular

★ ALL cells have a cell/plasma membrane, a cytoplasm, ribosomes, and genetic material (DNA) ★

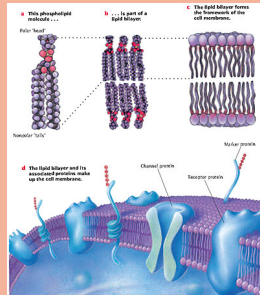
EUKARYOTIC ORGANELLES

- **Cell/Plasma Membrane** ★
- **Nucleus** ★
- Cytoplasm
- **Ribosomes** ★
- Vacuoles (food, contractile & central)
- Vesicles
- Lysosomes
- Cytoskeleton
- Centrioles
- **Chloroplasts** ★
- **Mitochondria** ★
- Cell wall
- Endoplasmic reticulum
- Golgi apparatus



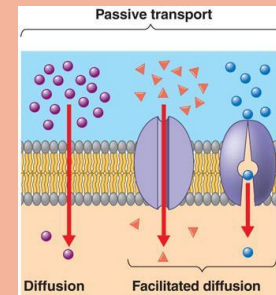
PLASMA MEMBRANE

- Function: regulates what enters & exits the cell; protection/support
- Fluid Mosaic Model
 - Phospholipid bilayer (hydrophilic head & 2 hydrophobic tails)
 - Also contains many proteins (transport), carbohydrates (identification), and other lipids (ex. cholesterol – maintains fluidity)
- Selectively Permeable



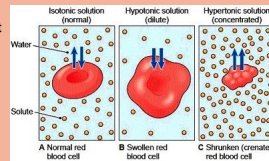
PASSIVE TRANSPORT

- High to low concentration
- No energy required
- Simple Diffusion: small, uncharged molecules
- Facilitated Diffusion: larger, charged molecules go through a protein channel
- Goal is to eventually reach equilibrium & maintain homeostasis



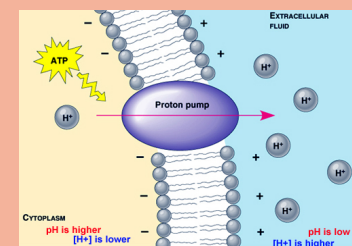
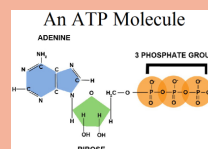
OSMOSIS & TONICITY

- Osmosis is a type of facilitated diffusion in which water moves from high to low concentrations using aquaporins
- Tonicity is the measure of the osmotic gradient
 - Hypertonic:** concentration of solutes is higher outside the cell
 - Water exits the cell, so cell shrinks
 - Isotonic:** same concentration of solutes & water inside and outside of the cell
 - Hypotonic:** concentration of solutes is lower outside the cell
 - Water enters the cell, so cell swells
 - Animal cells can easily burst under hypotonic conditions, but why don't plant cells usually burst?



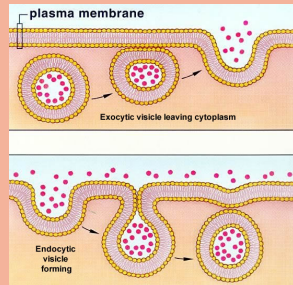
ACTIVE TRANSPORT (PUMPS)

- Low to high concentration
- Energy required - ATP!



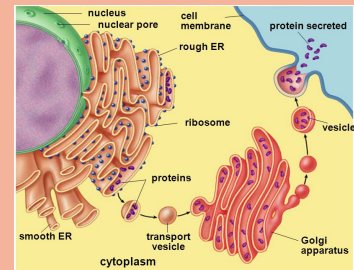
BULK TRANSPORT

- Endocytosis – into the cell
 - Phagocytosis
 - Pinocytosis
 - Receptor-mediated
- Exocytosis – out of the cell



ENDOMEMBRANE SYSTEM

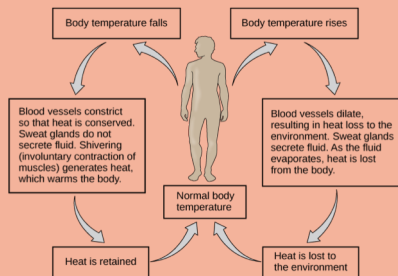
- **Nucleus (DNA) → Cytoplasm (mRNA) → ribosome on rough ER (protein) → Golgi → Vesicles move to destination (exocytosis)**



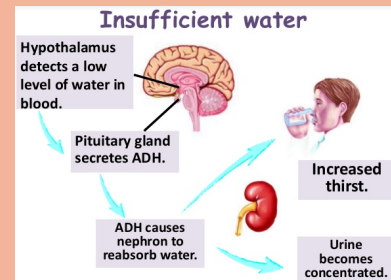
UNIT 5: HOMEOSTASIS

- Explain how organisms maintain homeostasis (thermoregulation, water regulation, oxygen regulation).

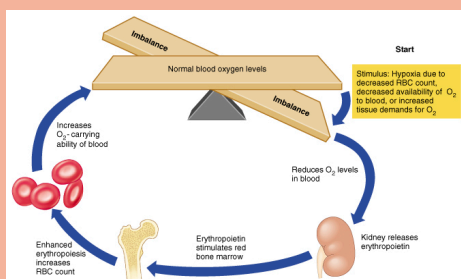
THERMOREGULATION



WATER REGULATION

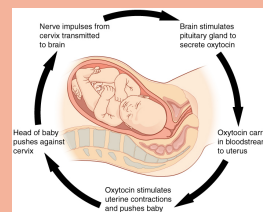


OXYGEN REGULATION



FEEDBACK LOOPS

- Previous three examples are known as negative feedback loops
- This type FIXES a problem by causing a counteractive response
- Positive feedback loops further cause a problem to intensify the response



KAHOOT!

- Kahoot.it
- [Cells Kahoot Link](#)

VIDEO REVIEW

- [Ameoba Sisters – Prokaryotes & Eukaryotes](#)
- [Ameoba Sisters – Introduction to Cells](#)
- [Ameoba Sisters – Cell Membrane](#)
- [Ameoba Sisters – Cell Transport](#)
- [Ameoba Sisters – Osmosis](#)
- [Ameoba Sisters – Homeostasis](#)