AP Bio Unit 2: Cell Structure and Function Cheat Sheet

by PrincessB3ll3 via cheatography.com/122525/cs/22770/

Membrane Transport

Passive Transport: net movement of molecules from H to L concentration without ATP; used for import and export of materials

Facilitated Diffusion: (1) Large quantities of water pass through aquaporins (2) Charged ions, (Na+ and K+), require channel proteins to move through membrane (3) Membranes may become polarized by movement of ions across the membrane

Active Transport: uses ATP to transport molecules and establish/maintain concentration gradients; requires membrane proteins

Exocytosis: internal vesicles fuse with plasma membrane and secrete large macromolecules out of cell

Endocytosis: cell takes in macromolecules and particulate matter by forming new vesicles derived from plasma membrane

Selective Permeability

-Selective permeability is a direct consequence of membrane structure
-Small, non polar molecules can pass through (N2, O2 and CO2)
-Hydrophilic substances (large polar molecules and ions) need embedded channels and transport proteins
-Polar uncharged molecules (H20) pass though in small amounts
-Allows for the formation of concentration gradients of solutes across the membrane

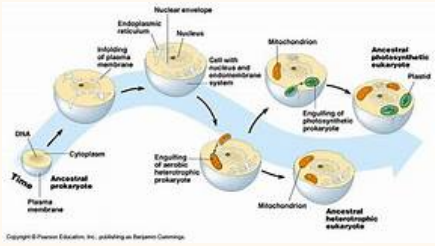
Surface Area to Volume Ratio

-Smaller cells typically have a higher SA:V for more efficient exchange of materials with environment
-As V increases, SA decreases, demand for internal resources increases
-Increasing cell size decreases SA:V
-Membrane folds can increase SA:V

Prokaryotic vs. Eukaryotic

Prokaryotes	Eukaryotes
Typically have circular chromosomes (plasmid)	Typically have multiple linear chromosomes (can have plasmids too)
Unicellular	Multicellular
No membrane bound nucleus	Membrane bound nucleus
Rare: microtubules, cytoskeleton; also chlorophyll scattered in cell	Lysosomes, peroxisomes, microtubules, ER, Mitochondria, Cytoskeleton, Vesicles, Golgi, Chloroplasts
Smaller ribosomes, have vacuoles	Larger ribosomes, have vacuoles
Chemically complex cell wall	Chemically simple cell wall
1-10um	10-100um
Groups of genes (operons) are transcribed in a single mRNA molecule	Groups of genes may be influenced by the same transcription factors to coordinately regulate expression

Cell Compartmentalization



-Membrane-bound organelles evolved from once free-living prokaryotic cells via endosymbiosis
-Prokaryotes generally lack internal membrane- bound organelles but have internal regions with specialized structures and functions.
-Eukaryotic cells maintain internal membranes that partition the cell into specialized regions

Cell Organelles

Ribosomes	Comprise ribosomal RNA (rRNA) and protein; Synthesize protein according to mRNA sequence; Found in all forms of life (evidence of common ancestor)
Endoplasmic Reticulum (ER)	Rough ER: compartmentalizes the cell; Smooth ER: detoxification and lipid synthesis
Golgi	Fold and chemically modify newly synthesized proteins; Packaging proteins for trafficking
Mitochondria	Powerhouse of cell; Double membrane provides compartments for different metabolic reactions

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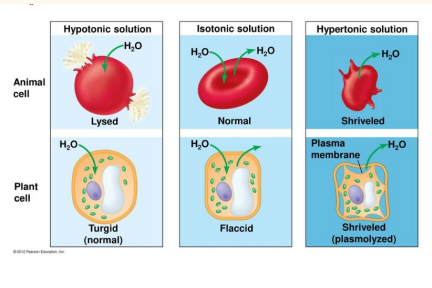
Not published yet.
Last updated 14th May, 2020.

Cell Organelles (cont)

Lysosomes	Contain hydrolytic enzymes for intracellular digestion, recycling of a cell's organic materials, apoptosis
Vacuoles	Storage and release of macromolecules and cellular waste products; In plants, aids in retention of water for turgor pressure

Osmosis



Water moves (by osmosis) from areas of H H20 potential/L solute concentration to areas of L H2O potential/H solute concentration