Organelles

Ribosomes = synthesize proteins; made of rRNA

Rough ER = compartmentalize cell and modify proteins synthesized by ribosomes

Smooth ER = detoxification of drugs, store calcium ions, and lipid production

Golgi Complex = package and fold proteins coming from ER; synthesize lysosomes

Mitochondria = ATP production for cellular respiration; contain double membrane; inner foldings are called cristae

Lysosomes = break down waste; digest food by using phagocytosis or engulfing nutrients to digest them with enzymes

Vacuole = water storage

Chloroplast = photosynthesis

Centrioles = small, paired cylindrical structures during cellular division, only in animal cells

Facilitated Diffusion

passive transport that does not require energy

concentration gradient = particles move from highly concentrated area of particles to less concentrated area

channel proteins = hydrophilic passage for molecules to avoid hydrophobic core; ex: aquaporins

carrier proteins = slower than channel proteins; alter shape to transport hydrophilic molecules

Cell Size

the greater the SA/V ratio, the more efficient the cell is

Tonicity

hypertonic solution = more solute than inside of cell; water rush OUT OF CELL (hyper run outside); plasmolyze

hypotonic solution = less solute than inside of cell; water rushes INTO CELL (optimal for plants); turgid

osmoregulation = cells can regulate their solute concentrations, maintain water balance, allows organisms to control their internal environment

water potential = tendency for water to move in one direction to another (water will flow from areas of high water potential to low) (high pressure to low) (low solute to areas of high solute)

osmosis = high water potential to low water potential

isotonic = same; flaccid

prokaryotes vs eukaryotes

prokaryotes (bacteria): cytoplasm, nucleoid (circular DNA), cell wall, cell membrane, ribosomes, flagella (movement), capsule outside of membrane

eukaryotes (fungi, protists, plants) : nucleus, nucleolus, only plasma membrane, membrane--bound organelles

Cell Membrane

small non polar molecules (N2, O2, CO2) can pass membrane easily, but larger polar molecules and ions cannot pass hydrophobic region alone

aquaporins = channel protein for water

channel proteins = a channel for smaller molecules like ions

carrier proteins = for larger molecules like glucose; once it enters inside, it spins to the other side of membrane

glycoproteins and glycolipids help with cell signaling and the attachment of the cell to other structures

hydrophobic fatty acid tails repel charged and polar molecules

cell compartmentalization

eukaryotes compartmentalize their internal processes in membrane-bound organelles; much more efficient

eukaryotic cells = RNA is made from DNA, RNA moves out of nucleus to ribosome or ER

prokaryotic cells = RNA is made from DNA, RNA is immediately converted into a protein because there is no nucleus or ER

endosymbiotic theory

how eukaryotic cells evolved form prokaryotic cells?

endosymbiotic theory (cont)

early ancestor of eukaryotic cell engulfed a prokaryotic cell, and the prokaryotic cell became an endosymbiont (a cell living in another cell) which was the mitochondria and chloroplast

Transport

simple diffusion = passive; small non-polar molecules with concentration gradient

facilitated diffusion = passive; small polar molecules and ions with concentration gradient; transport protein needed

osmosis = facilitate diffusion of water

active transport = energy needed; bulky molecules traveling against concentration gradient

endocytosis = taking bulk material INTO cell

three types of endocytosis:

1. phagocytosis = cell engulfs large molecule, brings into cell, becomes food vacuole (phagosome)

2. pinocytosis = cell engulfs small solutes, bring into cell, becomes vesicles

3. receptor-mediated endocytosis = receptor binds to cell. when solutes bind to receptor, forms vesicle that will bind to lysosome until solutes are digested

Transport (cont)

exocytosis = taking bulk material OUT OF cell; transport vesicle from golgi apparatus will fuse with membrane and release its contents outside of cell

plant cell vs animal cell

plants: cell wall, central vacuole, plasmodesmata, chloroplast

animals : lysosomes, centro-somes, flagella

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