

### Organelles

Nucleolus	where rRNA & ribosomes are synthesized
Ribosomes	protein factories
Peroxisomes	use converts $H_2O_2$ to water+ $O_2$
Endome-mbrane System	regulates protein traffic+m-etabolic functions
Nucleus	holds chromatin, surrounded by nuclear envelope
Endoplasmic Reticulum	Rough: makes proteins Smooth: synthesizes lipids, stores $Ca^{++}$ , detoxifies drugs/poisons
Golgi Apparatus	processes, packages, & secretes substances
Lysosomes	intracellular digestion
Mitochondria	powerhouse of the cell :) (respiration)
Vacuoles	storage & pumping out water
Chloroplast	absorbs light & synthesize sugar
Cytoskeleton	maintains cell shape, flow, positioning
Centrioles	organize spindle fibers (cell division)
Centrosomes	
MTOCs	
Cell Wall	protects, maintains shape, regulates water intake

### Prokaryotic vs. Eukaryotic Cells

Prokaryotes	Eukaryotes
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### Prokaryotic vs. Eukaryotic Cells (cont)

-no internal membranes/organelles	-membrane-bound organelles
-circular DNA	-DNA forms chromosomes
-small ribosomes	-larger ribosomes
-anaerobic or aerobic metabolism	-aerobic metabolism
-no cytoskeleton	-cytoskeleton present
-mainly unicellular	-mainly multicellular
-very small	-larger cells

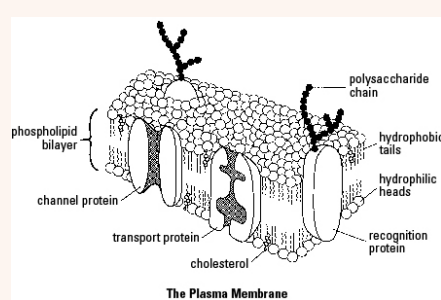
### Water Potential ( $\Psi = \Psi_p + \Psi_s$ )

water potential	potential energy of water to move elsewhere
solute potential	tendency of water to move across a permeable membrane into solution ( $\Psi_s = -iCRT$ )

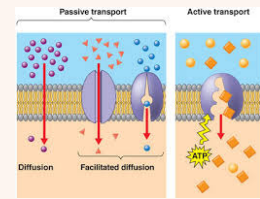
### Types of Cell Communication

Quorum Sensing	monitors bacteria population density & controls gene expression
Autocrine Signals	produced & used by same cell
Juxtacrine Signals	physically touching cells (gap junctions, plasmodesmata)
Paracrine Signals	adjacent (not touching) cells (synapses, growth factors)
Endocrine Signals	for all tissues, long distance (hormones)

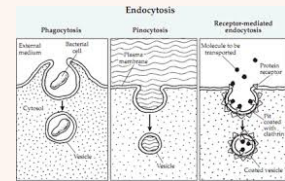
### Plasma Membrane Structure



### Plasma Membrane Transport



### Endocytosis & Exocytosis



### Signal Transduction Pathways- Reception

Reception	ligand binds to cell membrane or intracellular receptors & activates 2nd messenger
Ion channel	allows influx of ions to carry a message
GPCR	ligand binds, changes cytoplasmic structure, activates G protein, bonds to GTP, catalyzes cAMP production
Protein kinase (RTKs)	ligand binds, aggregates+activates tyrosine kinase regions, activates relay proteins
Intracellular	hydrophobic messengers diffuse into the cell and control genes

### Signal Transduction & Response

Signal transduction pathway	multistep process in which extracellular signal molecules produce a cascade effect
Second messenger	intermediate molecule (like cAMP) that distributes+amplifies signal throughout the cell
Response	regulation of protein synthesis by turning genes on/off

### Apoptosis

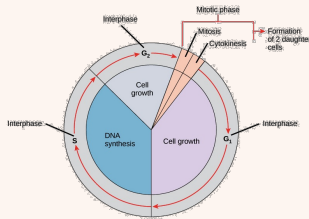
may be engulfed when no longer needed

cells with genetic damage are replaced

defense against infection

signals trigger caspases to carry out apoptosis

### The Cell Cycle



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