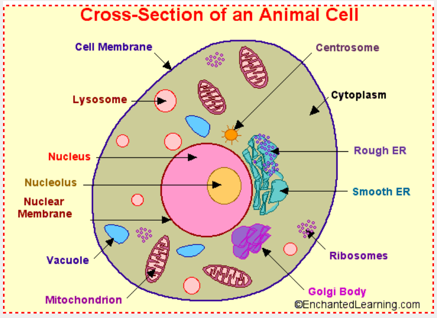
Cell Biology Cheat Sheet

by Bendash13 (Bendash13) via cheatography.com/24992/cs/8339/

Animal Cells



Organelle Functions

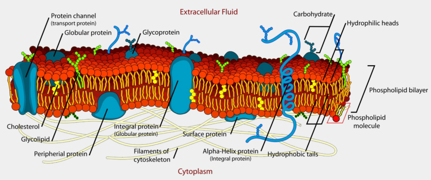
Organelle	Function
Centrosome	Forms Centrioles for Mitosis & Myosis
Lysome	Gets rid of waste products
Nuclear Pore	Transports messenger RNA
Chromosome	DNA + protein-> Chromatid
Smooth E.R.	Lipid synthesis, Vitamin + Mineral accumulation
Rough E.R.	Protein synthesis
Ribosome	messenger RNA joins with RNA to make aminoacid chains
Mitochondria	Site of respiration
Golgi Body	Packaging of products in a cell
Nucleo Plasm	Hydro-skeleton to hold chromasome
Nucleolus	Ribosomal RNA production
Nuclear Membrane	Holds nucleoplasm in place

Nucleoplasm+Cytoplasm=Protoplasm

Types of Cells

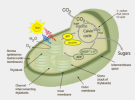
Eukaryotic Cells	Plant and animal cell with a nucleus and membrane-enclosed organelles.
Prokaryotic Cells	Unicellular organism without a nucleus or membrane enclosed organelles.

Cell Membrane



Surface Carbohydrate: used in cell recognition and communication.
Channel Protein: allow micro-molecules to enter and exit the cell.

Structure of Chloroplasts



Chloroplast Structure

Structure	Function
Thylakoid	A thylakoid is a membrane-bound compartment inside chloroplasts and cyanobacteria. They are the site of the light-dependent reactions of photosynthesis.
Grana	A stacked membranous structure within the chloroplasts of plants and green algae that contains the chlorophyll and is the site of the light reactions of photosynthesis. The saclike membranes that make up grana are known as thylakoids. See more at chloroplast.
Stroma	The colorless fluid surrounding the grana within the chloroplast. Dark-Phase takes place here

Structure of Mitocondria

Structure of Mitocondria

Structure	Function
Cristae	Mitochondrial cristae are folds of the mitochondrial inner membrane that provide an increase in the surface area. This allows a greater space for processes that happen across this membrane.
Matrix	the substance occupying the space enclosed by the inner membrane of a mitochondrion; it contains enzymes, filaments of DNA, granules, and inclusions of protein crystals, glycogen, and lipid.

Passive Cell Transport

Diffusion	The movement of molecules from and area of high concentration to an area of low concentration, until an equilibrium is reached.
Osmosis	Movement of **fresh** water (with low to no soluble components dissolved in it) from an area of high concentration to an area of low concentration through a semi/selectively-permeable membrane.
Channel Protein	The Channel Protein in the cell membrane allows the passive transport of larger molecules that cannot diffuse through the membrane.

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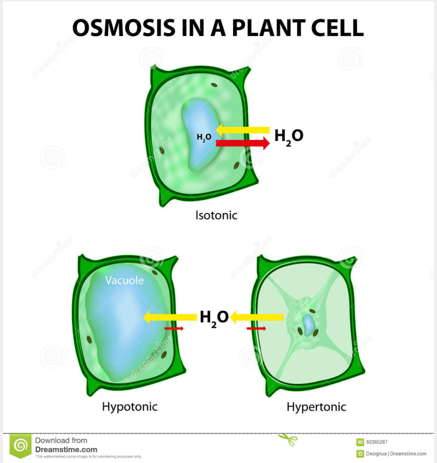
Passive Cell Transport (cont)

Carrier Protein	A charged molecule, such as ions, regardless of size cannot diffuse through the membrane. Micromolecules attaches to carrier protein which then travels through the membrane and releases the molecules inside.

Osmosis in Plant Cells



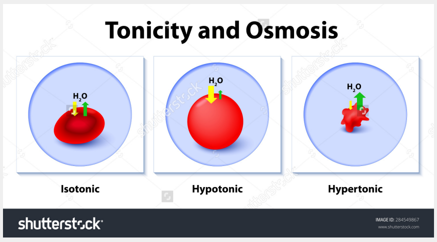
Osmosis in Plant Cells

If tonicity inside the cell > tonicity outside the cell: Cell becomes turgid as water diffuses into the cell, turning the cell rigid and giving the plant structure

If tonicity inside the cell = tonicity outside the cell: Cell loses some of the turgor pressure. Overall plant structure and integrity compromised

If tonicity inside the cell < tonicity outside the cell: Cell becomes plasmolysed as the water diffuses out of the cell. Cell membrane and cytoplasm detaches from Cell Wall.

Osmosis in Animal Cells



Osmosis in Animal Cells

If tonicity inside the cell > tonicity outside the cell: Cell takes on so much water that there is a possibility of it becomeing lysed, or bursting.

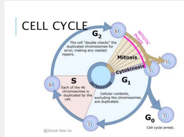
If tonicity inside the cell = tonicity outside the cell: Cell behaves normally

If tonicity inside the cell < tonicity outside the cell: Cell becomes shrivelled

DNA Replication

Splitting of DNA Strand	DNA strand is unwound and split into two halves by the enzyme helicase, hence creating a structure called a replication fork
Leading Strand	DNA polymerase binds to the leading strand (5'-3' beginning of the fork to the end) and reads the DNA in the 3' to 5' direction, adding nucleotides in the 5'-3' direction
Lagging Strand	RNA primers attach to points of the lagging strand. Okazaki fragments are able to be attached to the lagging strand using these primers as markers. RNA primers are removed by enzymes, and DNA polymerase replaces the gaps left by the primers.
Recombination of Strands	DNA strand is re-wound.

Cell Cycle



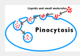
Active Transport

Molecules (usually **macro-molecules**) can be made to move against the concentration gradient (i.e. beyond an equilibrium) this requires the expenditure of energy ATP (Adenosine-Tri-Phosphate).

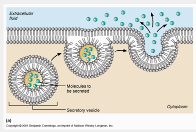
Endocytosis - Entering The Cell

Pinocytosis	Phagocytosis
Movement of small macro molecules and liquids/Fluids through a cell membrane enclosed in a vesicle	Phagocytosis is the same as pinocytosis but involves larger molecules

Pinocytosis/Phagocytosis



Exocytosis



The transport of material out of a cell by means of a sac or vesicle that first engulfs the material and then is extruded through an opening in the cell membrane

Photosynthesis

Light Phase	Dark Phase
Light energy is used to split a water molecules into oxygen and hydrogen (Photolysis)	3 CO2 molecues are introduced into the stroma and are added to the Hydrogen+ATP molecules to make 1 G-3-P (Glyceraldehyde 3-phosphate)

Photosynthesis (cont)

The oxygen escapes the cell as a bi-product. The H+ ion binds with a nearby electron to form a hydrogen atom, The energy released is used to create ATP	This process of converting CO2 to G-3-P. To create glucose, this is repeated to produce 2 G-3-P molecules, a total of 6 CO2 to make 1 Glucose

Photosynthetic reactions are affected by:
The surface area of the chloroplast, thylakoid membrane etc.
The concentration of reactants
The presence of Catalysts
Temperature and pH

Respiration - Step 1 - Glycolysis

Step 1. Glycolysis

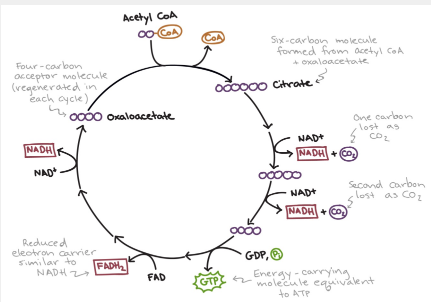
Occurs just outside the mitochondria. Glucose is split into 2 pyruvate molecules, requiring 2ATP and producing 4 ATP. Net gain of 2ATP

Pyruvate molecules are converted in to acetayl coenzyme A, which then enter the matrix space

(Bacteria only undergo this one step as they have very little energy requirements)

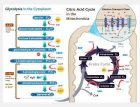
In anaerobic conditions, this produces ethanol and CO2 in plants and bacteria, while animal cells produce lactic acid and CO2

Respiration - Step 2 - Krebs Cycle



Acetyl co-enzyme A joins to a carbon carrier molecule and loses carbon as CO2
Hydrogen atoms are lost also and they in turn lose their elections -> net 2ATP molecules are produced

Respiration - Step 3 - Electron Chain



Hydrogen ions formed in Krebs cycle bind to O2 and produce water. Energy released is used within the cristae to produce ATP. During the entire cycle, there is a net production of 38 ATP