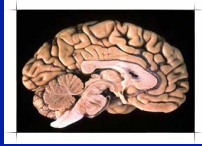


Cellular Respiration



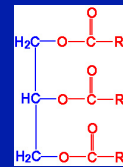
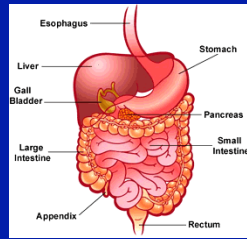
Metabolism

- Involves the many chemical reactions (breaking down and rearranging of bonds-providing cells with energy) that power all body activities



Digestion

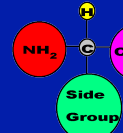
- Chemical changes of food
- Series of reactions where food is broken down into its components (smallest parts)



Fats



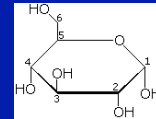
Amino Acids



Proteins



Glucose

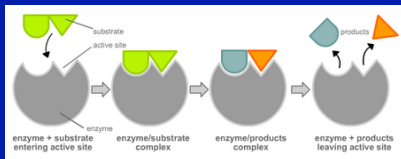


Carbohydrates

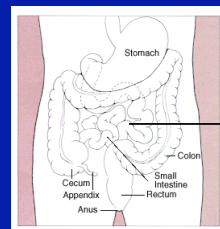


Enzymes

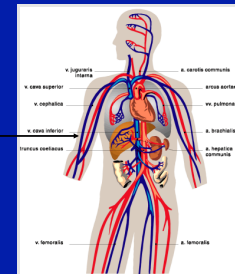
Help speed up chemical reactions



Small intestine



Circulatory system



Circulatory system

Liver

Fats and Starches

wealth

Cell

Processing factory

ATP

- Glucose → ATP (adenosine triphosphate)
- One unit of adenosine and three units of smaller phosphate molecules
- Last phosphate molecule is attached by high-energy bond-it is the bond that is the key for storing, transferring, and releasing energy.

ADP

- Adenosine diphosphate
- One unit adenosine and two units phosphates
- Can become ATP by adding an energy phosphate

Cellular Respiration

- How energy in glucose and ATP is released and used by cells
- Occurs in 2 stages: in the cytoplasm and mitochondria

Anaerobic Respiration (Glycolysis)

- First stage occurs in the cell's cytoplasm
- Without the presence of oxygen
- Glucose molecule is split into two molecules of pyruvic acid
- 2 molecules of ATP are yielded
- Not efficient

Fermentation

Pyruvic Acid → Lactic Acid
(animals)
Ethanol and CO₂
(plants)



Aerobic Respiration

- 2nd stage
- Occurs in the presence of oxygen
- More efficient
- Pyruvic Acid → Acetic Acid
- Acetic acid enters the mitochondria



- Acetic acid + coenzyme A (CoA) → acetyl CoA
- Acetyl CoA – “crossroads compound” – it occupies a central position in cell metabolism

Stage 1

Anaerobic
respiration In
cytoplasm

Lactic acid
or Ethanol
and CO₂

Glucose

2 ATPs

Pyruvic Acid

Pyruvic Acid

Stage 2

Aerobic respiration

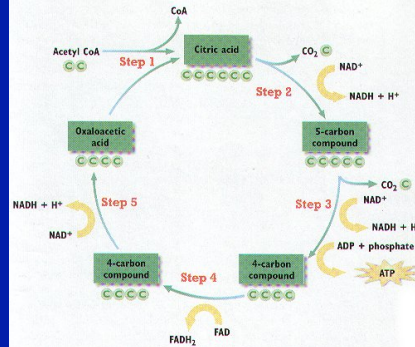
Acetic acid

CoA

Acetyl CoA



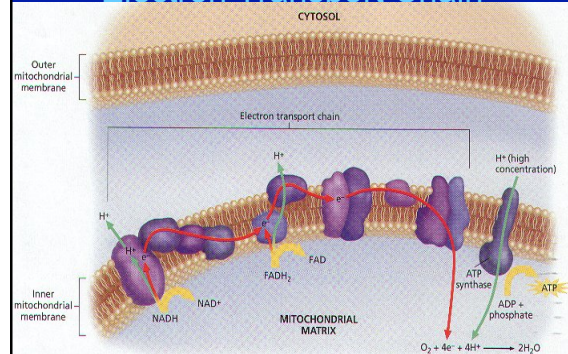
Kreb Cycle (citric acid cycle)



Kreb Cycle

- Series of chemical reactions
- Acetyl CoA moves to the Kreb Cycle and releases acetic acid, which enters the cycle
- Molecules are rearranged
- CO₂ released
- Energy-carrying hydrogens are removed

Electron Transport Chain



Electron Transport Chain (ETC)

- Involves the electrons from the H-atoms produced in the Krebs Cycle
 - They go thru a chain of reactions where they give up their energy to ADP + Phosphate to form ATP
- The electrons and H-atom combine with O₂ we breathe to form water (last product of cell respiration)

How many ATPs?

- 2 ATPs** from anaerobic respiration
- + 36 ATPs** from aerobic respiration (mainly from ETC)

- 38 ATPs** Total from each molecule of glucose



>



Catabolism

- The breaking down of complex molecules into simpler ones
 - Glucose → acetyl CoA
 - Protein → amino acids
 - Starch → glucose

Anabolism

- Opposite of catabolism
- Building up of large, complex molecules from smaller ones
 - Amino acids → protein
 - Glucose molecules → glycogen/starch

Cell Respiration



glucose	oxygen	carbon dioxide	water	energy
<i>reactants</i>		<i>products</i>		