Cheatography

AP Biology Unit 1: Biochemistry Cheat Sheet

by hlewsey via cheatography.com/36676/cs/11528/

Properties of Water

Polarity:
- allows cohesion, adhesion, surface tension

High Specific Heat:
- resists temp change
- high heat of vaporization
- allows evaporative cooling (high energy particles vaporize)

Universal Solvent:
- dissolves hydrophilic/repels hydrophobic

Properties of Carbon

tetrav-alence	4 bonds->complex molecules
hydroc-arbons	C and H, release energy
structural isomer	differs in covalent arrang-ement of atoms
geometric isomer	differs in spacial arrang-ements around double bonds
enantiomer	mirror image of 4 molecules attached to asymmetric carbon

Functional Groups

-OH	hydroxyl	polar/hydrophilic
-CH3	methyl	nonpolar/hydrop-hobic
-COOH	carboxyl	polar/hydrophilic
-COH	carbonyl	polar/hydrophilic
-NH2	amino	polar/hydrophilic
-SH	sulfhydryl	nonpolar/hydrop-hobic
-PO4	phosphate	polar/hydrophilic

Acids and Bases

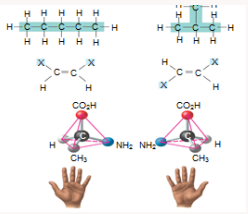
Acid	increases H+ in solution
Base	reduces H+ in solution (accepts H+or donates OH-)
pH	=-log[H+]
Buffer	accepts/donates H+ to stabilize pH

Metabolism

metabolic pathway	a specific molecule that is altered in defined steps catalyzed by enzymes that result in a certain product
catabolic pathway	releases energy by breaking down complex molecules
anabolic pathway	consumes energy to build more complex molecules
energy	the capacity to cause change or rearrange matter

Isomers

- Structural
- Geometric
- Enantiomers



Laws of Thermodynamics

1st Law of Thermodynamics

> energy can be transferred and transf-ormed but not created or destroyed

2nd Law of Thermodynamics

> every energy transfer/transformation increases the entropy of the universe; a process must increase entropy to be spontaneous

Free Energy

Gibbs free energy- $\Delta G=\Delta H-T\Delta S$

> energy in a temp/pressure constant system that can perform work

exergonic

> has a net release of free energy ($-\Delta G$)

endergonic

> absorbs free energy ($+\Delta G$)

ATP

> ribose, adenine, 3 phosphate groups
> hydrolyzed to ADP+P_i
> phosphorylated molecules=more reactive

Large Biomolecules

Carbohydrates

> -monosaccharides held by glycosidic linkages
> -energy storage, structure, protection

Lipids

> -fatty acids held by ester linkages
> -hydrophobic, saturated/unsaturated, hormones

Nucleic Acids

> -nucleotides held by phosphodiester H-bonds
> -enable reproduction, controls protein synthesis

Proteins

> -amino acids held by peptide bonds
> -follow varied instructions from DNA

Enzymes

Enzymes

> these macromolecules act as catalysts that lower activation energy barriers by forming an induced fit w/substrate in the active site

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Enzymes (cont)

Enzyme Activation

-gene regulation= enzymes produced when needed
-activators=cofactors (inorganic) and coenzymes (organic) make up and help enzymes function

Enzyme Inhibition

-competitive=inhibitor molecule binds to active site to block substrate
-allosteric=inhibitor molecule binds to allosteric site to cover or change shape of the active site

Optimal Conditions

-enzymes have optimal temp+pH
-cofactors+coenzymes bind to enzyme or substrate

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