Chapter 5 AP Biology Cheat Sheet

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5.1- Macromolecules

Polymer- long molecule consisting of many similar or identical building blocks linked by covalent bonds

Monomer- one of the smaller repeating units that serve as building blocks of a polymer

Enzymes- specialized macromolecules that speed up chemical reactions in cells; facilitate process of making and breaking down polymers

Dehydration reaction- reaction in which two molecules are covalently bonded to each other with the loss of a water molecule; one monomer provides hydroxyl (OH), the other provides H

Polymerization - process of monomers being added to chain one by one in creating a polymer

Hydrolysis- reverse of dehydration reaction; bond between monomers broken by addition of a water molecule where H attaches to one monomer and OH attaches to the other

Digestion- enzymes attack polymers (too large to enter cells) to speed up hydrolysis, released monomers absorbed into bloodstream, cells use dehydration reactions to assemble monomers into new polymers to perform various functions

Polymers constructed from 40-50 common monomers and other rare ones; small and common molecules act as building blocks ordered into unique macromolecules with emergent properties not found in individual components

5.2- Carbohydrates

Carbohydrates- include sugars and polymers of sugars

Monosaccharides- simple sugars and simplest carbohydrates; monomers from which more complex carbohydrates are built; generally have molecular formulas that are some multiple of CH2O

Disaccharides- double sugars consisting of two macromolecules joined by a covalent bond; must be brokend own into monosaccharides to be used for energy by organisms

Polysaccharides- carbohydrate macromolecules composed of hundreds to thousands of monosaccharides joined by glycosidic linkages

Glucose- aldose, most common monosaccharide, C6H12O6, consists of a carbonyl (>C=O) and multiple hydroxyls (-OH)

Aldehyde sugars (aldose)- carbonyl group on end of carbon skeleton, *ketone sugar (ketose)*- carbonyl group within carbon skeleton

Trioses- three-carbon sugars (C3H6O3), *pentoses*- five-carbon sugars (C5H10O5), *hexoses*- six-carbon sugars (glucose)

Asymmetric carbon- carbon attached to four different (groups of) atoms; placement of parts around an asymmetric carbon gives sugars distinctive shapes and binding activities, eg. glucose and galactose

Pentoses and hexoses like to form rings in aqueous solutions because they are the most stable form of sugars under physiological conditions

Cellular respiration- cells extract energy from glucose molecules by breaking them down in a series of reactions

5.2- Carbohydrates (cont)

Monosaccharides serve as major nutrients for cellular work; carbon skeletons serve as raw material for synthesis of organic molecules

Glycosidic linkage- covalent bond formed between two monosaccharides by dehydration reaction to form disaccharides

Maltose- disaccharide formed by linking two glucose molecules; 1-4 glycosidic linkage

Sucrose- most common disaccharide; formed between glucose and fructose; 1-2 glycosidic linkage

Lactose- disaccharide formed between glucose and galactose; lactose intolerance caused by lack of lactase (enzyme used to break down lactose)

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