**Biology 20 Notes - Nutrients**

* Vitamins and minerals Micronutrients
* Lipids (fats) Macronutrients
* Carbohydrates
* Proteins
* Nucleic Acids

**Carbohydrates**

* Provide fast source of energy and make up the largest components in most diets

Ex., potatoes, bread, corn, rice and fruit

* our body is unable to make them, we need to rely on plants
* They are macromolecules that always contain

carbon, hydrogen and oxygen; almost always in same

 proportions: *2 atoms of hydrogen and 1 atom of oxygen*

*for every atom of carbon*

* Carbohydrates are classified according to the number of sugar units they contain:
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - single molecule of sugar

Ex.,

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - 2 molecules of sugar

Ex., maltose = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Sucrose = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Lactose = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - 3 or more molecules of sugar

Ex., plants ->

 Humans ->

**Formation of Molecules**

* All assembled in cells the same basic way
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* To form a covalent bond between two subunit molecules, an –OH (hydroxyl) group is removed from one subunit and a hydrogen atom is removed from the other subunit
* Removing the –OH group and H atom during the synthesis of a new biological molecule essentially removes a molecule of water
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A molecule of water is added instead of removed
* A hydrogen atom from water is attached to one subunit and the hydroxyl group is bonded to another subunit effectively breaking a convalent bond in a macromolecule



* Both processes are carried out in the cell and involve enzymes.

**Lipids**

* Diverse group of macromolecules – all are insoluble in water
* Store 2.25 times more energy per gram than other biological molecules
* Functions:
	+
	+
	+
	+
	+
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Animal fats – ex., butter, lard
* Solid at room temperature
* Hard to break down
* Single bonds between carbons ***See figure 7 on p 246***
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Liquid at room temperature – ex., vegetable oils
* Double bonds between carbons
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Waxy, fat like substance
* Found naturally in membranes
* Not all bad

**Atherosclerosis –**

***Read the Case Study “Fats and Health” on p 248 and answer the questions that follow.***

During the synthesis of a fat molecule, **three fatty acid molecules** bond with **one glycerol** molecule, and three water molecules are produced.

**Proteins**

* Structural component of cells

Ex., muscle, hair, nails, nerves, cell membrane

* Mitochondria and ribosomes are composed largely of proteins
* Antibodies are specialized proteins that help the body defend itself against disease
* Enzymes are proteins that speed up chemical reactions
* Contain carbon, hydrogen, oxygen, nitrogen, and often sulfur atoms]
* Can supply energy for tissues but not their main function
* Made up of 20 amino acids. 11 of which can be synthesized by the body and nine (essential amino acids) which must come from the diet.
* General structure of an amino acid:
	+
	+
	+
* Order of amino acids determines the type of protein
* **Polypeptides join amino acids together**
* A chain of three or more amino acids is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A proteins shape or structure determines its function

***See fig. 13 on p251 for structure of protein.***

**Complete the following questions from your text.**

 **P 245 #1-6**

 **P 247 # 7-10**

 **P 253 # 1 –3**

***Know TABLE 2 on p. 253***