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|  | **Topic: Molecules: Carbohydrates & Lipids**  **Learning Objective: I can explain how sugar molecules are rearranged to form other macromolecules.** |
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| **Essential Question**: What is the structure and function of carbohydrates and lipids? | |
| **Questions:** | 1. What is a Macromolecule?    1. It must be a large molecule    2. It must have a complex structure. 2. What is a Monomer?    1. Mono= one ; -mer= part of    2. A monomer is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a polymer 3. What is a Polymer?    1. Poly= many    2. A long molecule made of monomers bonded together   II. Classes of Organic Molecules   1. Carbohydrates 2. Lipids 3. Proteins 4. Nucleic Acids   A. Carbohydrates= C(H2O)   1. Made of sugars and their polymers 2. Have Carbon (C), Hydrogon (H), and Oxygen (O) elements. 3. Functions:    1. Major fuel/ energy source    2. Can be used as raw materials for other macromolecules    3. Complex sugars= building materials for plants 4. Base unit (Monomer) is a Monosaccharide    1. Monosaccharide: A simple sugar       1. Glucose C6H12O6 (Corn syrup)       2. FructoseC6H12O6 (in fruits)       3. Galactose C6H12O6 (in milk    2. Disaccharide: two simple sugars linked together       1. SucroseC12H22O11 (table sugar: glu + fru)       2. LactoseC12H22O11 (milk sugar: glu + gal)       3. MaltoseC12H22O11 (formed from digestion of starch: glu + glu)    3. Polysaccharide: a chain of simple sugars       1. Starch: found in plants for energy reserves       2. Glycogen: in humans’ livers and muscles for energy reserves       3. Cellulose: found in plant cell walls for structural purposes       4. Chitin: found in insects exoskeleton and fungus cell walls for structural purposes 5. Functions: energy storage molecules for structural support   B. Lipids = C, H, O   1. Fats with varying structure 2. Hydrophobic = (“Hydro” = water ; “phobic” = Fearing) 3. Used for:    1. Long-term storage of energy    2. In cell membranes (cholesterol)    3. Protects against drying out (plant waxiness)    4. Insulation against cold    5. Speeds nerve transmissions    6. Absorbs shocks    7. Regulates cell activities by hormone actions 4. Structure of lipids    1. Triglycerides = Glycerol + 3 Fatty acid tails       1. Saturated fats : all Hydrogen filled in (no double bonds in fatty acid tails)          1. Most animal fats          2. Solid at room temperature       2. Unsaturated: Have one double bond between carbons in the fatty acids which allow for “kinks” in the tails          1. Most plant oils (olive oil)          2. Liquid at room temperature       3. Polyunsaturated: have many double bonds  |  |  | | --- | --- | | Saturated Fat | Unsaturated Fat |  * 1. Phospholipids = Glycerol + 2 fatty acid + Phosphate group      1. Function: creates cell membranes  |  | | --- | | Phospholipid |  * 1. Waxes = lipids that serve as coatings for plant parts and as animal coverings   2. Steroids = 4 Carbon rings + NO fatty acid tails      1. Function: Part of animal cell membranes and modified to form sex hormones  |  | | --- | | Steroids | |