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Organic Macromolecules

- I. Synthesis of Macromolecules
 - a. What are they
 - b. Compare/contrast condensation reactions with dehydration synthesis reactions
 - c. Describe a hydrolysis reaction and explain their importance
 - d. Explain the relationship between monomers and polymers.
- II. Carbohydrates
 - a. Monosaccharides—structure and function
 - i. What are they?
 - ii. Chemical formulas
 - iii. Molecular formulas
 - b. Disaccharides—structure and function
 - i. What are they?
 - ii. How do they form?
 - iii. Glycosidic linkage—structure and function
 - iv. Chemical formulas
 - v. Molecular formulas
 - b. Polysaccharides—structure and function
 - i. Structural
 1. plants
 2. animals
 - ii. Storage
 1. plants
 2. animals
 - iii. Chemical formulas
 - iv. Molecular formulas
- II. Lipids—structure and function
 - a. Fats—structure and function
 - i. Fatty acid—structure and function
 - ii. Triglyceride—structure and function
 - iii. Saturated—structure and function
 - iv. Unsaturated/monounsaturated—structure and function
 - v. Polyunsaturated—structure and function
 - vi. Steroids—structure and function
 - vii. Phospholipids—structure and function

- b. Waxes—structure and function
- c. Oils—structure and function
- III. Proteins—structure and function
 - a. Types and uses
 - b. Amino acids—structure and function
 - c. Polypeptide chain—structure and function
 - d. Peptide bond—structure and function
 - e. Conformation
 - i. Primary—structure and function
 - ii. Secondary—structure and function
 - iii. Tertiary—structure and function
 - iv. quaternary—structure and function
 - f. Significance of sickle cell disease w.r.t. protein conformation
 - g. Denaturation and role in protein conformation
 - h. What is a chaperonin protein?
 - i. Describe the significance of x-ray crystallography in determining protein structure. How does it work?
- IV. Nucleic Acids—structure and function
 - a. DNA—structure and function
 - b. RNA—structure and function
 - c. Nucleotides—structure and function
 - d. Purine—structure and function
 - e. Pyrimidine—structure and function
 - f. Compare/contrast DNA and RNA
 - g. Explain the significance of DNA being antiparallel
- V. Which macromolecules are polymers? **How** are these polymers made?