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The Four Groups of Biologically Important Compounds

Group →	**Carbohydrates** **sugars, starches, etc.**	**Lipids** **fats, oils, waxes, etc.**	**Polypeptides & proteins**	**Nucleic acids** **DNA & RNA**
What elements are found in this group?	carbon, hydrogen and oxygen	carbon, hydrogen and oxygen (nitrogen and phosphorus in some)	carbon, hydrogen, oxygen, nitrogen & usually sulfur	carbon, hydrogen, oxygen, nitrogen, phosphorus
What are the monomers called?	monsaccharides: glucose "blood sugar" fructose "fruit sugar" galactose (these are all isomers of $C_6H_{12}O_6$)	fatty acids and glycerol (make up mono-, di-, & tri-glycerides) •FA are long chain with 1 polar end and 1 non-polar end	amino acids "AA" •20 different amino acids used in making •AAs differ by their R group	nucleotides •each one has a 5-carbon sugar, a N-base and a phosphate group
Dimers and polymers	• disaccharides: maltose=glucose+ glucose sucrose=glucose+ fructose lactose=glucose+ galactose • polysaccharides - can be single long chains, repeating branched chains of m.s.	• triglycerides – 3 FA all linked to 1 glycerol (diglycerides have 2 FA linked to 1 glycerol) ex: oils & fats • steroids – no FA…made of 4 interlocking carbon rings. classified as a lipid due to not dissolving in water • waxes – long chain alcohols	•AA join to form polypeptides • the bond between AA is called a peptide bond • 2 or more polypeptide chains "tangle" together to form a protein	• a nuclei acid is a chain made up of many nucleotides • DNA's nucleotides contain deoxyribose; RNA's contain ribose

Other information	polysaccharide examples: • starch is a long-chain glucose polymer used by plants to store energy • cellulose is a long-chain glucose polymer that makes up most of the cell walls in plants. Humans can't break the bonds between the glucose monomers due to lack of the needed enzyme (i.e. we can't digest it…AKA fiber) • glycogen is a branching glucose polymer sometimes called animal starch. Animals can easily break off glucose from glycogen to used the energy. • chitin is a tough polysaccharide in the exoskeletons of insects, shrimp, etc. and in the cell walls of fungi.	• lipids do not dissolve in water • major component of cell membranes • store high amounts of energy • protect vital organs and insulate	• hemoglobin has 574 AA arranged in 4 polypeptide chains • proteins have a specific shape that determines their function. If the shape changes…it can no longer do its job 6 general types of proteins: 1.enzymes* 2. structural 3. contractile 4. signal 5. transport 6. defense * We will spend time looking specifically at enzymes	DNA • stores info. for all cell activities RNA • transfers info. for making proteins
Demonstrations/labs done in class	• testing for sugar using Benedicts solution • testing for starches using iodine • taste tests of sugars	• simple brown paper bag test • insulation value of fats	enzyme demonstrations: • cracker in saliva • gelatin w/ fresh pineapple vs. canned • gelatin w/ meat tenderizer • enzymatic activity of raw vs. cooked liver • bread vs. with saliva iodine test	DNA extraction from foods