Organic compounds

Carbohydrates: sugars & starches

body's E source

elements: C, H, O H:O in 2:1 ratio

building block: monosaccharide

ex: glucose, fructose, galactose

monomer + monomer: disaccharide

ex: sucrose (table sugar)

many monomers: polysaccharide (starches)

ex: cellulose, plant starch

most abundant organic compd on earth

found in cell walls of plants, fiber, need in diet to keep digestive tract healthy

glycogen: animal starch

if too much glucose in body, we store as glycogen

-ose ending says sugar

dehydration synthesis: to build a larger molecule by removing a water molecule

hydrolysis: using water to break down a molecule into smaller parts

Organic Compds

lipids: oils, fats, waxes, steroids

need for long term E storage, insulation, padding, structure of cell membranes

elements: C, H, O in no set ratio

simplest lipid: **tryglyceride:** 1 glycerol + 3 Fatty acids

Fatty Acids: long hydrocarbon chains, -C-C-C-C- w/carboxyl grp at one end -COOH

the differences in lipids or fats is the FA in structure

ex of FA: palmitic acid, lauric acid, butyric acid

special lipid: phospholipid, 1 glycerol + 2 FA + phosphate makes up structure of cell membr

complex lipids: steroids, cholesterol

misc: saturated fats: all available C bonds are filled w/H

tend to be solids at rm temp, animal fats

butter, lard, fats on meats

unsaturated fats: there are some double & triple bonds between C's, not all filled w/H

liquids at rm temp, plant fats

vegetable oils, cannola, olive, sunflower oil

monounsaturated fat: only one double bond btw C's

polyunsaturated fat: many double & triple bonds

healthier for you than saturated fats

polyunsat are healthier than monounsaturated fats

saturated fats are ones that can clog arteries, plaque

unsaturated do not clog arteries

transfats: process of taking polyunsaturated fats and adding H to it, called hydrogenation

essentially, turning an unsat fat into a saturated fat

why? it has a longer shelf life & stabilized flavor

food industry created this, health industry has now worked against it

Organic compds

Proteins: body structure, hair, skin, nails, muscle, cell memb

functions: need them to build bodies

chemical messengers & receptors: hormones

enzymes: biological catalysts

defense: antibodies help fight disease

elements: C, H, O, N & sometimes S

building block: Amino Acid (AA)

20 different AA's in body

proteins are **macromolecules**: big

hemoglobin: prot in blood, carries O2, also has Fe component

anyway, hemoglobin is made of 4 separate chains of 121 AA units

ex: glycine, leucine, valine, methionine

proteins: bldg block: AA

Amino Acids: 3 parts attached to central C

1-amino group: -NH2

2-carboxyl group (acid): -COOH

3- R group: variable, is different for each AA

simplest is glycine, R=H

alanine, R=CH3

to begin building a protein

AA + AA----------> dipeptide (AA-AA) + H2O

AA + AA + AA----------> tripeptide (AA-AA-AA)+ 2 H2O

AA-AA-AA-AA-AA-AA-AA-AA-AA-AA-AA=polypeptide

Organic Compds

proteins are macromolecules

can be looked at in levels

primary structure: sequence of AA
alanine-glycine-leucine-methionine-etc

secondary structure: due to polarity of molecules & H bonding, sequence or chain of AA may twist or fold becoming 2D

tertiary structure: due to folding, other parts may now attract, nonpolar parts tend to fold inside
3D shape forms

quarternary structure: more than one chain of AA

the sequence of AA determines the proteins shape (secondary & tertiary struct)

the tertiary struct (3D) determines the function of prot
protein is not functional until it has 3D shape

Organic Compds

Nucleic acids: carry genetic info

tells cells what to do, how to make proteins, controls basic life processes of cell

elements: C, H, O, N, P

building block: nucleotide: 3 parts

1-5 C sugar

2-N base

3-Phosphate group -PO3

2 main kinds of nucleic acids: **DNA & RNA**

DNA: deoxyribonucleic acid, RNA: ribonucleic acid

5 C sugar is either ribose or deoxyribose (1 less O)

N bases: 5 of them: adenine, quanine, cytosine, thymine (only in DNA), uracil (only in RNA)

phosphate group is same in both

nucleic acids: **RNA:** ribose sugar, single-stranded, uracil instead of thymine

DNA: deoxyribose sugar, dbl-stranded, thymine

these forms chains of nucleotides

put together by dehydration synthesis