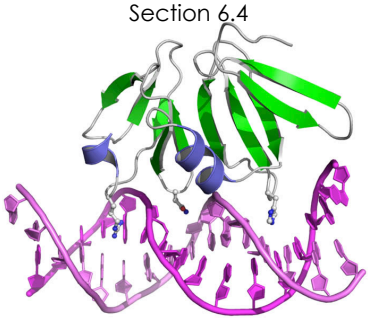
6.4 Building Block of Life

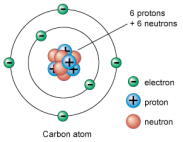
The Building Blocks of Life

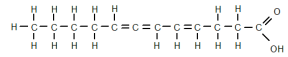
Section 6.4

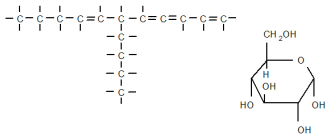


Carbon

- building block of life
- can form up to 4 covalent bonds
- 3 fundamental structures
  - straight chain
  - branched
  - ring



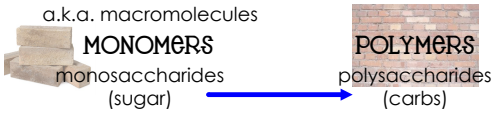




Just like this brick wall is made from several small bricks, a polymer is made from several small monomers.

Monomer & Polymers

- monomer ("bricks") - 1 subunit
- polymer ("brick walls") - a molecule that contains many monomers covalently bonded together
  - a.k.a. macromolecules



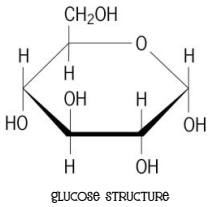
amino acids → proteins

fatty acids → lipids (fats)

nucleotides → nucleic acids

Carbohydrates

- elements - C, H, O in 1:2:1 ratio
  - ex. glucose $C_6H_{12}O_6$
- monomer - monosaccharide (simple sugar)
- drawing -



glucose structure

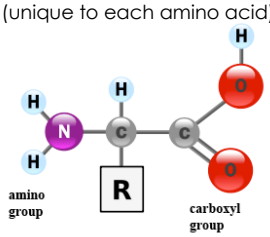
Carbohydrates - cont.

- examples -
  - monosaccharides - (simple sugars)
    - glucose, fructose, galactose
  - disaccharides - (2 sugars)
    - sucrose (table sugar)
  - polysaccharides - (many sugars)
    - starch (plants), glycogen (animals)
- purpose (function)
  - a. short term energy (sugars/starch)
  - b. energy storage (starch/glycogen)
  - c. structure (cellulose)

6.4 Building Block of Life

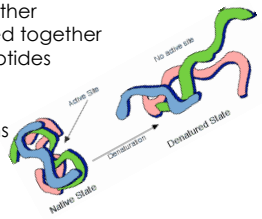
PROTEINS

- elements - C, H, N, O
- monomer - amino acid
  - a. amino group (-NH2)
  - b. carboxyl groups (-COOH)
  - c. "R" group (unique to each amino acid)
- drawing -



PROTEINS

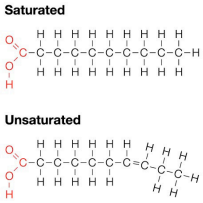
- example -
  - a. peptide bonds - covalent bonds between amino acids
  - b. dipeptide - 2 a.a. linked together
  - c. polypeptide - many a.a. linked together
  - d. a protein is 1 or more polypeptides
- purpose (function)
  - a. transportation
  - b. speed up chemical reactions
  - c. structure and support
  - d. make hormones
- extra information

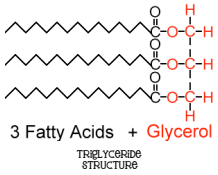


when pH drops or temp increases, proteins tend to unfold and lose their unique 3D shape making them useless

LIPIDS

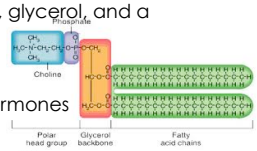
- elements - C, H, O
- monomer - fatty acid chains
  - a. saturated - C chains are saturated with H atoms
  - b. unsaturated - C chains contain double/triple bonds and fewer H atoms
- drawing -

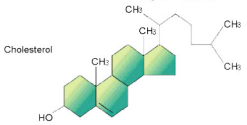




LIPIDS

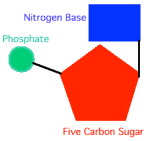
- examples-
  - a. fats, oils, wax, cholesterol
  - b. triglycerides - 3 fatty acids and glycerol
  - c. phospholipids - 2 fatty acids, glycerol, and a phosphate group
  - d. steroids - cholesterol and hormones
- purposes (functions)
  - a. store energy
  - b. provide barriers

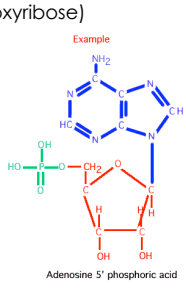




NUCLEIC ACIDS

- elements - C, H, O, N, P
- monomer - nucleotide
  - a. 5-carbon sugar (ribose or deoxyribose)
  - b. nitrogen base
  - c. phosphate group
- drawing -





NUCLEIC ACIDS

- examples -
  - a. DNA - deoxyribose nucleic acid
  - b. RNA - ribose nucleic acid
  - c. ATP - adenosine triphosphate
- purposes (function)
  - a. store and communicate genetic info
  - b. carry instructions for making proteins (over 200,000 in the human body)