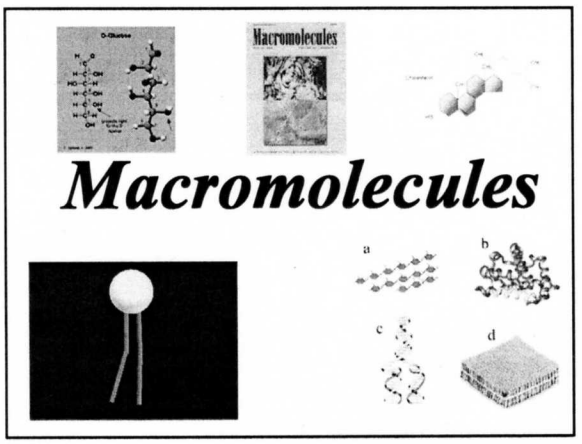
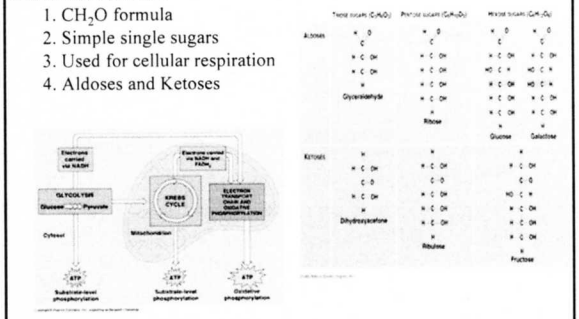


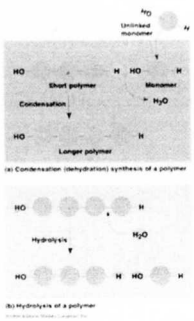
III. Carbohydrates

A. Monosaccharides
1. CH_2O formula
2. Simple single sugars
3. Used for cellular respiration
4. Aldoses and Ketoses



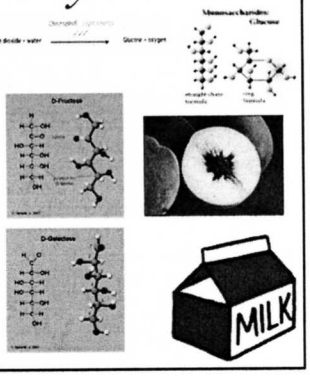
I. Polymers

A. Compounds made of repeating linked units
B. Covalent bonds link monomers
C. Condensation reaction
   a. Dehydration reaction
   b. Form a water molecule
D. Hydrolysis: bonds between monomers are broken by adding water (digestion)
E. Wide variety of polymers based on few monomers



III. Carbohydrates

5. Examples:
   a. Glucose
      1) Made by plants during photosynthesis
      2) Main source of energy for plants and animals
      3) Metabolized during cellular respiration.
      4) Ring structure in water
   b. Fructose
      1) Found in fruit.
      2) Sweetest sugar.
   c. Galactose- Found in milk.

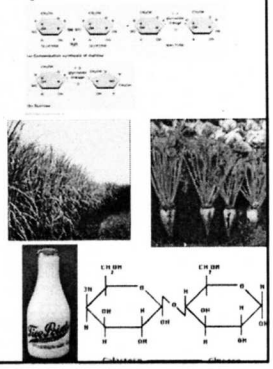


II. Molecules of Life

A. Four main compounds essential for life
   1. Carbohydrates
   2. Lipids
   3. Proteins
   4. Nucleic Acids
B. All contain C, O, and H, but in different ratios

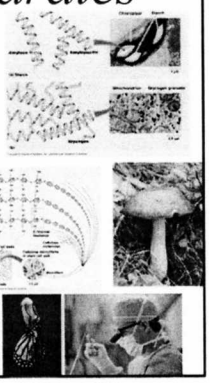
III. Carbohydrates

B. Disaccharides
   1. Form by Glycosidic linkage
   2. Covalent bond by dehydration reaction
   3. Sucrose
      a. Fructose + Glucose
      b. table sugar
      c. from beets and cane
   4. Lactose
      a. Glucose + Galactose
      b. found in milk
   5. Maltose: Glucose + Glucose



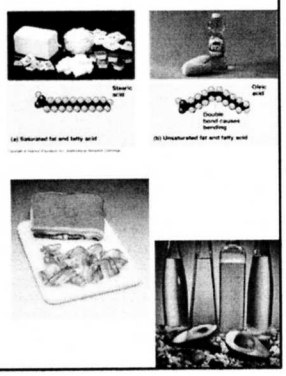
III. Carbohydrates

C. Polysaccharides
1. Three or more monosaccharides
2. Storage:
   a) Glycogen- The way animals store glucose.
   b)Starch- The way plants store glucose.
3. Structural:
   a)Cellulose- most abundant organic compound, cell walls of plants
   b)Chitin- exoskeletons; cell walls of fungi; surgical thread



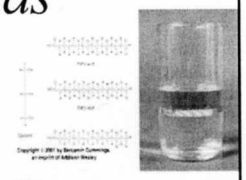
V. Lipids- Fats, Oils, Waxes

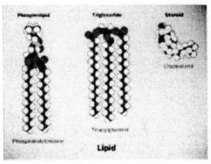
C. Triglycerides
1. Saturated - only single bonds
2. Unsaturated - some double bonds
3. Fats
   a) Usually found in animals
   b) Usually a solid at room temperature
4. Oils
   a) Usually found in plants
   b)Usually liquid at room temperature.

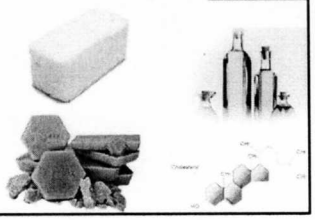


IV. Lipids

A. Large number of C and H, smaller number of O.
B. Don't dissolve in water.
C. Fats, oils, waxes, phospholipids, steroids.

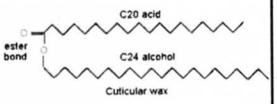






V. Lipids- Fats, Oils, Waxes

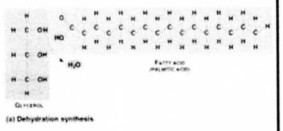
D. Wax
1. Long fatty acid connected to long alcohol
2. Long fatty acid = hydrophobic
3. protective barriers in plants and animals.

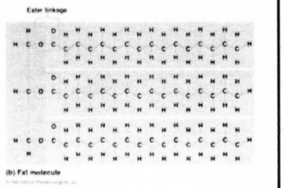


V. Lipids- Fats, Oils, Waxes

A. Fatty Acids
1. The monomer that makes most lipids
2. One end contains a hydrophilic carboxyl (COOH)
3. Non-polar C-H bonds in fatty acid 'tails'(hydrophobic)

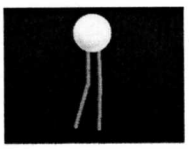
B. Ester linkage: 3 fatty acids to 1 glycerol (condensation reaction)

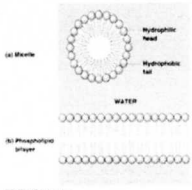




VI. Lipids- Phospholipids

A. 2 fatty acids and one phosphate group
B. 'Tails' hydrophobic; 'heads' hydrophilic
C. *Micelle* (phospholipid droplet in water)
D. *Bilayer* (double layer); cell membranes





VII. Lipids- Steroids

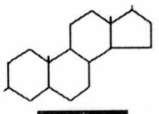
A. Lipids with 4 fused carbon rings

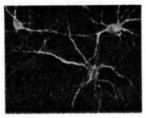
B. Not fatty acids.

C. Four carbon ring that does not dissolve in water.

D. Found in hormones, nerve tissue, toad venoms, plant poisons.

E. Cholesterol:
   a. cell membranes
   b. precursor for other steroids



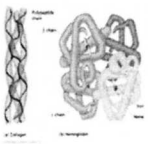


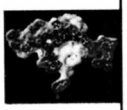
The Cell Membrane

VIII. Proteins

3. Tertiary
   a. H-bonds
   b. Disulfide bridges
   c. Ionic bonds
   d. van der Waals

4. Quaternary
   a. Two or more polypeptides
   b. Denatured by- Temp, pH, acids, bases, organic solvents, salt concentration





VIII. Proteins

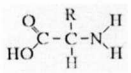
A. 50% dry weight of cells

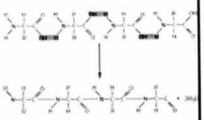
B. Form muscle, skin, and enzymes

C. Amino Acids (20)
   a. carboxyl (-COOH) group
   b. amino group (NH_2)
   c. H atom
   d. variable group (R)....
   e. R group has specific properties

D. Long chain of amino acids is a polypeptide.

E. Polypeptides: formed by dehydration reaction



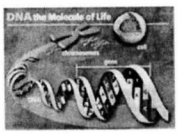


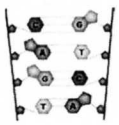
IX. Nucleic Acids

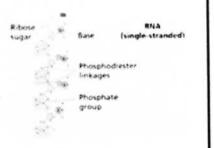
A. Stores hereditary information

B. Deoxyribonucleic acid (DNA)
   1. stores essential info for almost all cell activities
   2. blueprint for all proteins
   3. Watson and Crick (1953)- proposed double helix

C. Ribonucleic acid (RNA): stores, transfers info essential for the manufacturing of proteins.

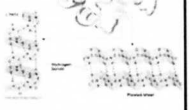






VIII. Proteins

F. Three-dimensional shape (native conformation)
   1. Primary
      a) Frederick Sanger
      b) Pioneered work on AA sequence of insulin
      c) late 1940s-early 1950s
   2. Secondary
      a. α Helix
      b. β Pleated Sheet

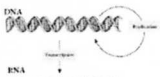


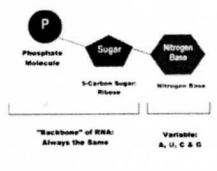
IX. Nucleic Acids

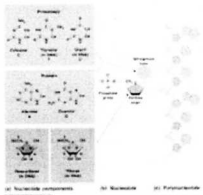
D. DNA→RNA →Protein

E. Monomers are polymers of nucleotides (polynucleotides)
   1. nitrogenous base
   2. pentose sugar
   3. phosphate group

F. Phosphodiester linkages







IX. Nucleic Acids

G. Nitrogenous bases:
   1. pyrimidines= cytosine, thymine, uracil(RNA)
   2. purines= adenine, guanine

H. A to T; C to G pairing by H-bonds