

Ch 27 HW: Sec Rev 4-11,25,31  
 Sec 27.2-27.3 obj: Describe the bonding in carbohydrates and the bonding of amino acids in peptides and proteins.

Major Biological Molecules

- Carbohydrates

- \* Compounds of Hydrogen, oxygen + Carbon.
- \* Carbohydrates are polymers from aldehydes + ketones w/ numerous hydroxyl groups attached.
- \*  $C_n(H_2O)_n$
- \* Simplest Carbohydrates (simple sugars) are called monosaccharides
- \* Glucose + Fructose

\* Glucose is an Aldehyde

Straight-chain and cyclic forms of glucose

\* Fructose is a ketone

Straight-chain and cyclic forms of fructose

\* When glucose + fructose are dissolved in water they change from the cyclic form to a branched chained form.

- Two simple sugars can link together through a condensation reaction and form disaccharides

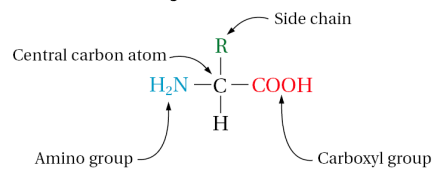
Glucose + Fructose  $\xrightarrow{-H_2O}$  Sucrose

- Polysaccharides are the result of polymerization/condensation of several monomers from simple sugars

- \* Polysaccharides are commonly called starches.
- \* Glycogen, Cellulose

- Amino Acids

- Any compound that contains an amino group and a carboxylic acid group.



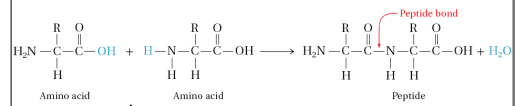
- There are 20 different amino acids

\* The chemical nature of the side groups distinguishes one amino acid from the other.

Abbreviations for Amino Acids	
Amino acid	Abbreviation
Alanine	Ala
Arginine	Arg
Asparagine	Asn
Aspartic acid	Asp
Cysteine	Cys
Glutamic acid	Glu
Glycine	Gly
Histidine	His
Isoleucine	Ile
Leucine	Leu
Lysine	Lys
Methionine	Met
Phenylalanine	Phe
Proline	Pro
Serine	Ser
Threonine	Thr
Tryptophan	Trp
Tyrosine	Tyr
Valine	Val

- Peptides

\* Combination of amino acids in which the amino group of one acid links w/ the hydroxyl group of another amino acid.



\* polymerization condensation reaction.

\* Peptides have fewer than 100 amino acids.

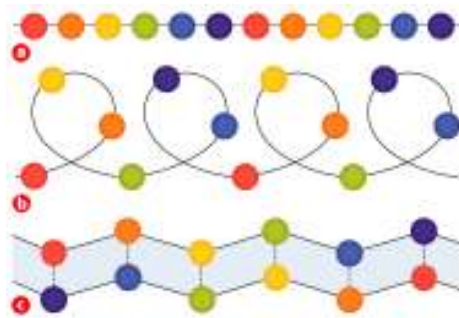
\* Peptides w/ less than 10 amino acids are named w/ prefixes.  
\* a peptide w/ 3 amino acids is called a tripeptide.

\* Peptides w/ 10 or more amino acids are collectively called polypeptides

\* To identify different polypeptides depends on the peptide sequence

- \* The order of the amino acids.
- Asp-Glu-Gly
- Gly-Glu-Asp

- Proteins
  - Peptide w/ more than 100 amino acids.
  - Needed for almost all chemical reactions that take place in the body
  - \* Differences in the peptide sequence creates different proteins
- Proteins commonly fold themselves to form a more stable structure.



- Enzymes
  - Proteins that act as biological catalysts.
  - \* Enzymes promote reactions, are unchanged by the reaction and do not disrupt the chemical equilibrium.
- Enzymes catalyze most of the chemical changes in a cell
  - \* Substrates are the substances that the enzyme interacts w/
  - \* The substrate binds to the enzyme at the active site



- \* The active site has a unique shape.
- \* One enzyme for one substrate.

- Coenzymes
  - \* Nonprotein enzyme that works w/ the enzyme.
  - \* Are metal ions or small organic molecules.
  - \* Mg, K, Fe + Zn