



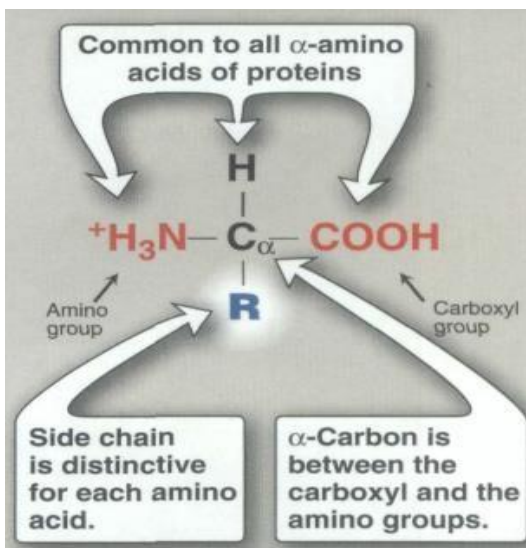
PROTEINS

Characteristics of Proteins

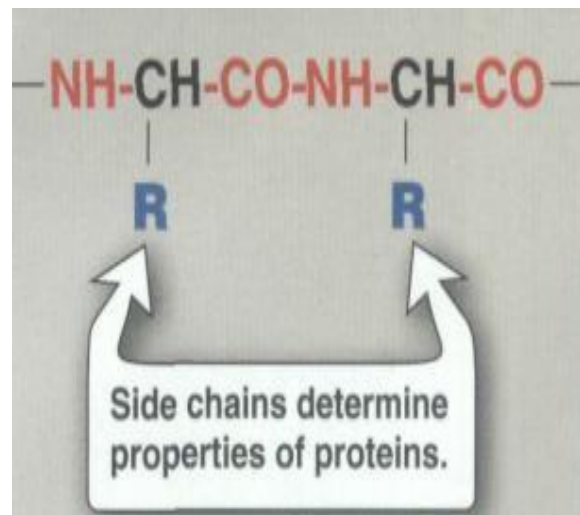
Proteins are macromolecules made of amino acids, with each amino acid being linked to another via a peptide bond. Peptide bond is formed when the carboxyl (-COOH) group of one amino acid links to the amino (-NH₂-) group of another amino acid with the loss of a water molecule .

- ✚ N-terminal: End of protein structure with a free amino group
- ✚ C-terminal: End of protein structure with a free carboxyl group

There are 20 types of amino acids found in proteins .



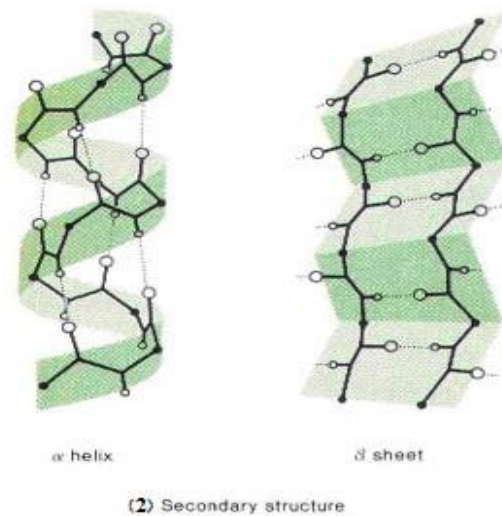
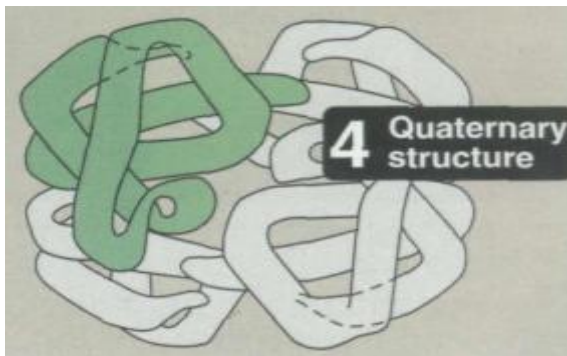
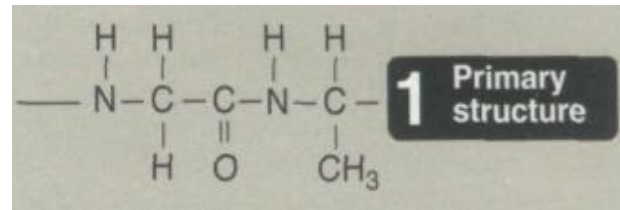
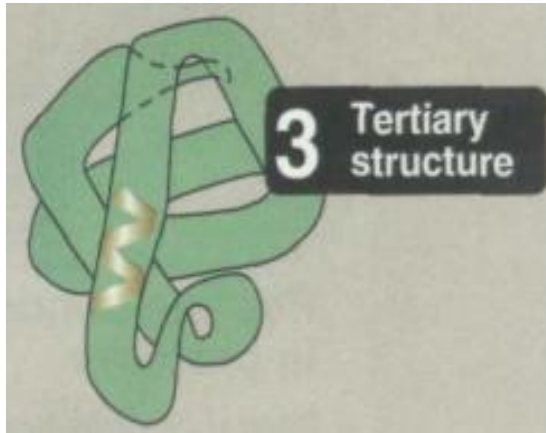
Free amino acid



Peptide bond

Protein structure

- a. Primary structure
- b. Secondary structure
- c. Tertiary structure
- d. Quaternary structure



Classification of Proteins

1. **Simple proteins:** Polypeptides composed of only amino acids
2. **Conjugated proteins:** Composed of protein (apoprotein) and nonprotein (prosthetic group) components; prosthetic groups are commonly metal, lipid, and carbohydrate in nature

Protein Functions

- | | | | |
|---------------------|-----------------------|------------------------|---------------|
| 1-Energy production | 2- Water distribution | 3-Buffer | 4-Transporter |
| 5- Antibodies | 6- Cellular proteins | 7- Structural proteins | 8- Enzymes |




Biuret Test

It is a common and delicate test for the identification of protein in a biological material. These reactions are of importance in qualitative detection of proteins and their constituent amino acids .

Principle: Cupric ions in alkaline medium form a violet colored complex with peptide bond nitrogen. Copper sulfate is converted to cupric hydroxide which chelates with peptide linkage in proteins to give the purple color.

Biuret Reagent: Contains sodium potassium tartarate and copper sulfate.

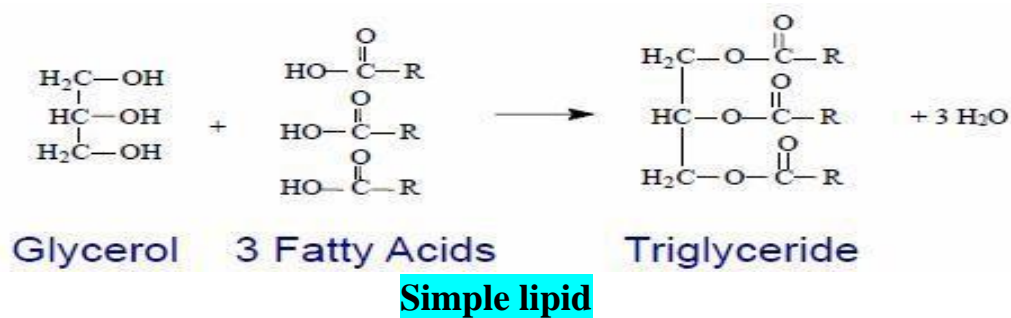
<i>Experiment</i>	<i>Observation</i>	<i>Inference</i>
Take 2 ml of protein solution in a test tube. Add 2 ml of 5% sodium hydroxide. Mix and add one or two drops of 1% copper sulfate.	Violet color is formed 	Indicates the presence of peptide linkage.



LIPIDS

Definition

Lipids are organic compounds formed mainly from alcohol and fatty acids combined by Ester linkage. Lipids are insoluble in aqueous solutions and soluble in organic solvents.



Biological importance of lipids

1. They serve as structural components of biological membranes.
2. They provide energy reserves, predominantly in the form of triacylglycerols.
3. Both lipids and lipid derivatives serve as vitamins and hormones.
4. Lipophilic bile acids aid in lipid solubilization.
5. Serve as thermal and electrical insulator.

Classification of lipids

1. Simple lipids

- a. **Fat**: Ester of fatty acid and glycerol
- b. **Waxes**: Ester of fatty acid and higher M.wt. monohydric alcohol

2. Complex lipids:

- a. **Phospholipid** (FA+Alcohol+ph.)

