

# PROTEINS

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# PROTEINS

- The Molecules which yields amino acids upon hydrolysis are called proteins.
- Proteins are natural polymer of amino acids.
- The number of amino acids in a protein molecule may range from two to several thousands.
- Protein molecules contain Nitrogen, Carbon, Hydrogen and Oxygen.

# PROTEINS

- Proteins are the basis for the major structural components of animal and human tissue.
- They act as biological catalysts (Enzymes), form structural parts of organisms, participate in different cell reactions, act as molecules of immunity and also provide fuel.

# CLASSIFICATION OF PROTEINS

## (a) Simple Proteins

- Those which give one amino acid only upon hydrolysis.

## (b) Conjugated Proteins

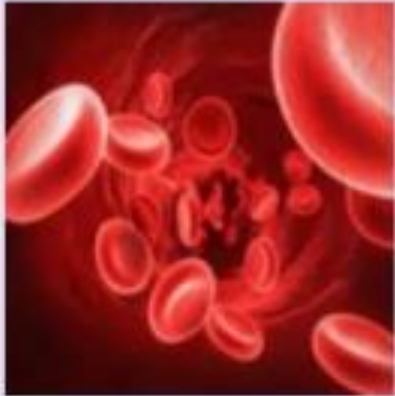
- Those which give an amino acid and a non-protein group upon hydrolysis.

## (c) Derived Proteins

- Those which are derived from simple and conjugated proteins.



# (a) SIMPLE PROTEINS - Albumins



Blood  
(Serumbumin)



Milk  
(Lactalbumin)



Egg White  
(Ovolbumin)



Lentils  
(Legumelin)



Kidney Beans  
(Phaseolin)



Wheat  
(Leucosin)

## (a) Simple Proteins - Albumins

- Globular protein is insoluble in water and dilute salt solution.
- Precipitated by saturation with  $(\text{NH}_4)_2\text{SO}_4$  solution.
- Coagulated by heat.
- Found in plant and animal tissue.

# (a) Simple Proteins - Globulins



Blood (Serum Globulins)



Muscles (Myosin)



Potato (Tuberin)



Brazil Nuts (Excelsin)



Hemp (Edestin)



Lentils (Legumin)



## (a) Simple Proteins - Globulins

- Globular Protein is sparingly soluble in water and neutral solutions.
- Precipitated by dilute Ammonium Sulphate.
- Coagulated by Heat.
- Distributed in both plant and animal tissues.



## (a) Simple Proteins - Glutelins



Wheat (Glutenin)



Rice (Oryzenin)

## (a) Simple Proteins - Glutelins

- Insoluble in water and dilute salt solutions.
- Soluble in dilute acids.
- Found in grains & cereals.

## (a) Simple Proteins - Histones

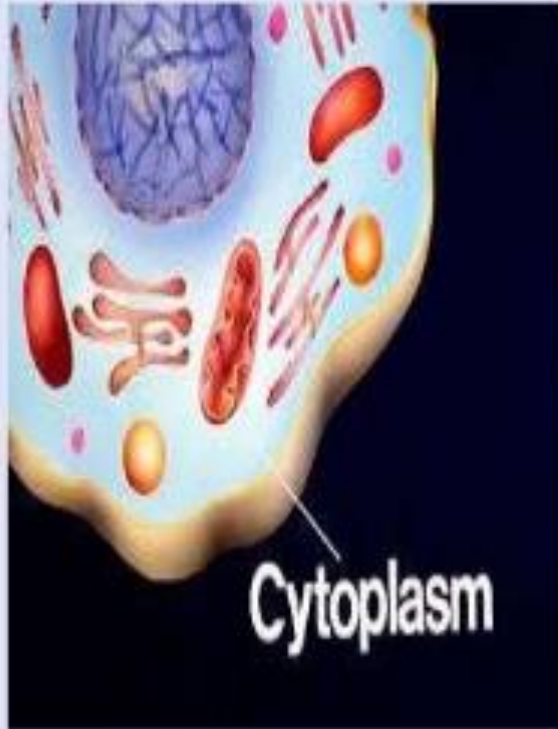
- Thymus Gland, Pancrease and Nucleoproteins (Nucleohistones).
- Soluble in water, salt solutions & dilute acids.
- Insoluble in Ammonium Hydroxide.
- Yields large amount of Lysine & arginine.
- Combined with nucleic acids within cells.

## (a) Simple Proteins - Scleroproteins

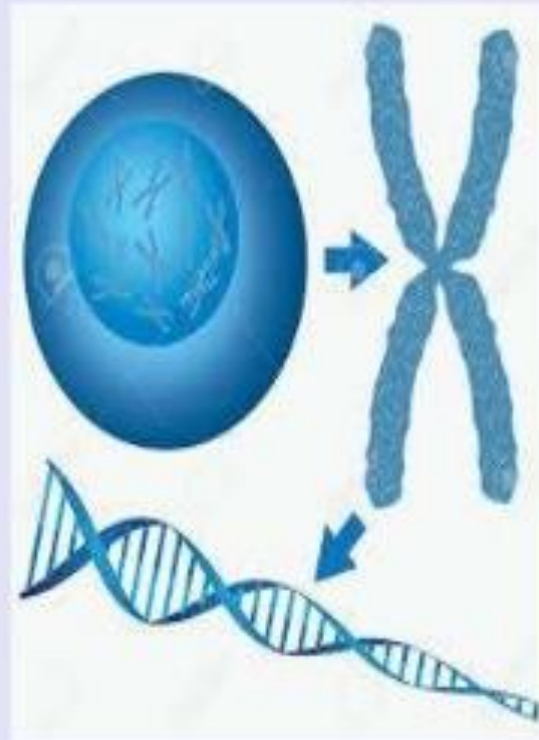
- Connective tissues and hard tissues.
- Fibrous protein is insoluble in all solvents.
- Resistant to digestion.



# (a) Conjugated Proteins - Nucleoproteins



Cytoplasm of Cells  
(Ribonucleoprotein)



Nucleus of Chromosomes &  
Ribosomes  
(Deoxyribonucleoprotein)



Viruses &  
Bacteriophage

## (a) Conjugated Proteins - Nucleoproteins

- It contains nucleic acids, nitrogen and phosphorus.
- It is present in chromosomes and in all living forms as a combination of protein with either DNA or RNA.

## (b) Conjugated Proteins - Mucoprotein

- Saliva (Mucin) and Egg white (Ovomucoid).
- Proteins combined with amino sugars, sugar acids and sulfates.

## (b) Conjugated Proteins - Glycoproteins

- Bones (Osseomucoid), Tendons (Tendomucoid) and Cartilage (Chondromucoid).
- Containing more than 4% Hexosamine, mucoproteins; if less than 4%, then Glycoproteins.



## (b) Conjugated Proteins – Phosphoproteins

- Milk (Casein) and Egg yolk (Ovovitellin).
- Phosphoric acid joined in ester linkage to protein.



## (c) Derived Proteins - Proteans

- Edestan ( from Elastin) and Myosin (Myosin).
- It results from short action of acids or enzymes
- Insoluble in water.

## (c) Derived Proteins -Peptones

- Intermediate product of protein digestion
- Same properties as proteases except that they cannot be salted out.
- Smaller molecular weight than proteases.

## (c) Derived Proteins - Peptides

- Intermediate product of protein digestion
- Two or more amino acids joined by a peptide linkage.
- Hydrolyzed to individual amino acids.



**THE END**

*Stay Home & Stay Safe*