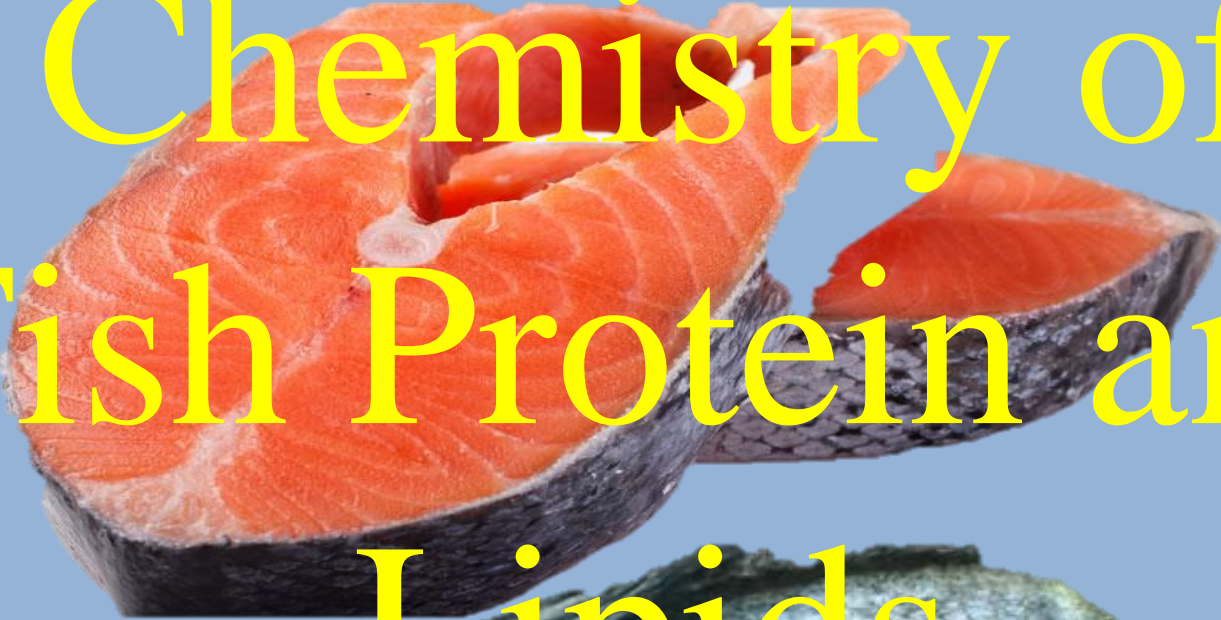


Chemistry of Fish Protein and Lipids



Part 1: Proteins



Fish Protein chemistry

- 1- Introduction**
- 2- Nature of proteins**
- 3- Protein Chemistry**
- 4- Classification of Amino Acids.**
- 4- Structure of Amino Acids.**
- 5- Properties of Amino Acids**
- 6- Levels of Protein Structure.**
- 7- Fish protein**
- 8-Protein composition of fish**
- 9- Functional properties of proteins**
- 10- Structure of skeletal muscle of fish**

Refs.

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- Handbook on Ingredients for Aquaculture feeds by Joachiom.W.hertrampt
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- Handbook of aquaculture
- www.ebi.ac.uk
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➤ Reference-

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2. Textbook of fish processing technology (K.Gopakumar).
3. Principle of biochemistry(Lehniger).

INTRODUCTION

- A protein is a polymer consisting of several amino acids(a polypeptide).
- Each amino acid can be thought of a single carbon atom(the α carbon) to which there is attached one **carboxyl group**, one **amino group**, and a side chain denote **R**.
- The side chains are generally carbon chains or rings to which various functional groups are attached.
- There are mainly 20 different amino acids present in nature.

Nature of proteins

Proteins play an important role in biological systems. Proteins are synthesized in ribosomes. After synthesis some amino acids are modified by cytoplasmic enzymes. Proteins that are not modified thus are called homoproteins and that are modified or complexed with nonprotein parts are called heteroproteins or conjugated proteins.

Conjugated proteins

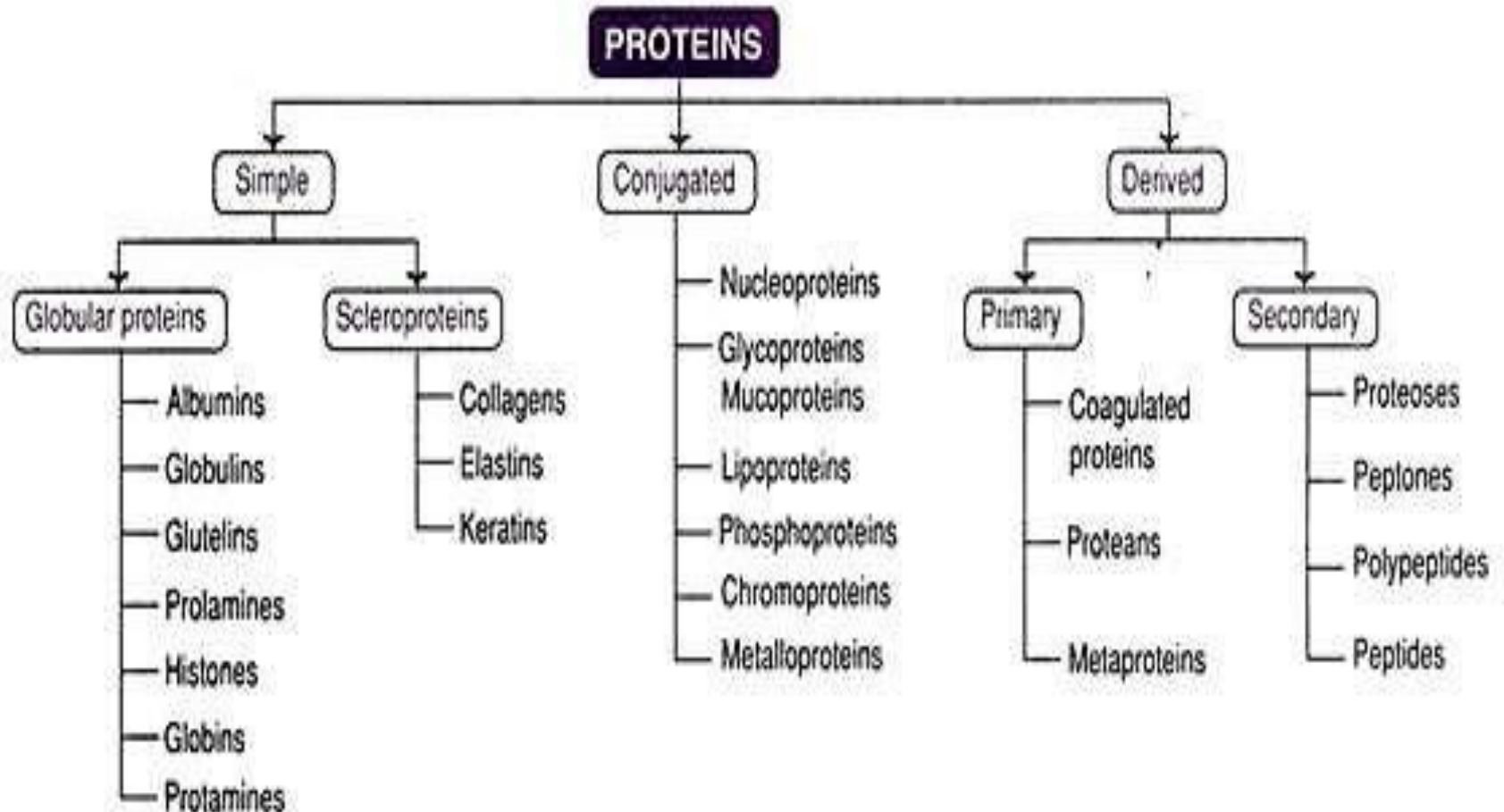
Type	Examples
Nucleoprotein	Ribosomes, Histones
Glycoprotein	Ovalbumin, k-casein
Phosphoproteins	α , and β caseins, phosphorylases
Lipoproteins	Proteins of egg yolk, plasma proteins
Metalloproteins	Hemoglobin, myoglobin and enzymes

Functions of proteins

- ❑ As a source of energy
- ❑ Required for the formation of hormones and enzymes
- ❑ To repair worn or wasted tissue and to rebuild new tissues
- ❑ Serve as lubricants and protective agents
- ❑ Serve as substrates for CHO and FA synthesis

PROTEIN CLASSIFICATION

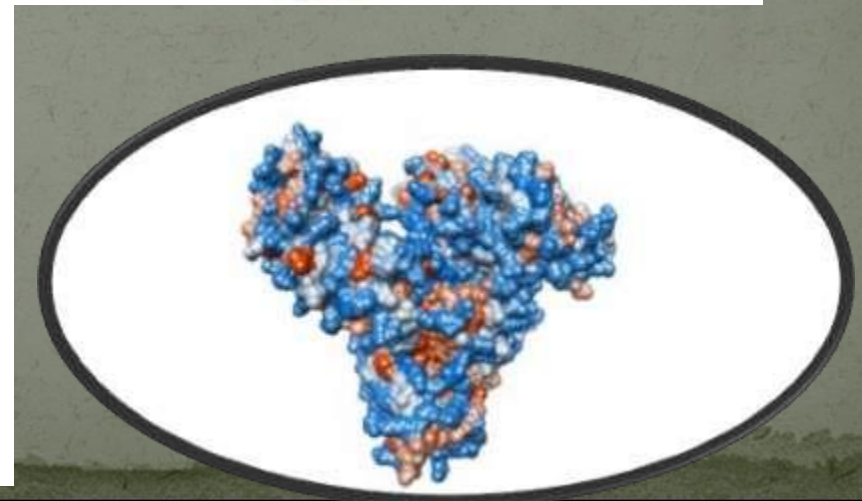
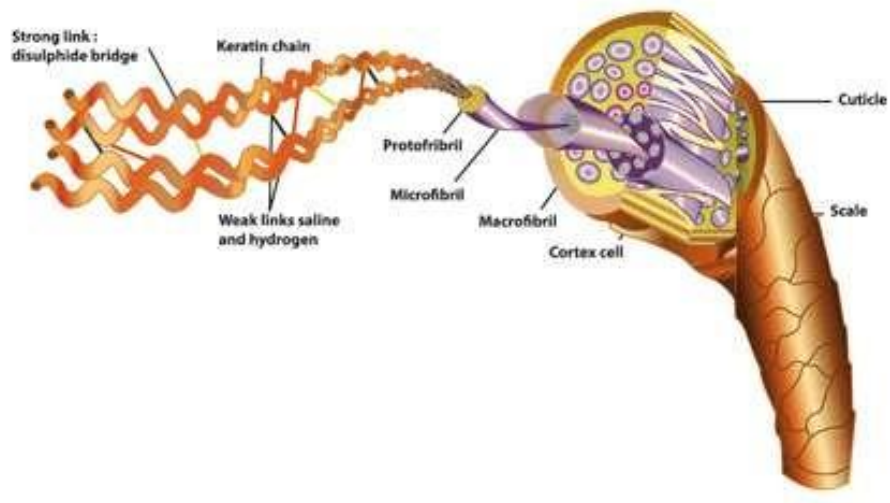
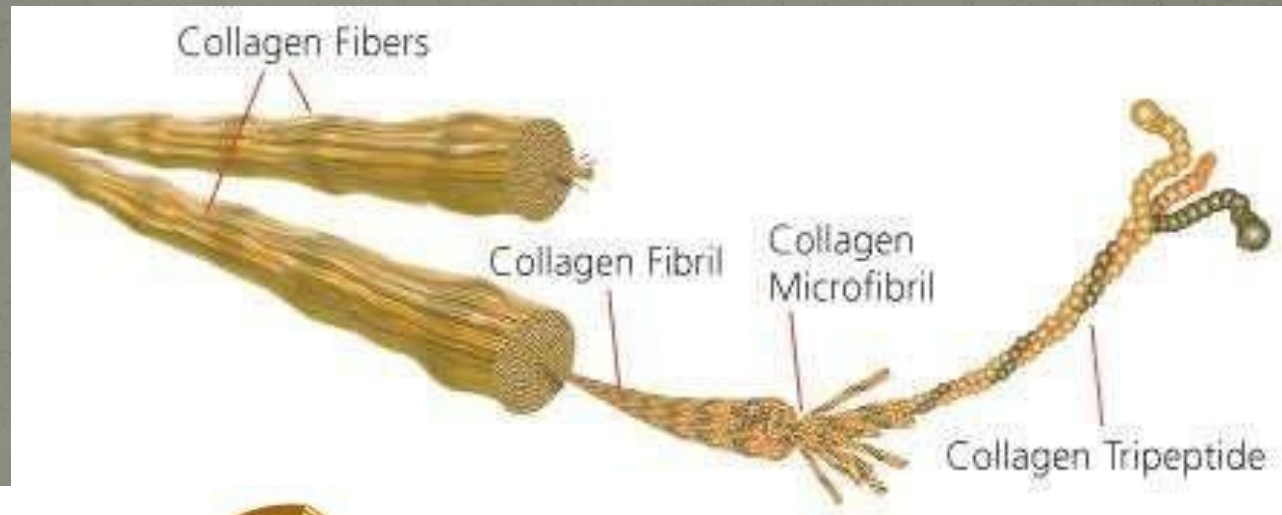
TABLE 65.4 Summary of classification of proteins



Simple proteins

Also known as **homoproteins**, they are made up of only amino acids.

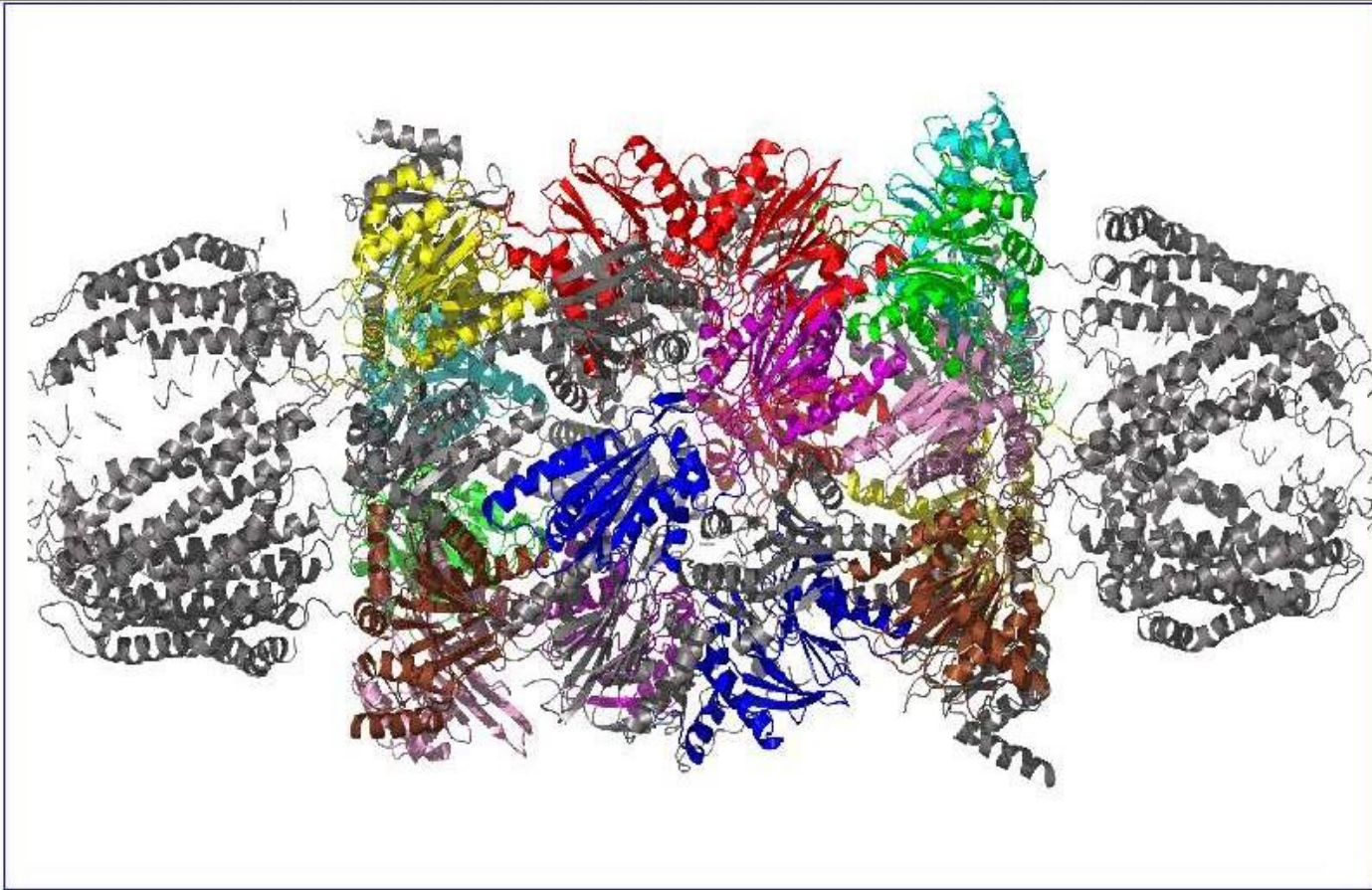
Examples are **plasma albumin, collagen, and keratin**



Conjugated proteins

Sometimes also called **heteroproteins**, they contain in their structure a non-protein portion.

Three examples are **glycoproteins**, **chromoproteins**, and **phosphoproteins**.



Glycoproteins

They are proteins that **covalently bind one or more carbohydrate units to the polypeptide backbone.**

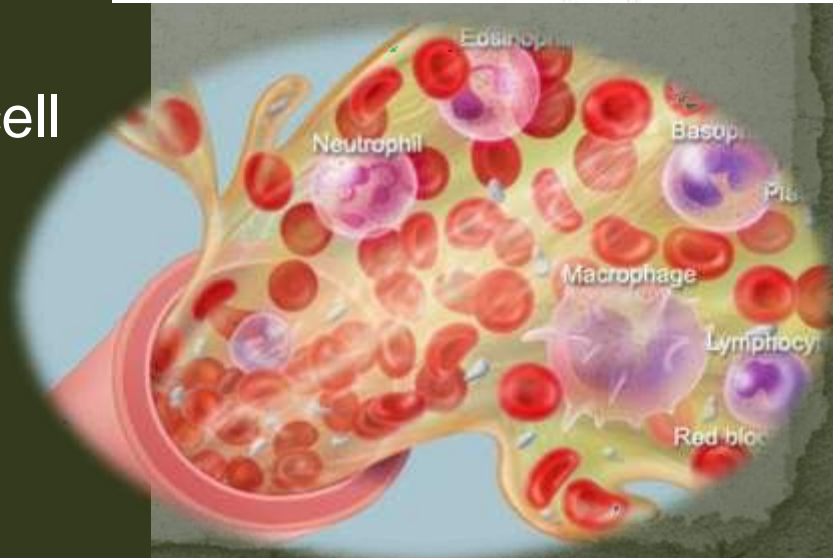
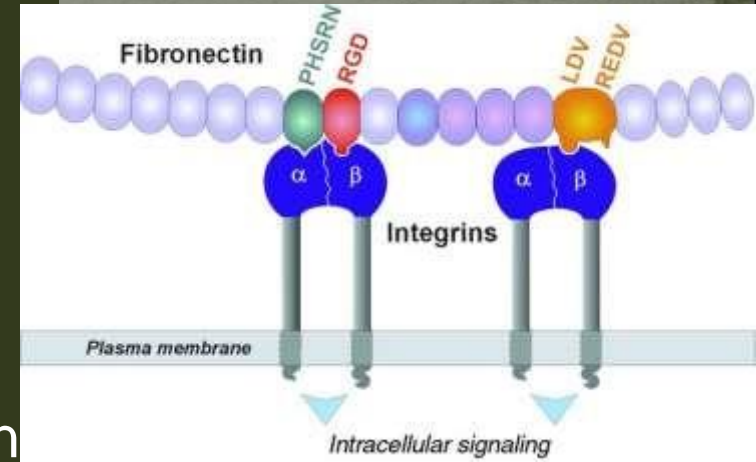
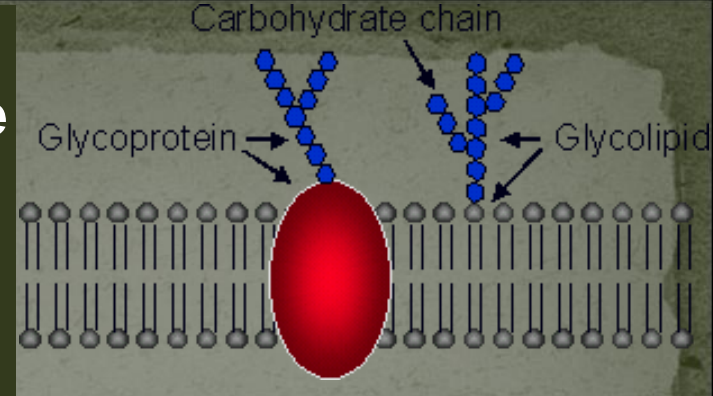
Examples of glycoproteins are:

□ **glycophorin**, the best known among erythrocyte membrane glycoproteins;

□ **fibronectin**, that anchors cells to the extracellular matrix through interactions on one side with collagen or other fibrous proteins, while on the other side with cell membranes;

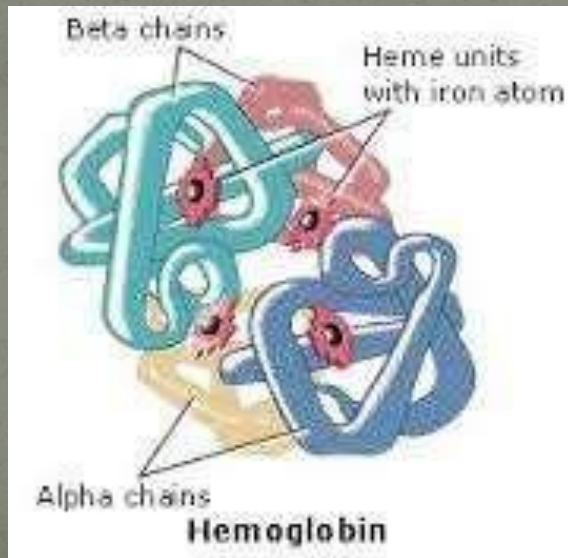
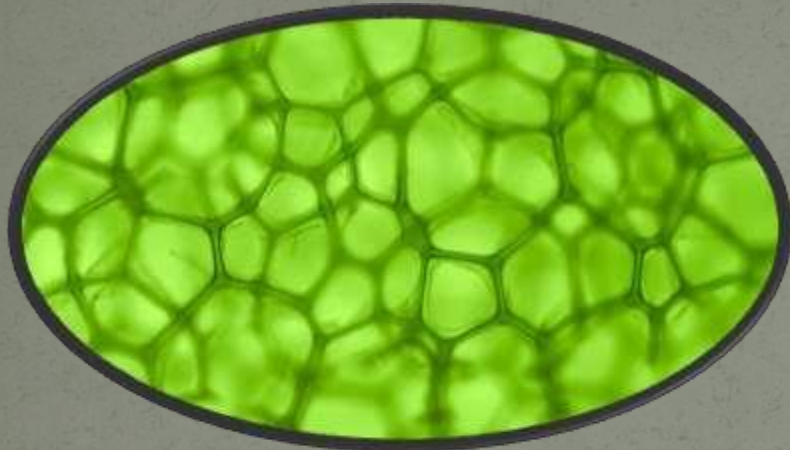
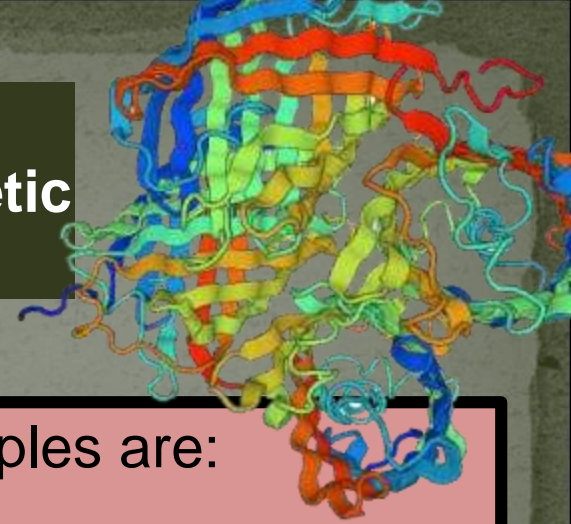
□ **all blood plasma proteins**, except albumin;

□ **immunoglobulins or antibodies.**



Chromoproteins

They are proteins that contain **colored prosthetic groups**.



Typical examples are:

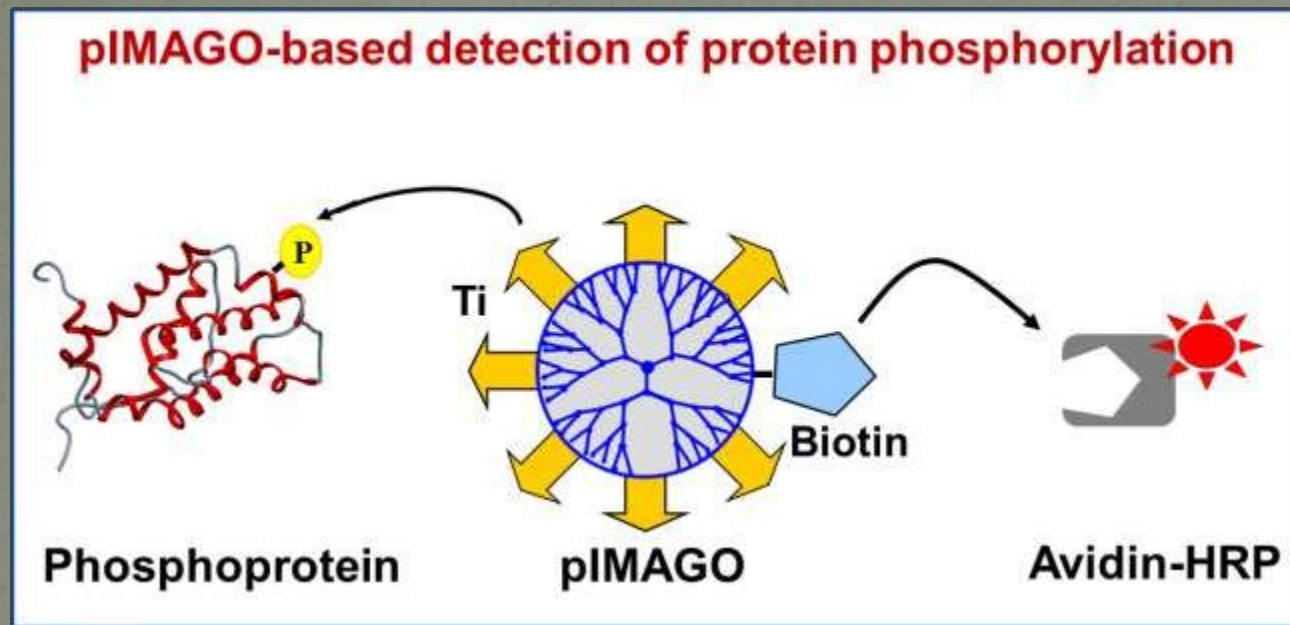
□ **hemoglobin and myoglobin**, which bind, respectively, one and four heme groups;

□ **chlorophylls**, which bind a porphyrin ring with a magnesium atom at its centre;

□ **rhodopsins**, which bind retinal.

Phosphoproteins

- They are proteins that bind phosphoric acid to serine and threonine residues.
- Generally, they have a **structural function and reserve function**



structural function- tooth dentine

reserve function,- milk caseins, egg yolk phosvitin.