

Welcome to the course Animal

Physiology and Biochemistry.

This module is about introduction
to simple and conjugate proteins.

I am Dr. Socorrinha D'Costa and
today we are going to study simple
and conjugated proteins and we
are going to be familiar with the
classification of simple and conjugated
proteins based on their solubility.

Simple proteins are also
known as Holoproteins.

They are globular in nature,
and they include proteins which
contain only amino acids.

The difference between simple and
conjugated proteins is that simple proteins
give only amino acids upon hydrolysis,
whereas conjugated proteins yield amino acid
as well as non protein group upon hydrolysis.

Based on their solubility,

simple proteins may be classified

into the following types:

Protamines and histones,

Albumins, Globulins,

Glutelins, Prolamines and Scleroproteins,

which are also known as Albuminoid's.

Now let us speak about Protamines and Histones.

These are basic proteins because of

amino acids lysine and arginine.

They occur in animals and

they have simple structure,

low molecular weight.

They are soluble in water and

are not coagulated by heat.

Protamines are devoid of sulfur

and aromatic amino acids. Histones are

weaker bases which are insoluble

in ammonium hydroxide solution.

Examples of protamines is

clupeine from herring sperm

whereas examples of histone

include nucleohistones of

nuclei and globin of hemoglobin.

The next class are the albumins. Albumins

are soluble in water and dilute

solutions of acids, bases and salts.

They are precipitated with saturated

solution of an acid salt or a neutral salt.

They are also coagulated by heat.

Example of albumin is the

ovalbumin from white of egg.

Globulins are of two types

Pseudoglobulins and euglobulins.

Pseudoglobulins are

soluble in water whereas

euglobulins are insoluble in water.

They are precipitated with half saturated

solution of ammonium sulfate.

They're coagulated by heat.

Example of pseudoglobulin would be

milk Whey whereas euglobulins occur

in serum globulin from blood plasma.

Glutelins –Glutelins are soluble

in dilute acids and alkalis,

and they're coagulated by heat.

They are isolated only from plants.

They are found in wheat, they are

found in corn and also oryzenin from rice.

Prolamines - prolamines are insoluble in

water as well as dilute salt solutions.

They are soluble in dilute acids and alkalis

and also in 60 to 80% alcohol solutions.

Prolamines are not coagulated by heat.

They have been isolated only from plants.

Examples would be gliadin from wheat.

Scleroproteins or albuminoids -

They are also known as

animal skeleton proteins.

These occur in animals.

They are insoluble in water,

dilute solution of acids, bases,

salts, 60 to 80% alcohol solutions.

They are not attacked by enzymes.

We find scleroproteins in collagen

of bones and elastin in ligaments.

Now let us begin with the conjugated

proteins, which are also known as

complex proteins or hetero proteins.

These proteins also are of globular type.

They contain nonprotein portion which

is called as the prosthetic group.

Prosthetic group may be either

a metal or a compound.

On decomposition with acids,

conjugated proteins liberate the constituent

amino acids and the prosthetic group.

They are further divided into

metalloproteins, chromoproteins.

glycoproteins, phosphoproteins,

lipoproteins and nucleoproteins.

Metalloproteins - metalloproteins are proteins

which are linked with various metals.

They can be stable or they can be

labile. Now they are of three types.

The first type include metals which strongly bound to proteins. Mercury, silver, copper, zinc get strongly bound with proteins like collagen, albumin, casein through the SH radicals of the side chain.

The second category includes the metals which are found weakly by proteins, and the example is calcium.

Then is the third category as metals which do not couple with proteins and they include sodium and potassium.

Chromoproteins are proteins which are coupled with the colored pigment.

Enzymes like catalase, peroxidase.

Flavoenzymes show the presence of chromoproteins..

Example of chromoproteins would be myoglobin and hemoglobin.

Glycoproteins and mucoprotein's.

Glycoproteins and mucoprotein's

have carbohydrate as prosthetic

group. Glycoproteins have small

amount of carbohydrates.

That is less than 4%.

Example would be the egg album

whereas Mucoprotein have comparatively

higher amount of carbohydrates.

That is more than four percent.

Examples of Mucoproteins are

ovomuroid from egg white and mucin from saliva.

Phosphoproteins are proteins which

are linked with phosphoric acid.

These are mainly acidic. Example

is casein from milk.

Lipoproteins - now these are proteins

which form complexes with lipids like,

cephalin, lecithin, cholesterol.

They are soluble in water,

but they are not soluble in organic solvents.

Example: Lipoproteins of blood.

They act as temporary intermediates

in the process of transfer of lipids from the site of absorption to the site of utilization.

Based on their density,

Lipoproteins may be classified

into the following types:

If the density is above 1.21, then they are grouped into very high density Lipoproteins.

If the density ranges from 1.063 to 1.21 then they are called high density Lipoproteins.

If the density ranges from 1.05 to 1.063 they are called low density lipoproteins and if it ranges from 0.93 to 1.05 they are called very low density Lipoprotein's.

Next conjugated type of proteins, are nucleoproteins.

They have nucleic acid and proteins they are having opposite charges.

They're bound to each other

by electrostatic forces.

They are present in nuclear

substances in cytoplasm,

and they also act as the site of

protein and enzyme synthesis.

Examples are nuclear histones from glandular

tissues.

So this is all about simple

and conjugated proteins,

and these are the references

which have been used.

Thank you.