

Classification of Proteins

PART-B

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Protein classification based on shape

On the basis of their shape, proteins may be divided into two classes:

- **Fibrous protein**
- **globular protein**

Fibrous proteins

They have primarily **mechanical and structural functions**, providing support to the cells as well as the whole organism.

Here are some examples.

• **Fibroin**

It is produced by spiders and insects. An example is that produced by the silkworm, *Bombyx mori*.

• **Collagen**

The term “collagen” indicates not a single **proteins** but a family of structurally related **proteins** (at least 29 different types), which constitute the main protein component of connective tissue, and more generally, the extracellular scaffolding of multicellular organisms.

Fibrous proteins conti....

• α -Keratins

They constitute almost the entire dry weight of nails, claws, beak, hooves, horns, hair, wool, and a large part of the outer layer of the skin.

•Elastin

This protein provides elasticity to the skin and blood vessels, a consequence of its random coiled structure, that differs from the structures of the α -keratins and collagens.

Globular proteins

They have a compact and more or less spherical structure, **more complex** than fibrous **proteins** .

In this regard, motifs, domains, tertiary and quaternary structures are found, in addition to the secondary structures.

They are generally soluble in water but can also be found inserted into biological membranes (transmembrane proteins), thus in a hydrophobic environment.

Unlike fibrous **proteins**, that have structural and mechanical functions, they act as:

enzymes;

hormones;

Globular proteins conti...

membrane transporters and receptors;
transporters of triglycerides, fatty acids and oxygen in the blood;

immunoglobulins or antibodies;

grain and legume storage **proteins**.

Examples of globular proteins are myoglobin, hemoglobin, and cytochrome c.

At the intestinal level, most of the globular **proteins** of animal origin are hydrolyzed almost entirely to amino acids.

Protein classification based on biological functions

The multitude of functions that [proteins](#) perform is the consequence of both the **folding of the polypeptide chain**, therefore of their three-dimensional structure, and the presence of many different **functional groups** in the amino acid side chains, such as thiols, alcohols, thioethers, carboxamides, carboxylic acids and different basic groups.

From the functional point of view, they may be divided into several groups.

- **Enzymes (biochemical catalysts).**
- **Transport proteins.**
- **Storage proteins.**
- **Mechanical support.**
- **Hormones.**
- **Protection against harmful agents..**
- **Storage of energy.**

Classification based on solubility

The different globular proteins can be classified based on their **solubility in different solvents**, such as water, salt and alcohol