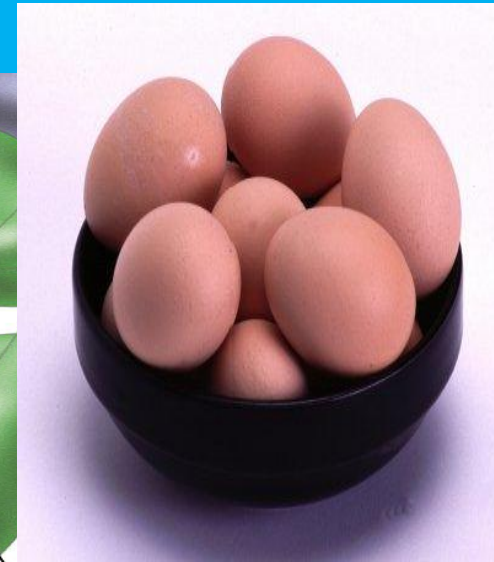
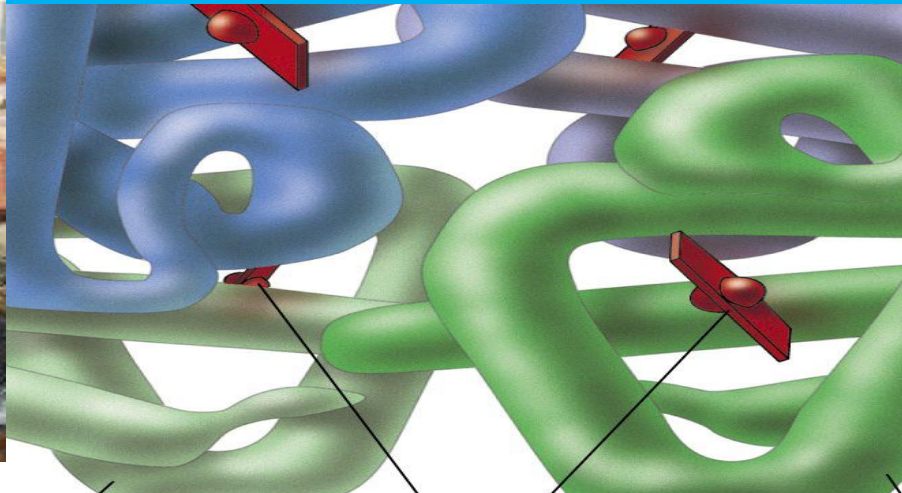


AMINO ACIDS & PROTEINS

211 Chem



By

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Classification of proteins

- **Classification by Composition** (according to their products on hydrolysis)
 1. Simple Proteins
 2. Conjugated or Compound Proteins
 3. Derived Proteins
 - a. Primary derived*
 - b. Secondary derived*

Classification of proteins

1- Simple proteins that produce only amino acids on hydrolysis e.g.:

- **Albumins**
- **Globulins**
- **Histones**
- **protamines**

Classification of proteins

2- Conjugated proteins that produce amino acids and other groups on hydrolysis e.g.:

- **Phosphoproteins** (protein + phosphate)
 - **Lipoproteins** (protein + lipid)
- **Glycoproteins** (protein + carbohydrate)
- **Nucleoproteins** (protein + nucleic acid)

Classification of proteins

3- Derived proteins

a- Primary derived they are produced by denaturation of proteins e.g.:

- **Coagulated proteins**

b- Secondary derived they are produced by hydrolysis e.g.:

- **Small peptides**

Classification of proteins

Classification by Conformation

1- Fibrous proteins consist of polypeptide chains that are arranged in a parallel form along a single axis, to yield **long fibers or sheets in a helical shape.**

- They have an axial ratio more than 10.
- They are insoluble in water or dilute salt solutions
- They have supportive or protective functions in tissues e.g. **collagen**, **elastin** and **alpha-keratin**.

Fibrous Proteins

- Collagen
- Keratin
- Fibrinogen
- Muscle protein



Collagen, a fibrous protein

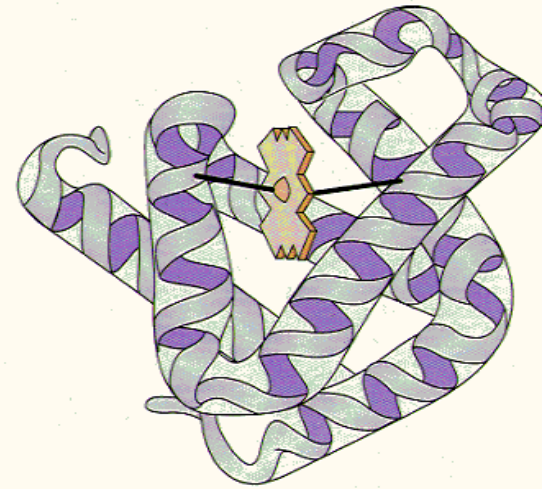
Classification of proteins

Classification by Conformation

2- **Globular proteins** consist of polypeptide chains that are tightly folded into compact **spherical or globular shapes**.

- They have an axial ratio less than 10.
- Most of them are soluble in water
- They usually have a mobile or dynamic functions in the cell e.g. most of **enzymes**, many **hormones**, **immunoglobulins (antibodies)** and **plasma proteins**.

(b)



Myoglobin, a globular protein

Globular Proteins

- Myoglobin
- Albumin
- Globulin
- Casein
- Haemoglobin
- All enzymes
- Proteins hormone

Classification of proteins

Classification by essential amino acids content.

- 1. Complete proteins:** proteins that contain all the essential amino acids
- 2. Incomplete proteins:** proteins that lack even one essential amino acids
- 3. Complementary proteins:** combinations of two or more incomplete proteins that supply all the essential amino acids.

Complete Proteins:

- *Animal Based:*
 - ✓ Meat
 - ✓ Poultry
 - ✓ Dairy
 - ✓ Eggs
 - ✓ Fish



❖ Soy is the only known plant based complete protein

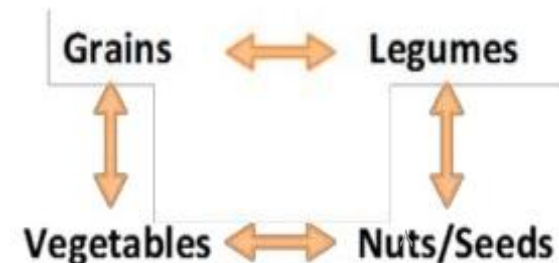


Incomplete Proteins:

- *Plant Based:*
 - ✓ Vegetables
 - ✓ Grains
 - ✓ Legumes/Beans
 - ✓ Nuts/Seeds

Complementary Proteins:

- *Grains + Legumes/Vegetables*
- *Nuts/Seeds + Vegetables/Legumes*



Food Sources of Proteins

Some food sources of protein are:

- **Eggs:** A medium egg has about 6 g of protein in an easily digestible form
- **Milk:** Dairy foods are packed with protein and contain bone-building calcium, too
- **Yogurt**
- **Fish and seafood**
- **Soya**
- **Nuts**
- **Beef**
- **Chicken and turkey**

