Proteins

Proteins:

- Proteins are polymers of amino acids that are covelently linked through peptide bonds.
- Proteins composed of 20 different amino acids.
- The term protein is used to describe molecules with greater than 50 amino acids.
- Each protein consist of one or more polypeptide chains.

- Dalton: is the measuring unit of proteins molecular weight , it is equal to the mass of one hydrogen atom = 1.67×10^{-24}

Functions of proteins:

1- catalysis enzymes: are proteins that accelerate thousands of biochemical reactions.

2- structural proteins : such as collagen.

3- some proteins help in the movement of cells such as actin.

4- Defence: such as immunoglobulins(antibodies).

5- Regulation : such as hormones.

6- Transport: such as hemoglobin that carries O2.

7- Storage proteins such as ferritin which stores iron.

8- contractile proteins: these proteins help in contraction and relaxation of muscles such as myosin.

9- maintenance proteins: these help in maintenance of osmotic pressure and pH.

10- toxins: there are some toxic proteins such as snake toxins and anaerobic bacteria toxins.

Proteins properties:

1-molecular size: most proteins are macromolecules having high molecular weight.

2-differential solubility: solubility of proteins affect by many factors like pH and temperature.

3-less solubility of proteins is at the isoelectric point.

Iso electric point: is the pH at which the negative charge neutralized with the positive charge.

4-some proteins are less soluble in water, but the solubility can increasing if we add a salt such as 0.02 N NaCl this process called salting in , while proteins precipitate from aqueous solutions by adding concentrated salt solution ,this process called salting out.

5- Heavy metals: salts of heavy metal(like pb,Hg) can precipitate proteins.

6- proteins hydrolysis by boiling them with acids or by proteolytic enzymes.

7- proteins have different bonds which are:

- Peptide bond
- Disulphide bond
- Hydrogen bond
- hydrophobic bond

8-proteins have optical mutarotation

Mutarotation is the change in the rotation of the compound to the equilibrium value.

9- proteins in general are not crystalline except few types .

Proteins classification:

Proteins are classified according to :

shape

- fibrous like collagene
- Globular like albumin

composition

- simple proteins like globulins
- conjucated proteins like metaloproteins are consistof simple proteins combined with nonprotein component called prosthetic group.

Structure of proteins:

1-primary

2-secondary:either α-helix or β-sheet

3-tertiary

4-quaternary

Some important definitions:

- Bohr effect: is a mechanism where by O_2 is delivered to cells in proportion to their needs in addition the binding of oxygen to hemoglobin is affected by the concentration of hydrogen ion (H+) and CO2 in the surrounding tissue.
- Albumin: is the most abundant protein in serum (more than 50% of blood serum proteins) , albumin synthesized in liver and its half life is (18-20) days.

Denaturation of proteins:

Denaturation means disruption of protein structure or irreversible precipitation of proteins.

Denaturation of proteins causes partial or complete loss of their biological activity.

Many factors can denature proteins such as:

1-freezing

2-UV.

3-alcohol and alkaline compound

4-urea

5-detergents

6-stirring

7-salting

8-heavy metals

9-temperature change

THANK YOU