## Classification of proteins according to the shape:

I. Fibrous proteins : Long and narrow ; Axial ratio greater than 10

II. Globular proteins: These proteins more or less spherical in nature

III. Membrane proteins : A protein molecule that is attached to, or associated with the

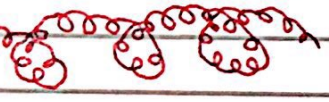
## Fibrous Proteins (Collagen):

# Amino acids → α-chains → tropocollagen → Fibrils → Fibers
covalent bond — Hydrogen bond

# Tropocollagen : composed of 3 right handed α-helices arranged around one another as a left-handed helix ; each of the α-helices forms hydrogen bonds with ~~each~~ other two

# Collagen AAs composition : High amount of Glycine and Proline (Helices breakers) which cause kinks in the α-chains causing them to adapt left handed helices thus maintain collagen

توضيح : بعد تكون الـ α-chain و بفعل وجود البرولين تنثني الـ α-chain وتكون شكل لولبي ثاني
وبالتالي بتتجدل الثلاث α-chains مع بعض



## Fibrous Proteins (Keratin):

α-keratin : Peptide backbone forms an α-helix

β-keratin : Peptide backbone Forms a β-sheet

## Globular Proteins:

Spherical in shape ; Functional proteins

Soluble in aqueous media → Due to their distribution of AAs hydrophobic inside and hydrophilic outside

Examples : Albumin, Globulin, Casein, Oxygen-binding proteins (Myoglobin, Hemoglobin), All of the enzymes, and All of the protein hormones

## Oxygen-binding proteins

Myoglobin : stores oxygen in the muscles

Hemoglobin: transports oxygen in the blood

PB
محاضرة ب
مع

## Membrane Proteins:

# It is a protein molecule that is attached to, or associated with the membrane of a cell or an organelle

# Membrane proteins categories

1. Integral membrane proteins : which is permanently bound to the lipid bilayer ; extend through the membrane ; Functions : Ion channels, Carriers, Receptors, and enzymes
2. Peripheral membrane proteins : Temporarily associated with lipid bilayer or with integral membrane proteins ; E.g. G-proteins
3. Lipid-anchored proteins : bound to lipid bilayer through lipidated AA residues

## Properties of Proteins:

### A. Solubility:

Soluble in water and insoluble in fat solvents except:

- 3G (globulins, glutelins, gliadins) : soluble in dilute acids and alkalies
- Globulins : soluble in dilute salt solutions
- Gliadins, soluble in 70-80 % alcohol
- Scleroproteins : are insoluble in most solvents

### B. Amphoteric properties ( Iso electrical point I.E.P )

- At the acid side of the I.E.P : they carry predominantly positive charge (+)
- At the Basic side of the I.E.P : they carry predominantly negative charge (-)
- At I.E.P : The proteins can be precipitated

### C. Colloidal properties:

Due to their large M.W, they form emulsoid colloidal solutions in water and have all the properties of colloid

### D. Precipitation of proteins: على السلايد

### E. Denaturation : على السلايد

### F. Inhibition:

Proteins that binds ligands (enzymes, receptors, Carriers, transporters, etc.) may be affected by the act of inhibition [سيتم تناول موضوع الـ Inhibition كاملاً في ثالث محاضرة إن شاء الله]

### G. Post-translation modification,

هذا الموضوع غير مطلوب حالياً" سيتم شرح جزئية
محذوفة منه فقط بهدف فهم و توضيح محاضراتي
الأخرى

## Isolation, purification and fractionation of proteins: على السلايد