

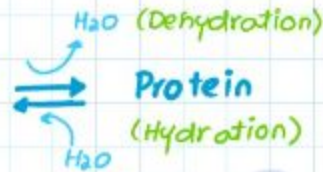
Proteins→ **Proteins** → Prime Importance

- Most abundant Organic molecule in cell

- Eukaryotic → 18 %
- Prokaryotic → 15 %

* Proteins are polymers of Amino Acids.

Elements → Essential (C, H, O, N)
Non-Essential (S, P, Fe, I, Mg)

Amino Acids

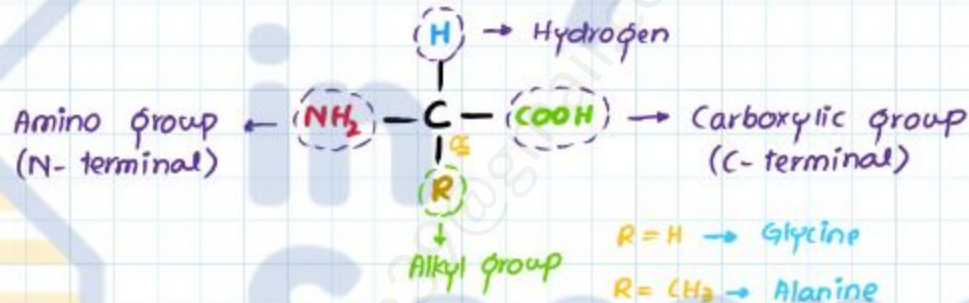
- Total Types → 170 Types
- Protein Formation → 25 Types
- Abundantly → 20 Types

Essential Amino Acid → 10

→ Which can not be prepared by body.

Non-Essential A. Acids → 10

→ Which are prepared by body.

**ZWITTER ION / INTERNAL SALT**

SULPHUR CONTAINING
→ Methionine
→ Cysteine
(Disulphide bridges)

The course videos and lecture notes provided by Physics I Tutorials are for educational and informational purposes only and protected by local copyright laws.

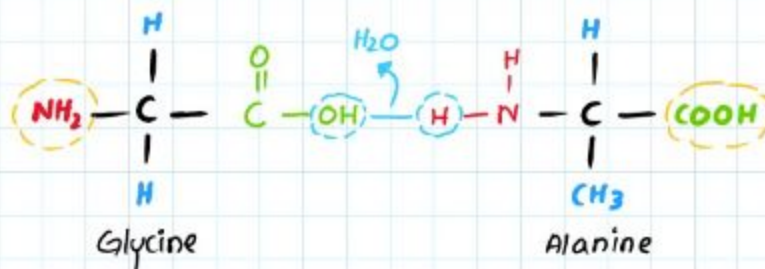
Unauthorised reproduction or distribution is strictly prohibited. By accessing and using these materials, you agree to use them solely for personal, non-commercial use and will not hold the copyright holder liable for any damages.

PROTEIN FORMATION

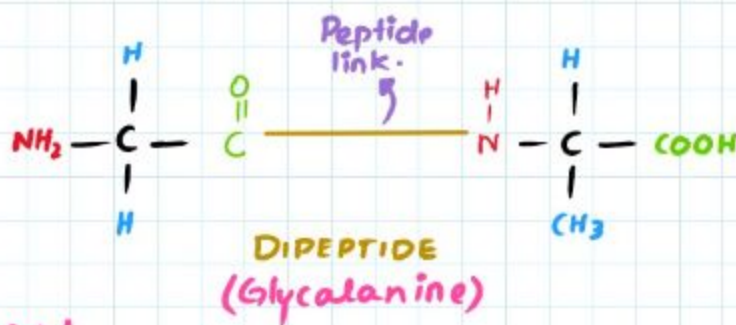
→ Translation (Ribosomal Dependant Reaction)
→ Amino Acid Polymerization

By accessing and using the materials, you also agree to abide by all local copyright laws.

N-terminal → **C-terminal**
 NH_2 → COOH



Peptide



1000 A-Acid

- One Protein
- 10 polypeptide chain.
- Peptide ?

$$1000 - 10 = ?$$

990

NAME	AMINO ACIDS	PEPTIDE
DIPEPTIDE	2	1
Tri Peptide	3	2
Tetra "	4	3
Penta "	5	4
Hexa "	6	5
Hepta "	7	6

- One polypeptide chain of 200 Amino Acid.
- Peptide linkage ?

(199) Peptide/Amide

Q = 10 different types of Amino Acids → Dipeptides ?

$$n^2 = 10^2 \rightarrow 10 \times 10 = 100 \text{ Dipeptides}$$

STRUCTURES OF PROTEIN

PRIMARY STRUCTURE

No. of Amino Acids

Sequence of Amino Acids

The course slides and lecture notes provided by Physics In Seconds are for educational and informational purposes only and protected by local copyright laws.

- Short termed
- Quickly converted into higher level of Organization
- Last to break

Unauthorized reproduction or distribution is strictly prohibited. By accessing and using these materials, you agree to use them solely for personal, non-commercial use and will not hold the copyright holder liable for any damages.



By accessing and using the materials, you also agree to abide by a local copyright laws.

→ Normal Hb
(2 α , 2 β)

6th Amino Acid (Glutamic Acid)

→ Sickle cell Hb

Each β -chain 6th position
Amino Acid changed
6th (Valine)

F. SANGER → 1951

INSULIN

51
21 30

Peptide linkage = ?

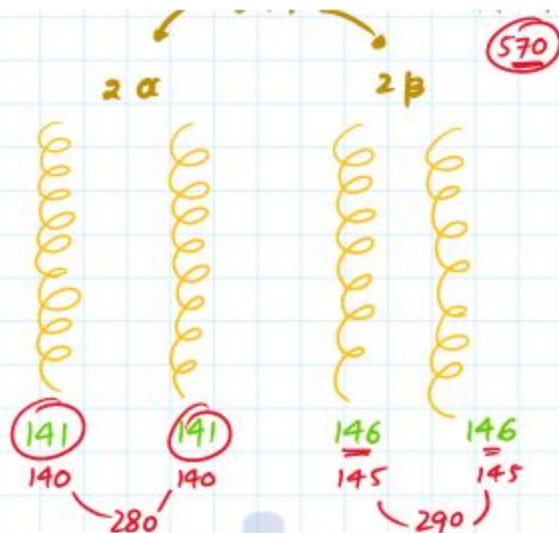
$$51 - 2 = (49)$$

HAEMOGLOBIN

574 → 574 - 4
2 α 2 β (570)



$$51 - 2 = 49$$



SECONDARY STRUCTURE

→ Stable / Geometrical Configuration

- Fibrillar Proteins / Fibrous Proteins
- Structural Proteins

→ Bonds

- Peptide bonds
- Hydrogen bonds → Provides stability

α - Helix
 β - Pleated Sheet

α - Helix



Helix = 3.6 A-Acids

10 Helix, A-Acids?

$$10 \times 3.6 = 36$$

$$20 \times 3.6 = 72$$

β - Pleated Sheet



H-bonds.

The course videos and lecture notes provided by Physics In Seconds are for educational and informational purposes only and are not to be used for any other purpose without the permission of the copyright holder.

Unauthorised reproduction or distribution is strictly prohibited. By accessing and using these materials, you agree to use them solely for personal, non-commercial use and will not hold the copyright holder liable for any damages.

By accessing these materials, you agree to abide by all local copyright laws.

TERTIARY STRUCTURE

→ Globular Proteins / Functional Proteins

- Bonds



Globular Protein



Peripheral (Hydrophilic A-Acids)

Core (Hydrophobic A-Acids)

QUATERNARY STRUCTURE → Ellipsoidal / Functional Proteins

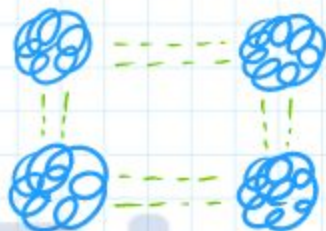
Bonds

H-bonds

Hydrophobic interactions

Ionic bonds

Haemoglobin



→ Bonds present in all structures

• Peptide linkages

→ Disulphide bonds are also found in every protein at each level.

FIBROUS PROTEINS

F

S → S^o- structure

I → Insoluble in solutions

N → Non-crystalline

E → Elastic in Nature

EXAMPLE :

- Silk (Spider web + Silk worm)
- Keratin (Nails, Horns, Hoofs)
- Fibrin (Blood clot)
- Myosin (muscle)
- Collagen (connective tissues)
- Elastin (KPK)

GLOBULAR PROTEINS

→ T^o / Q^o structure

→ Soluble in solutions

→ Crystalline

→ Non-elastic in Nature

EXAMPLE :

- Hormones
- Enzymes
- Anti-bodies
- Haemoglobin
- Myoglobin
- Ovalbumin + Casein (Storage of Amino Acids)
- Phosphocreatine (Provides Energy)

The course videos and lectures are provided by Physics In Secondary for educational and informational purposes only and protected by local copyright laws.

Unauthorised reproduction or distribution is strictly prohibited. By accessing and using these materials, you agree to use them solely for personal, non-commercial use and will hold the copyright holder liable for any damages.

GENERAL QUESTIONS :

By accessing and using the materials, you also agree to abide by all local copyright laws.

→ Most abundant Protein in Nature	→ Rubisco Enzyme
" " " " Body	→ Collagen Protein
" " " " Blood	→ Haemoglobin
" " " " Plasma	→ Albumin