

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr M.G.R Medical University, Chennai



DEPARTMENT OF PHYSICIAN ASSISTANT

COURSE NAME: BIOCHEMISTRY

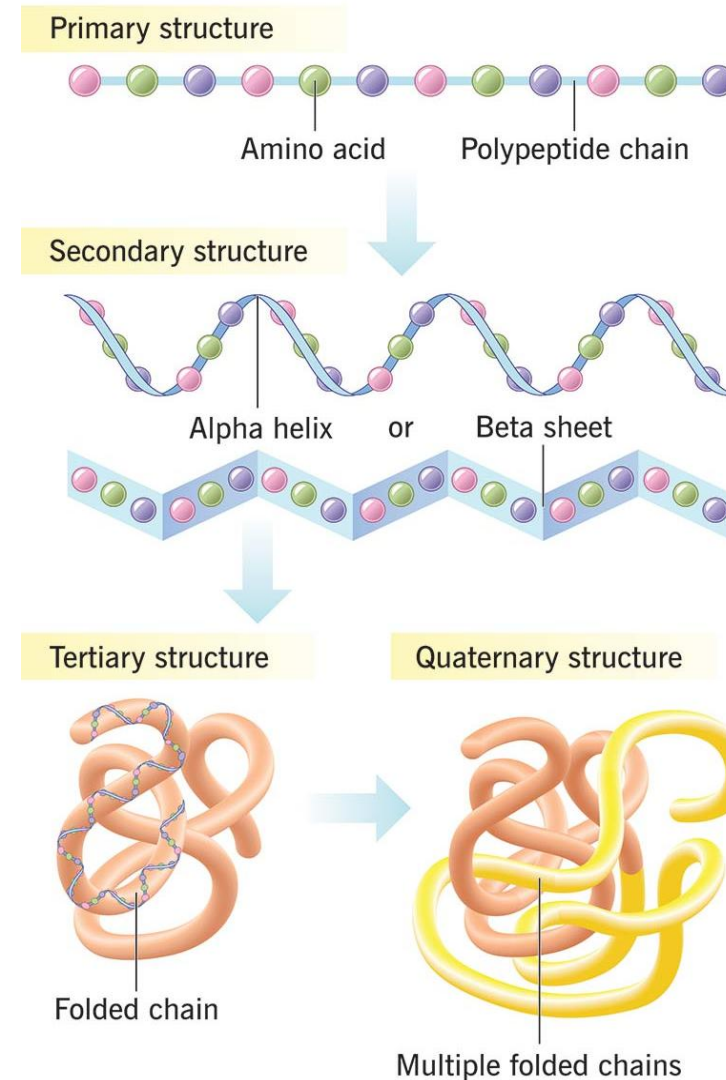
UNIT : 1

TOPIC : PROTEIN - STRUCTURE

FACULTY NAME: MITHRA V

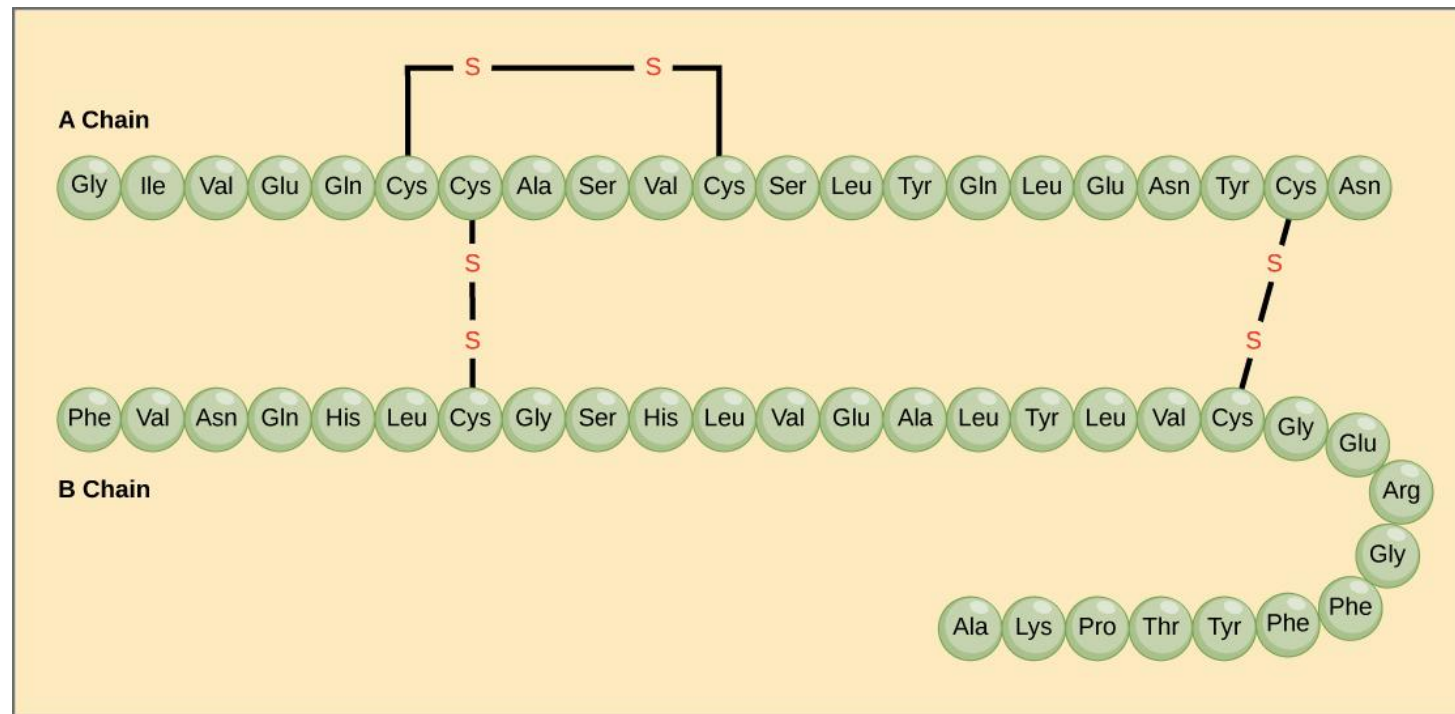
RECAP – PROTEIN STRUCTURE (DEFINE)

- Proteins have 4 levels of structural hierarchy.
- Structure determines function.
- 1. Primary Structure
- 2. Secondary Structure
- 3. Tertiary Structure
- 4. Quaternary Structure



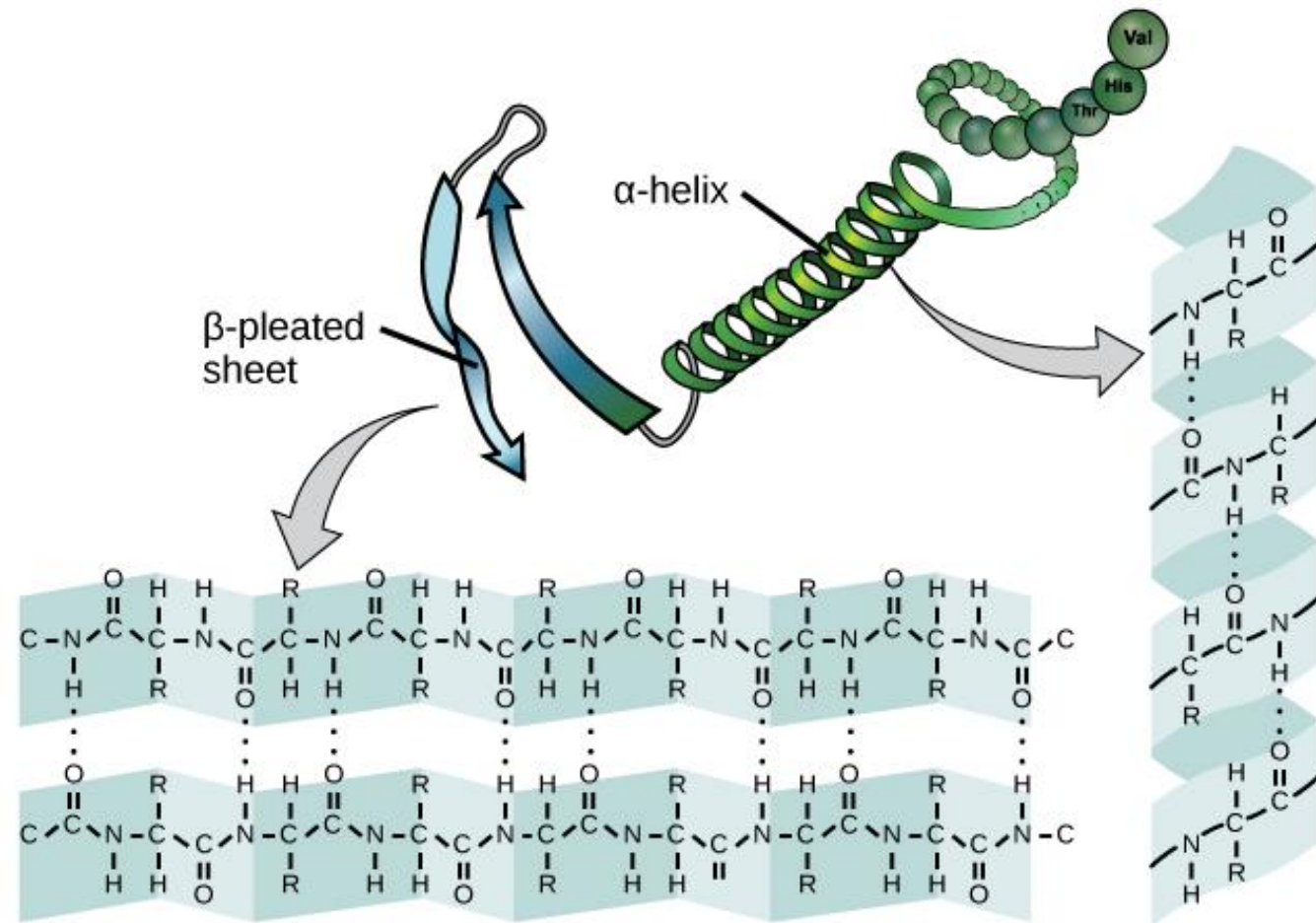
PRIMARY STRUCTURE

- Linear sequence of amino acids.
- Linked by peptide bonds.
- Example: Insulin (51 amino acids)

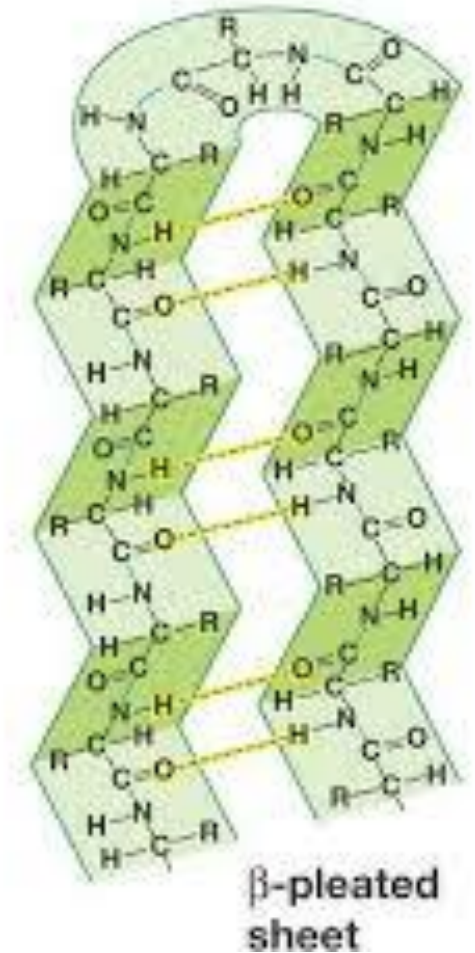
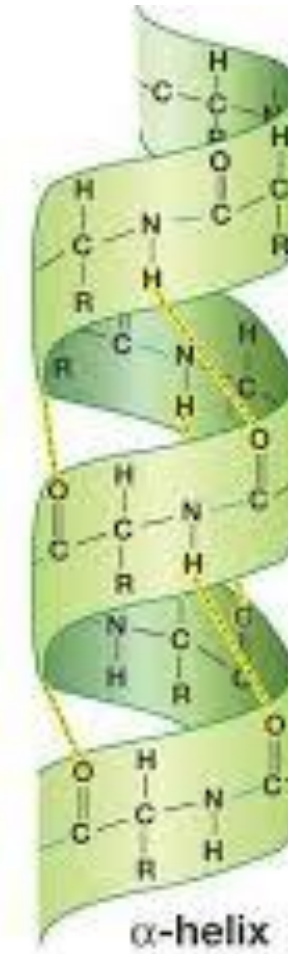


SECONDARY STRUCTURE

- Local folding of polypeptide chain.
- Two types: α -helix & β -pleated sheet.
- Stabilized by hydrogen bonds.

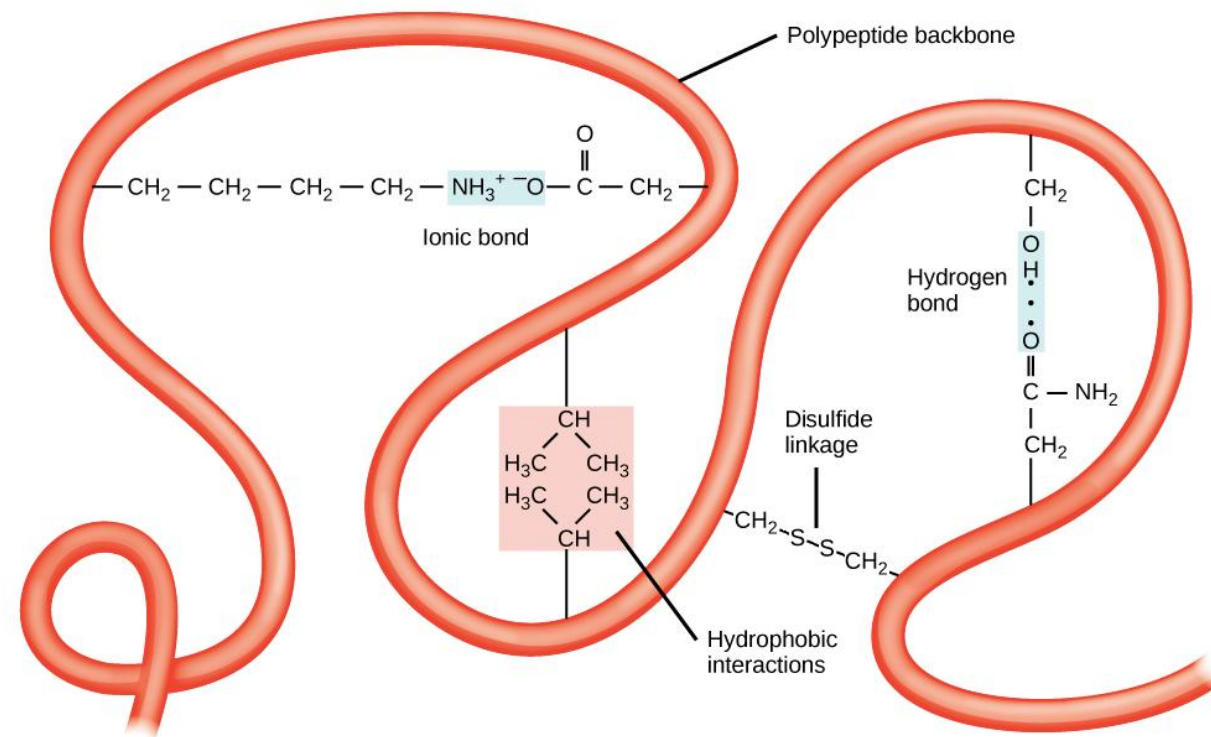


- **α -Helix**
- Spiral structure.
- 3.6 amino acids per turn.
- Intrachain H-bonding (carbonyl O $\rightarrow$ amide H).
- **β -Pleated Sheet**
- Extended chains aligned side by side.
- Parallel or antiparallel.
- Interchain H-bonding.



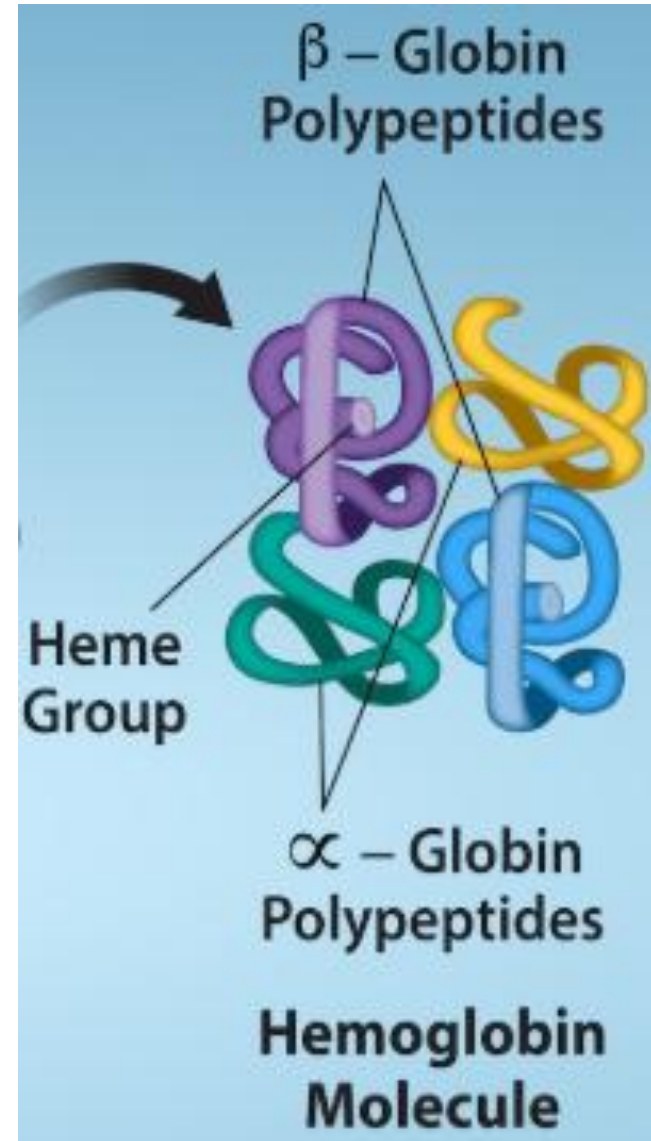
TERTIARY STRUCTURE

- 3D folding of entire polypeptide.
- Interactions: H-bonds, ionic, hydrophobic, disulfide.
- Functional shape of monomeric/multimeric proteins.

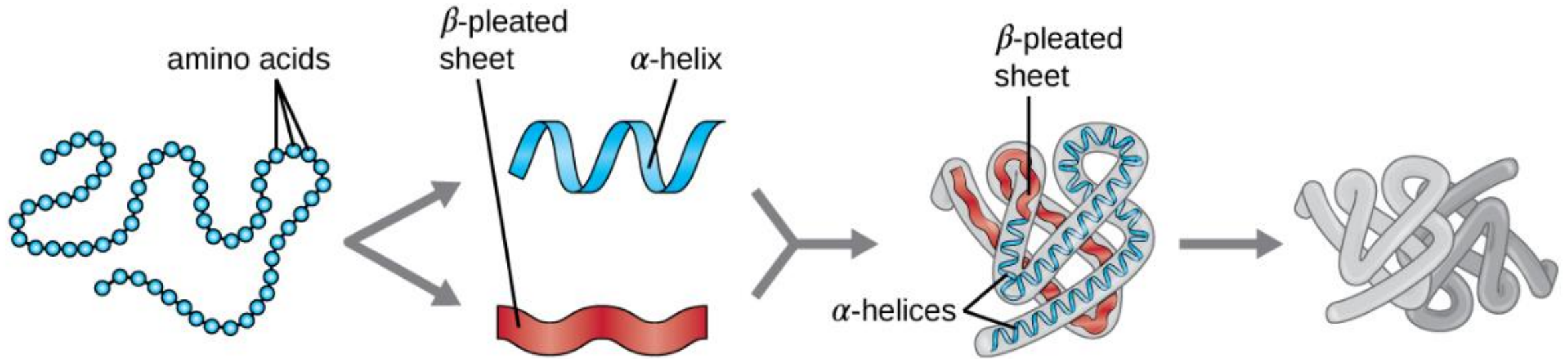


QUATERNARY STRUCTURE

- Arrangement of multiple polypeptide subunits.
- Example: Hemoglobin (4 subunits).
- Stabilized by same forces as tertiary structure.



SUMMARY



Primary Protein Structure

Sequence of a chain of amino acids

Secondary Protein Structure

Local folding of the polypeptide chain into helices or sheets

Tertiary Protein Structure

three-dimensional folding pattern of a protein due to side chain interactions

Quaternary Protein Structure

protein consisting of more than one amino acid chain

REFERENCES

- *Lehninger Principles of Biochemistry* – David L. Nelson, Michael M. Cox
- *Biochemistry* – Jeremy M. Berg, John L. Tymoczko, Lubert Stryer
- *Principles of Protein Structure* – Georg E. Schulz, Reinhard H. Schirmer
- Protein Data Bank (PDB) – <https://www.rcsb.org>
- UniProt – <https://www.uniprot.org>

THANK YOU