



Protein

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▼ [G/A/V/L/I/M/Phe\(F\)/T\(W\)/Pro\(P\)](#) → Non Polar

Asparagine was first found in asparagus, and glutamate in wheat gluten; tyrosine was first isolated from cheese (its name is derived from the Greek *tyros*, “cheese”); glycine (Greek *glykos*, “sweet”) was so named because of its sweet taste.

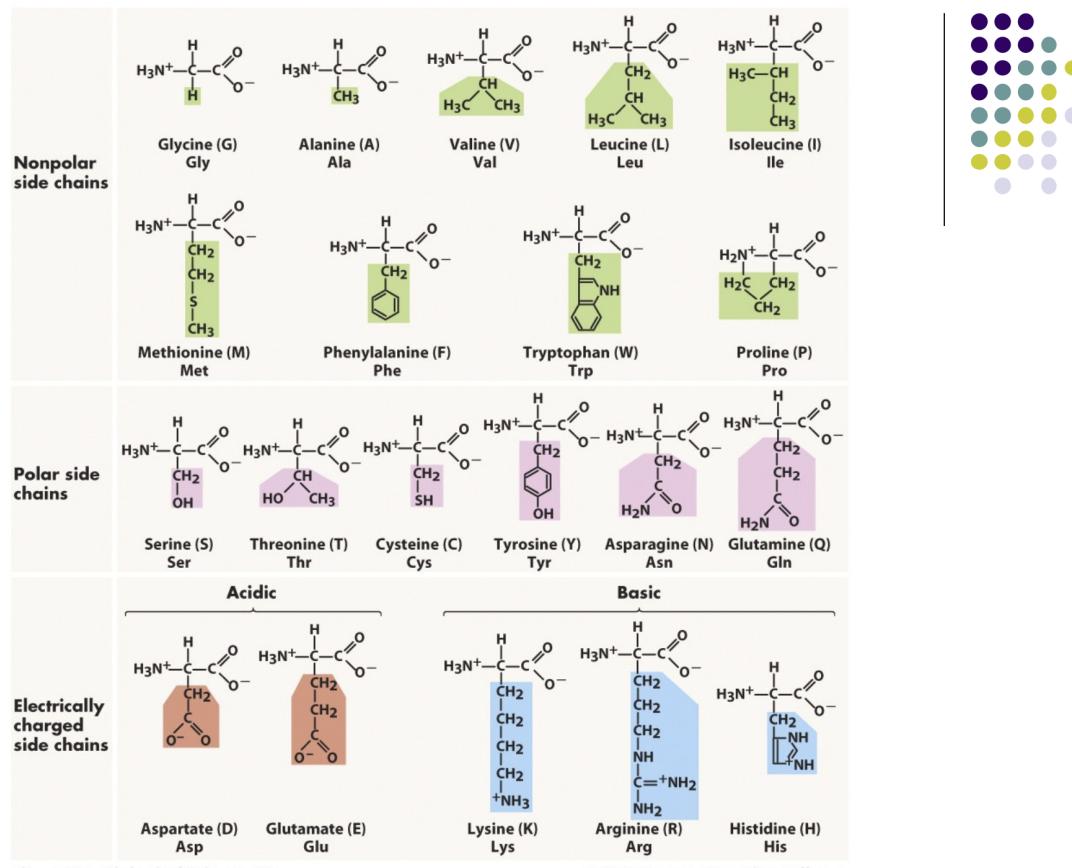


Figure 3-5 Biological Science, 2/e

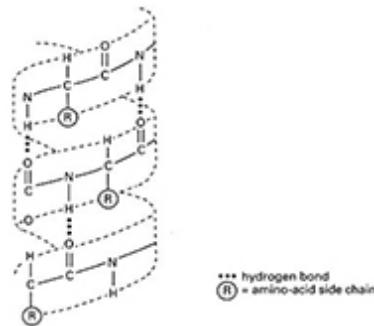
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▼ Why α - helix or β -helix structure don't contain amino acid proline?

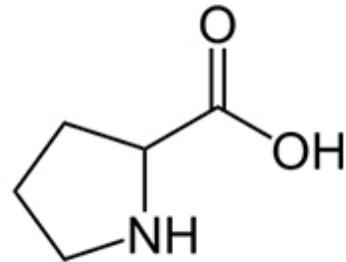
Proline shares many properties with the aliphatic group.

Proline is formally NOT an amino acid, but an imino acid. Nonetheless, it is called an amino acid. The primary amine on the α carbon of glutamate semi-aldehyde forms a Schiff's base with the aldehyde which is then reduced, yielding proline.

When proline is in a peptide bond, *it does not have a hydrogen on the α amino group, so it cannot donate a hydrogen bond to stabilize an α helix or a β sheet.* It is often said, inaccurately, that proline cannot exist in an α helix. When proline is found in an α helix, the helix will have a slight bend due to the lack of the hydrogen bond.



Drawing of a typical α -helix



Proline cannot form alpha helix due to lack of amide hydrogen and presence of steric hindrance

Proline is often found at the end of a helix or in turns or loops.

Unlike **other amino acids** which exist almost exclusively in the **trans- form in polypeptides**, **proline can exist in the cis-configuration** in peptides. The cis and trans forms are nearly iso-energetic. The cis/trans isomerization can play an important role in the folding of proteins and will be discussed more in that context.

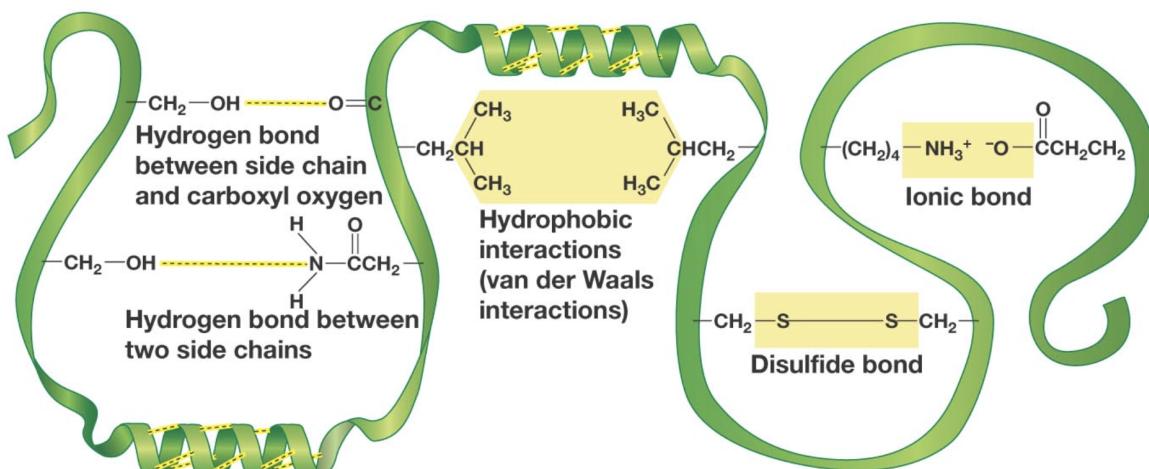
▼ Protein Structure

- Salt bridges and disulphide bonds commonly hold quaternary structure together



Tertiary Structure

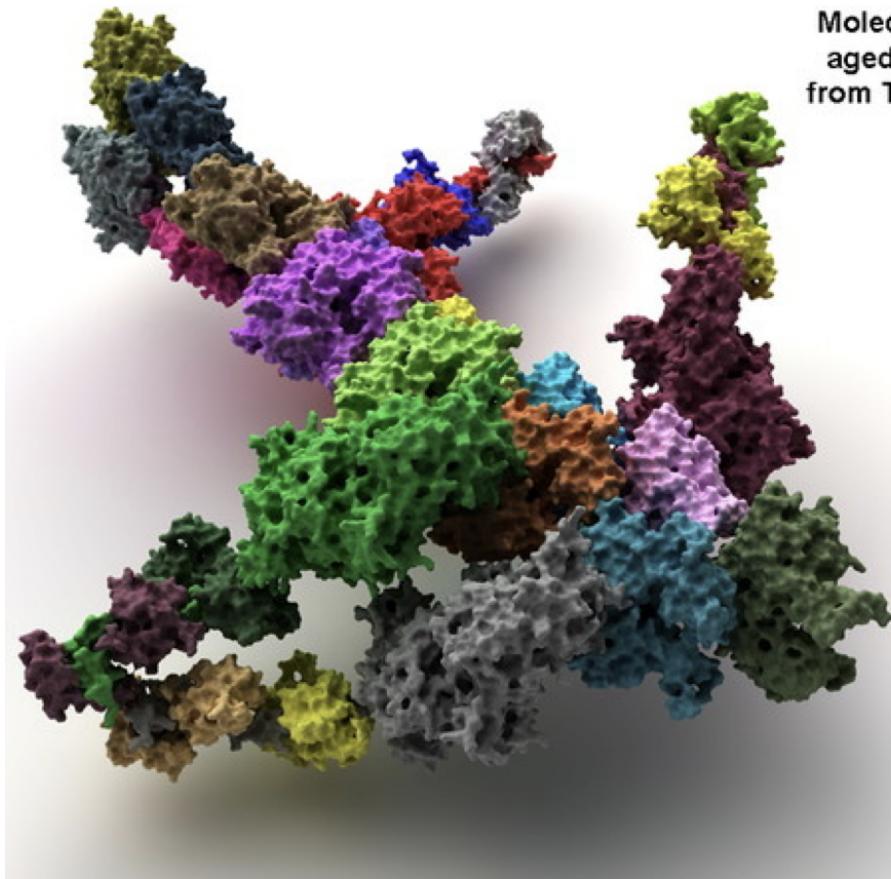
(a) Interactions that determine the tertiary structure of proteins



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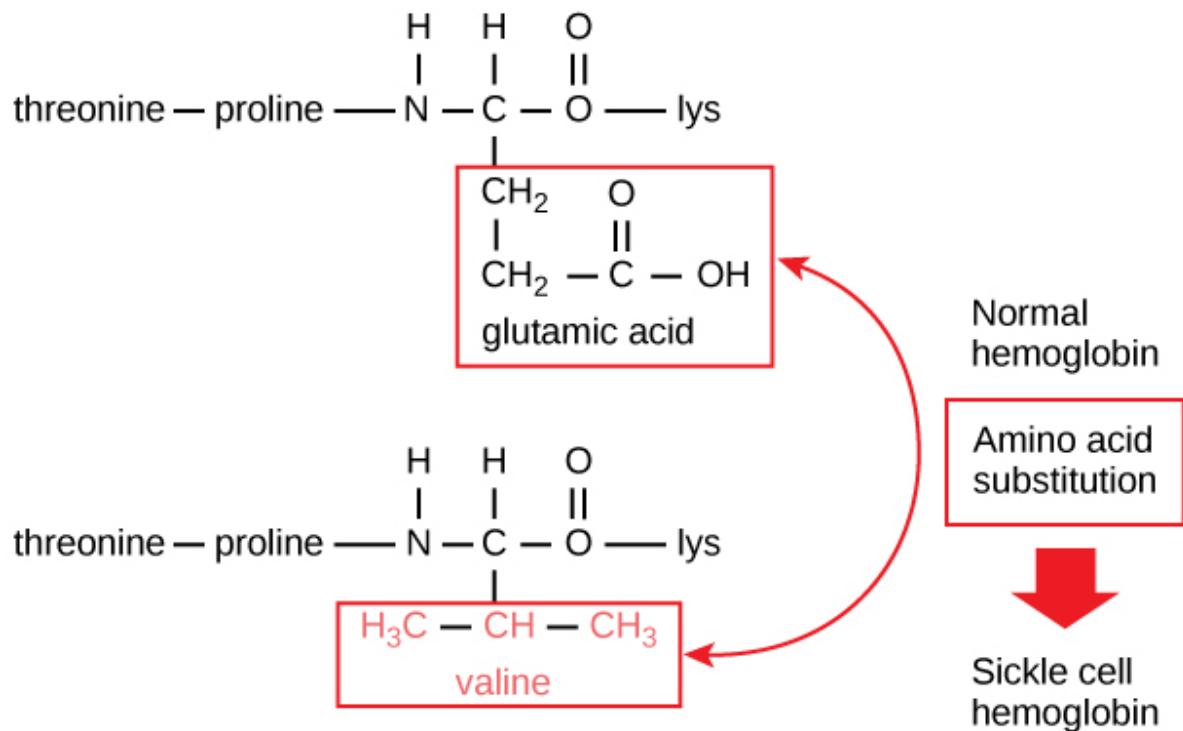
Cro, a repressor protein of temperate bacteriophages (e.g. lambda [λ], 434, P22), works in opposition to the phage's repressor to control the genetic switch that determines whether a lytic or lysogenic cycle will follow infection.
It's a dimer.

Molecular Models of averaged Rigor Crossbridges from Tomograms of Insect Flight Muscle



▼ Glutamine - Valine Mutation at 6th Position

Ahh! See the structure of Glutamine and Valine below



Glutamic acid has a negative charge that allows it to stick to positively charged amino acids, holding the protein's shape. Valine can't stick to positively charged amino acids, so a protein with this substitution won't be shaped correctly.

