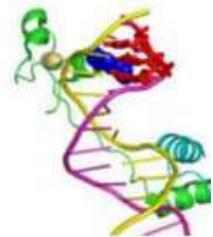
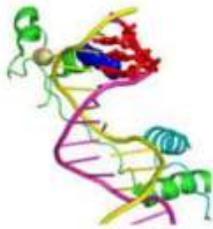


*Bonds Responsible  
For  
Protein Structure*



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*Proteins are linear, polymers of a.a's formed by linking covalently peptide bonds*

*Each a.a unit in the polypeptide chain is called residue.*

*Functions are closely related to the structure of proteins*

*Proteins structure is stabilized by different types of bonds*

*Structure of Proteins is Formed  
by*

*Covalent (or)  
strong bonds*

*Peptide bonds*

*Disulphide bonds*

*Non-covalent or  
weak bonds*

*Hydrogen Bonds*

*Electrostatic Bonds*

*Hydrophobic Bonds*

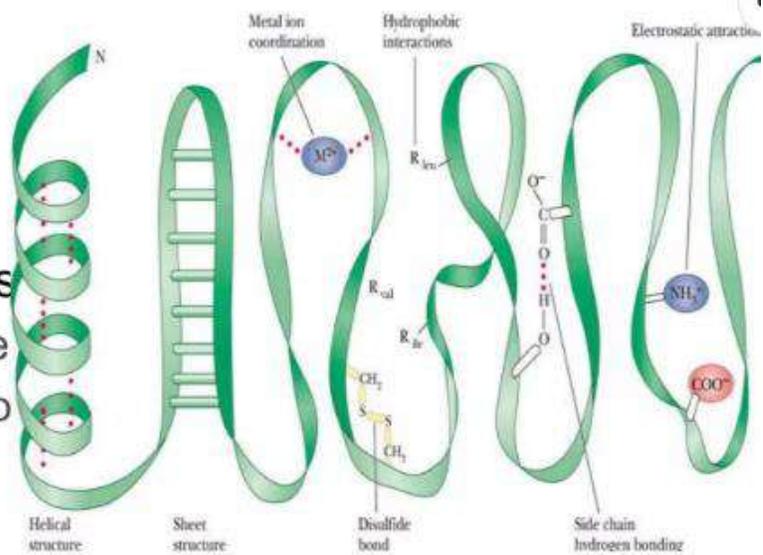
*Van der waals interaction*

▶ **Covalent bonds**

- ▶ Peptide bond
- ▶ Disulphide bridges

▶ **Non-covalent bonds**

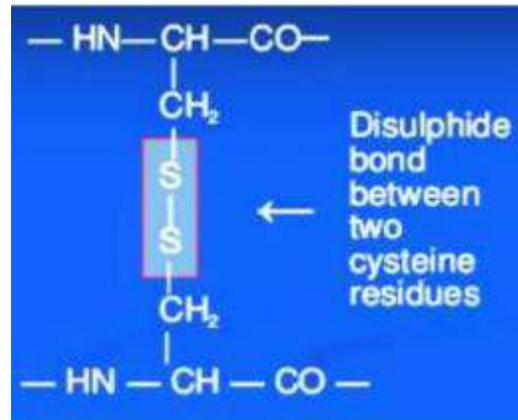
- ▶ Van der Waals force
- ▶ Short range repulsion
- ▶ Electrostatic bonds
- ▶ Hydrogen bonds
- ▶ Hydrophobic interactions



## ***Disulphide (-S-S-) Bond***

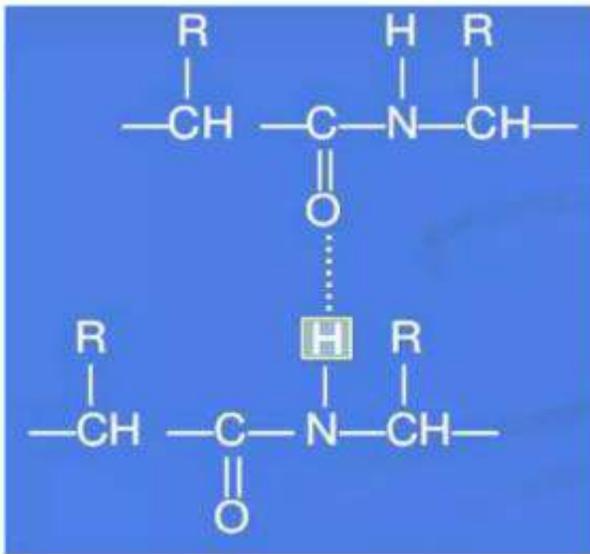
- *Formed b/w the **sulphydryl (-SH) groups of side chain of cysteine** in the same or in different peptide chains. Further, will be linked together.*
- *These are strong, high energy covalent bonds.*

- *It help to stabilize against denaturation and confer additional stability*



## **Non-covalent bonds**

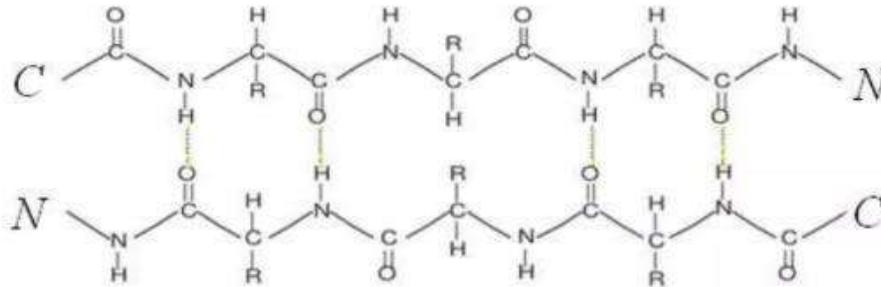
- *Weaker than the covalent bonds but they contribute significantly to the stability of protein structure*



### ***Hydrogen bonds***

- *formed between -NH group and -CO groups of two peptide linkages, may be present in the same (intra chain) or in different polypeptide chains (inter chain)*

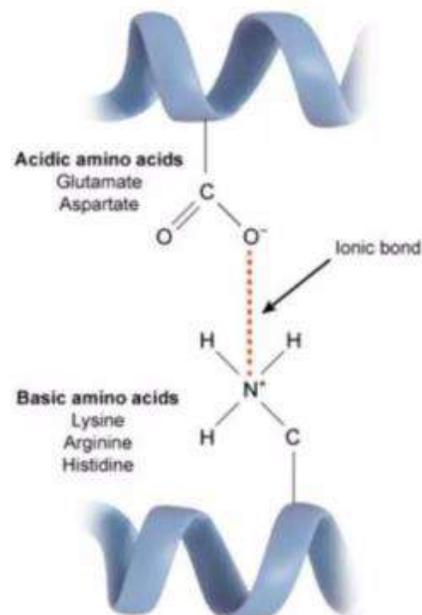
- The **nitrogen atom** involved in sharing belongs to one peptide bond, and the **oxygen atom** belongs to another peptide bond.



- H- bonds b/w polar groups on the surface of a protein & enhances the solubility of the protein

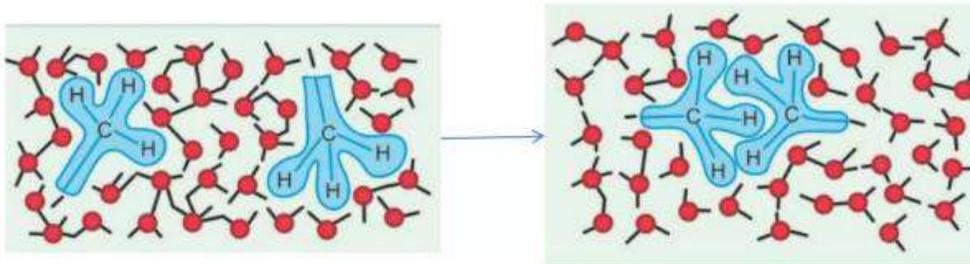
## Electrostatic / Ionic bond / Salt bridge

Occurs between *two oppositely charged polar side groups of amino acids* (e.g. Lys, Arg, His & acidic amino acids)



# Hydrophobic Bonds

*Occurs between the non-polar side chains of amino acids  
(Val, Leu, Ile, Met, Phe)*



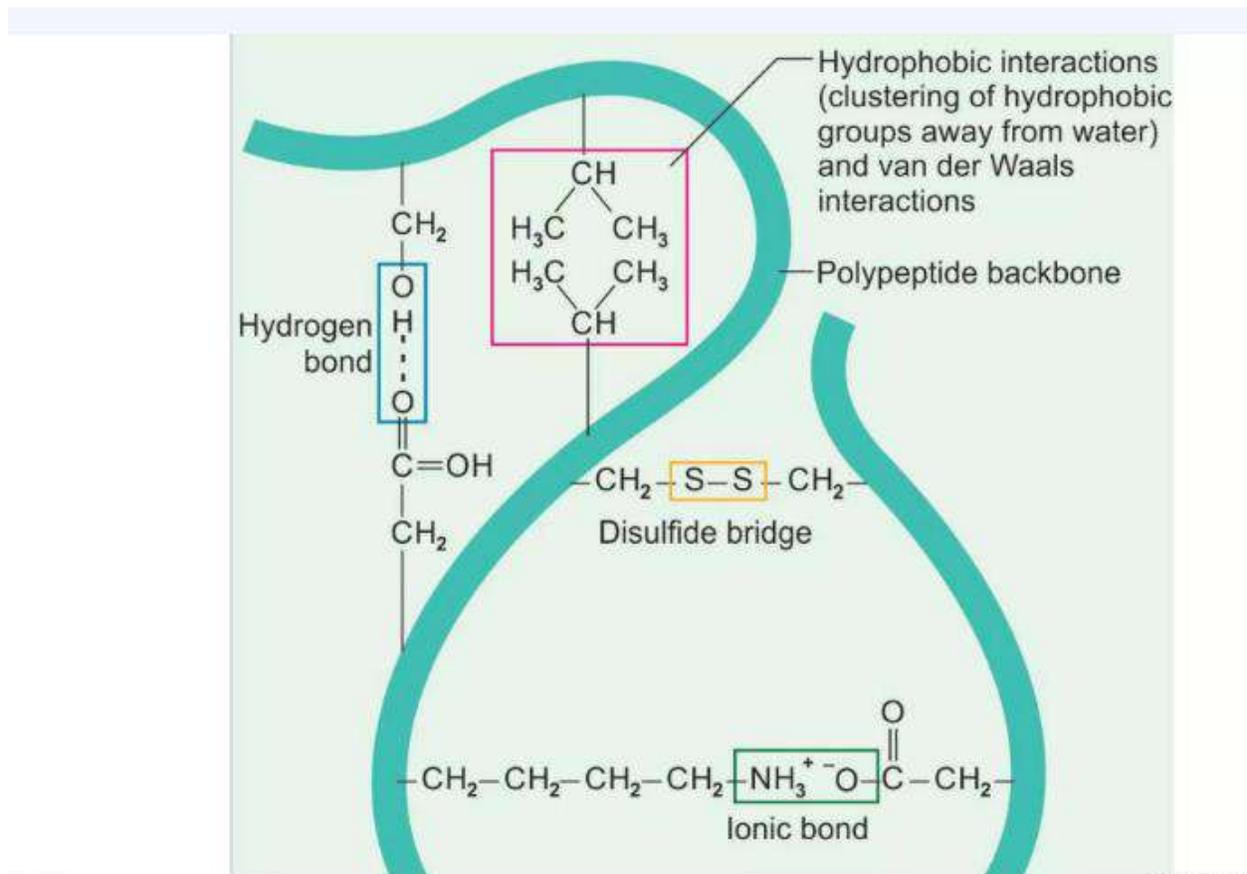
*When two hydrophobic molecules come together,  
surrounding water molecules are minimal*

*However, this is only a physical attraction and no chemical  
bonds are formed*

# Van der waals interaction

*This forces are extremely weak*

*Between two hydrophobic regions of amino acids residues*



*Don't cry over the past, its gone.  
Don't stress about the future, it hasn't arrived.  
Live in the present & make it beautiful*

