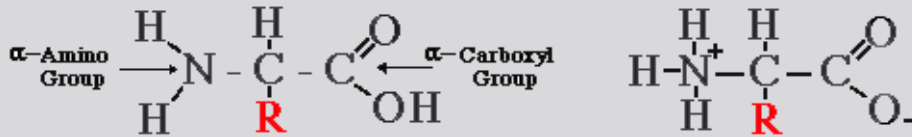
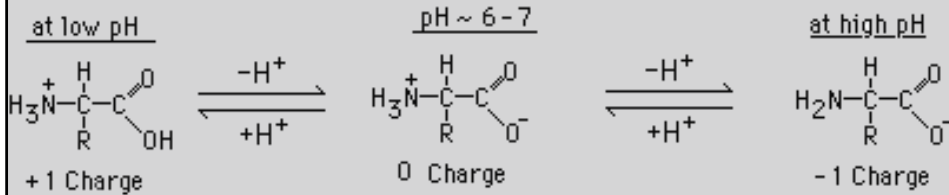


α -Amino Acids

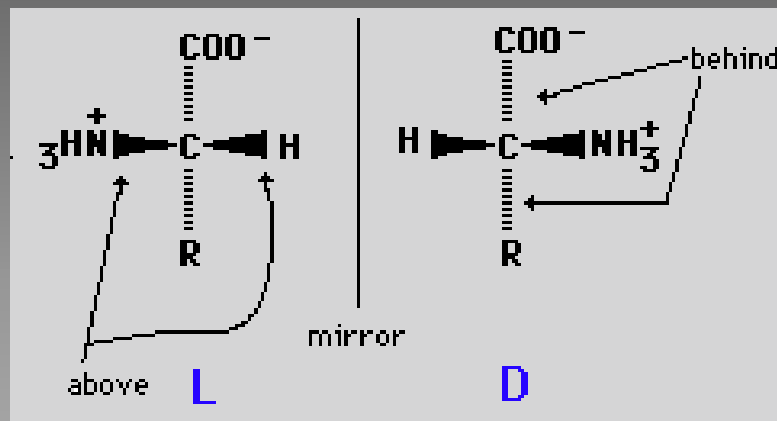


R = one of 20 possible organic compounds



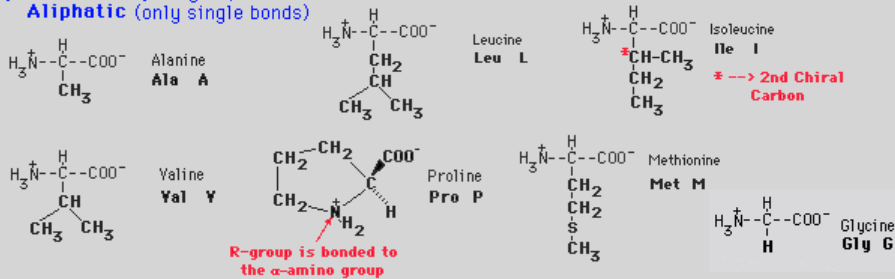
Amino acids have both acidic (carboxyl) and basic (amino) functional groups

Stereochemistry -- Tetrahedral α -Carbon

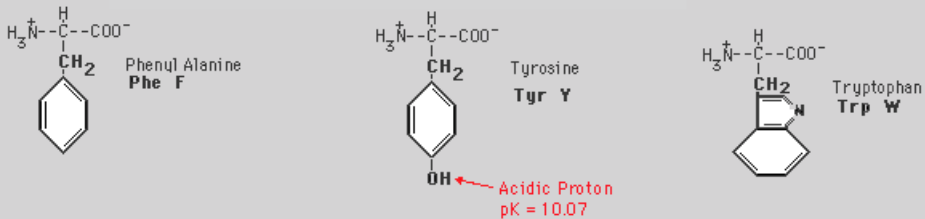


Hydrophobic Amino Acids have nonpolar R-Groups

Apolar R-Groups (Hydrophobic)
Aliphatic (only single bonds)

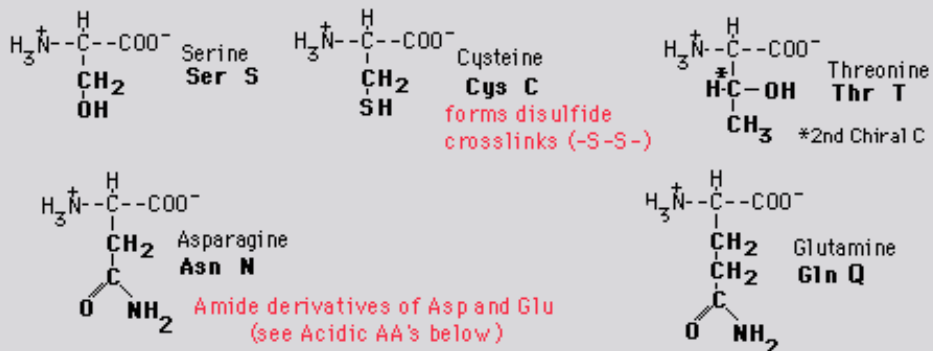


Aromatic: Aromatic amino acids adsorb ultra-violet (UV) light.
 This Provides a technique for measuring concentrations of these aa's and proteins which contain them.

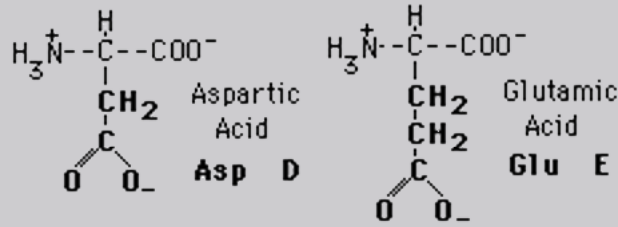


Polar Amino Acids have polar R-Groups

Polar: Uncharged (Tyrosine is also considered to be polar)



Acidic: Negatively charged at neutral pH



Basic: Positively charged at neutral pH

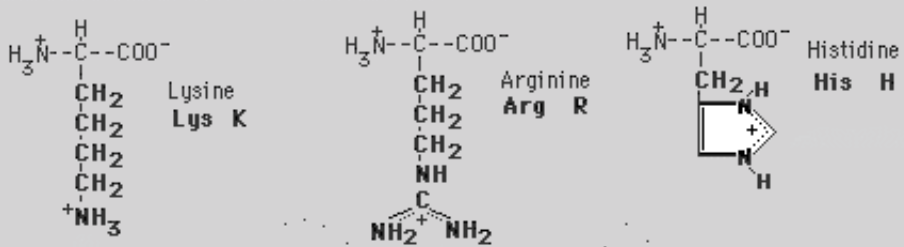
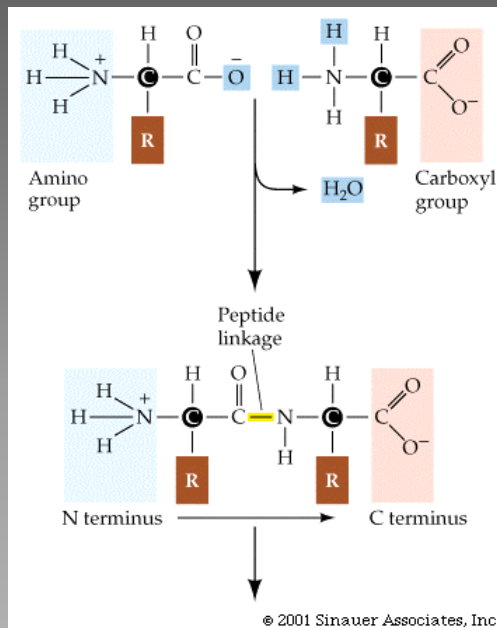
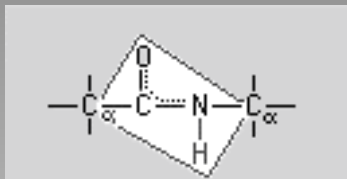
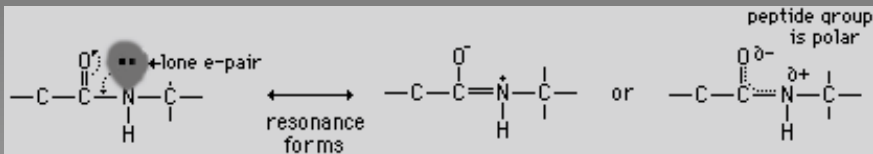
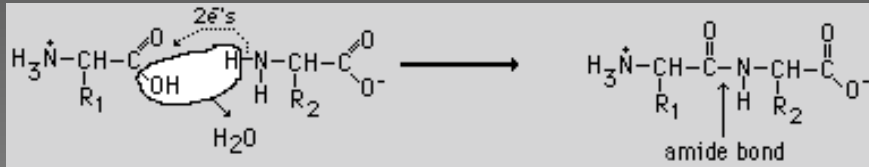


Figure 3.4: Peptide Bonds join Amino Acids in Proteins



Peptide Bond: How are proteins (polypeptides) made from amino acids?



The π bond is shared between the O and N in the Peptide Bond Group. Thus, each bond $\text{C}=\text{O}$ and $\text{C}=\text{N}$ behaves like a double bond, and there is no rotation around the bonds connecting these atoms. Furthermore, all of the atoms of the peptide bonding group lie on a plane.

Peptide Bonds

free rotation not possible

Rotation is possible around the single bonds to α -C's

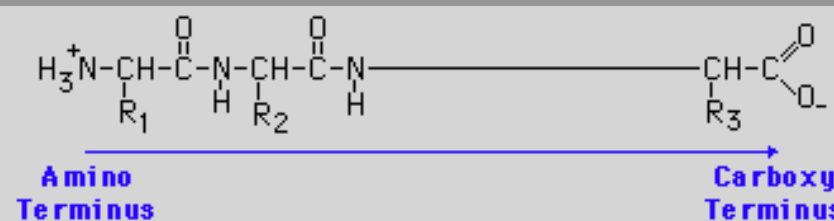
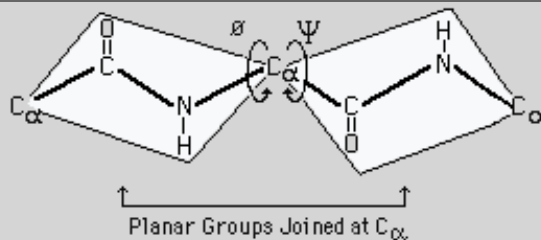
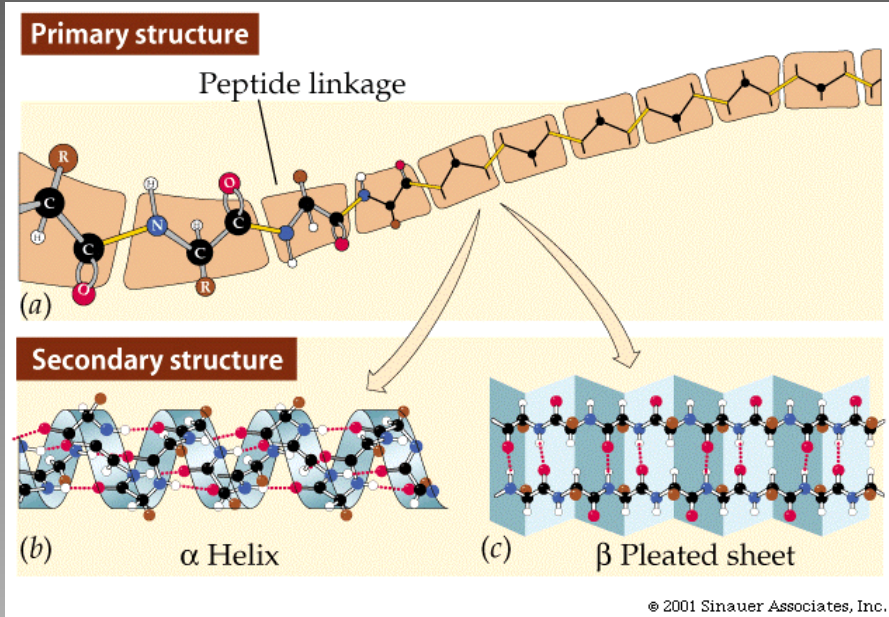


Figure 3.5a: **Primary** and **Secondary** Protein Structure



Lysozyme has two important types of secondary structure, α -helix and β -sheet



Figure 3.3: **Disulfide Bonds**

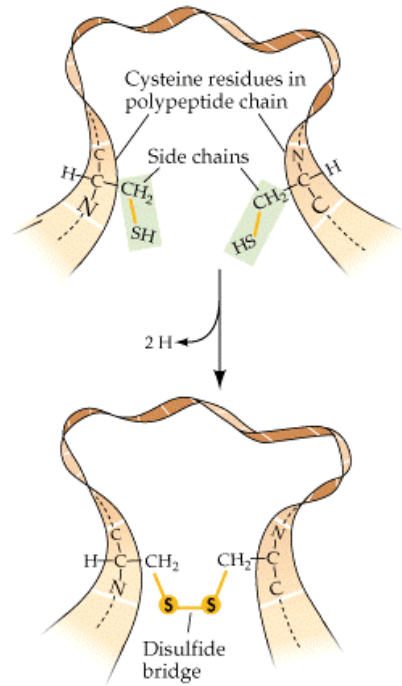


Figure 3.7: **Quaternary Structure**

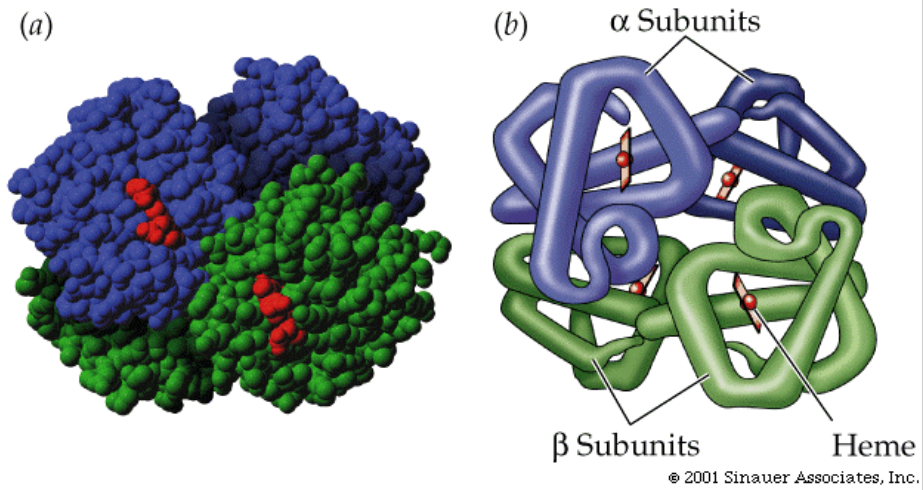
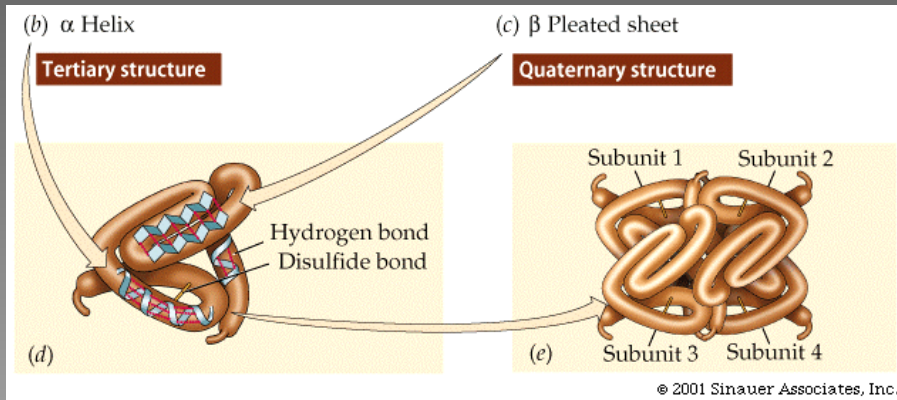


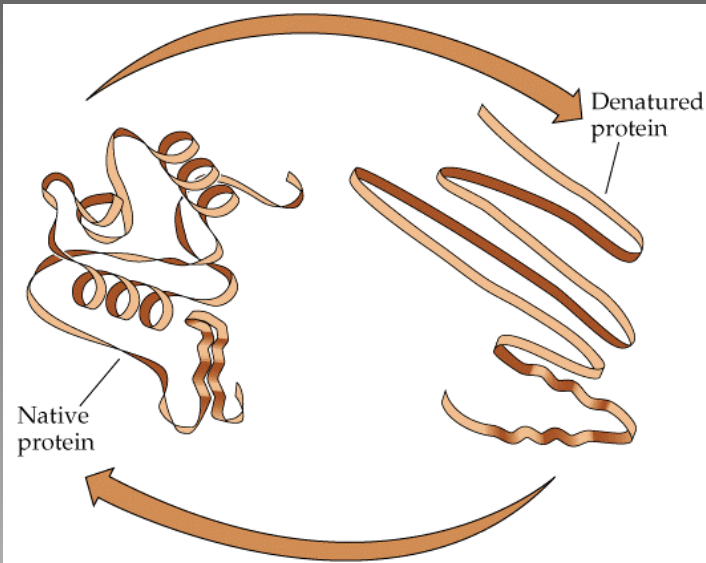
Figure 3.5b: **Tertiary** and **Quaternary** Protein Structure



Level of Structure	Type of Bond
Primary	Covalent Peptide
Secondary	Hydrogen Bond
Tertiary	Hydrophobic Bond most important + others
Quaternary	Hydrophobic Bond most important + others

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Figure 3.9: **Denaturation** is the loss of **Tertiary Protein Structure**. Loss of structure also results in loss of function. Denaturation can be caused by extreme temperature (heating), certain chemicals, ...



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