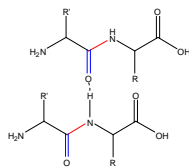


Outline

- 1 Intermolecular Forces
 - 1 Polar Interactions
 - 1 Hydrogen Bonding
 - 1 Van Der Waal Interactions
 - 1 The Amide Bond
 - 1 Bonding Interactions in Tertiary Structure
 - 1 Ionic
 - 1 Covalent
 - 1 Examples of Proteins

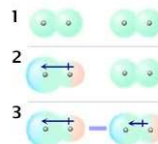
Molecular Interactions

- 1 Polar Interactions
 - 1 Stabilizing force arising from the attraction between positive and negative portions of protein chain. The more polar the portions, the stronger the attractive force.
 - 1 Special type of polar interaction: The hydrogen bond
 - 1 strong polar interaction between a somewhat electron deficient hydrogen and an electronegative (electron rich) oxygen or nitrogen.



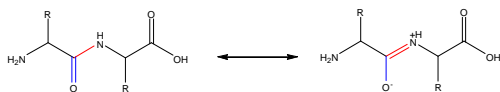
Molecular Interactions

- 1 Nonpolar interactions: Van Der Waal/London dispersion forces
 - 1 Stabilizing force present between all molecules/porions of protein. The movement of electrons cause temporary dipoles to form, which induce other dipoles. The dipoles attract.

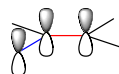


<http://www.chem.unsw.edu.au/coursenotes/CHEM1/nonunipass/Haines/IMF/dispersion.html>

The Amide Bond

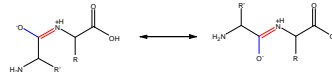


- Amide has resonance structure
- Electronics of amide can be seen in resonance structure

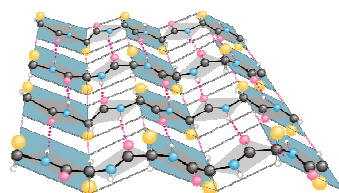
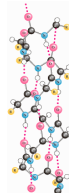


Consequences

- 1 Omega bond is either trans (180 degrees) or cis (0 degrees)



- 1 Alpha helix and beta sheets can form via hydrogen bonding

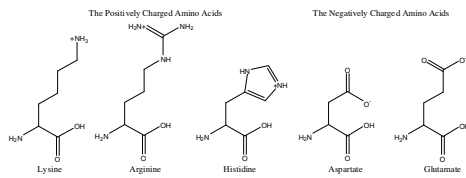


<http://www.sciencecollege.co.uk/SC/biochemicals.html>

Bonding Interactions in Tertiary Structure

1 Ionic Bond

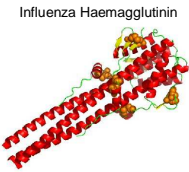
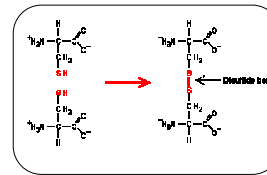
- ‡ Bond formed when two atoms are held together by electrostatic forces.
- ‡ Bonds can form between positively and negatively charged side chains



Bonding Interactions in Tertiary Structure

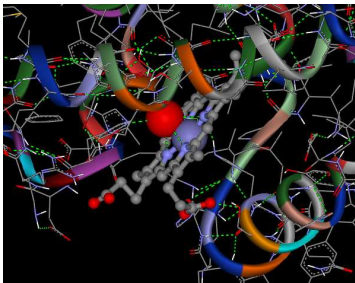
1 Covalent Bond

- ‡ Bond formed when electrons are shared between atoms
- ‡ Example: disulfide bridge



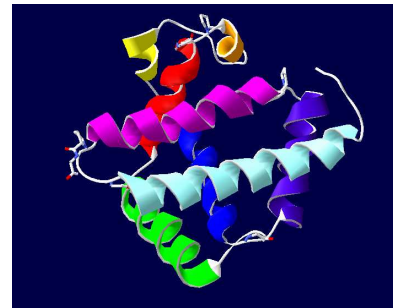
<http://chemistry.umeche.maine.edu/CHY431/Proteins11.html>
<http://www.kensiorcfs.com/celchem.html>

Heme: a cofactor

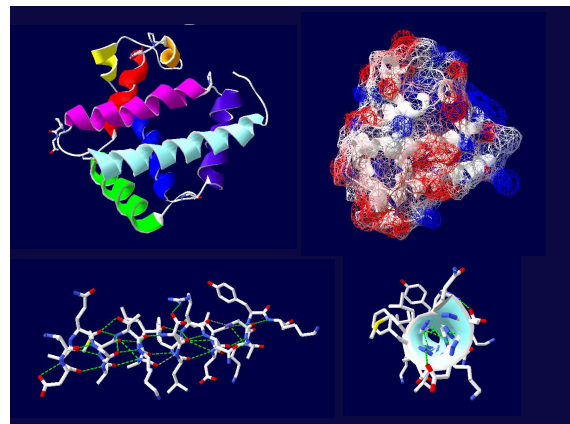
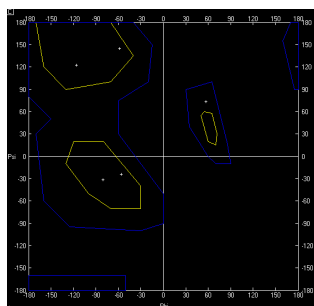


<http://www.acekeys.com/pharma/target/>

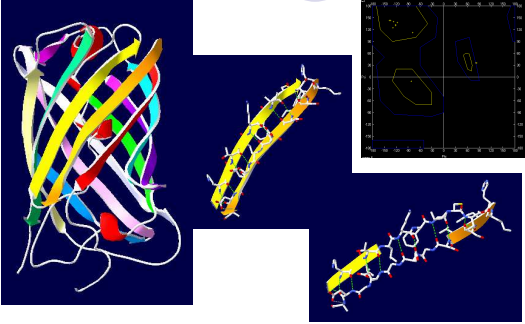
Protein Examples: Horse myoglobin



Ramachandran Plot



Protein Examples: GFP



Protein Examples: ATPase

