

BMS1011 – BIOMEDICAL CHEMISTRY

SECTION B

PROTEIN STRUCTURE AND FUNCTION

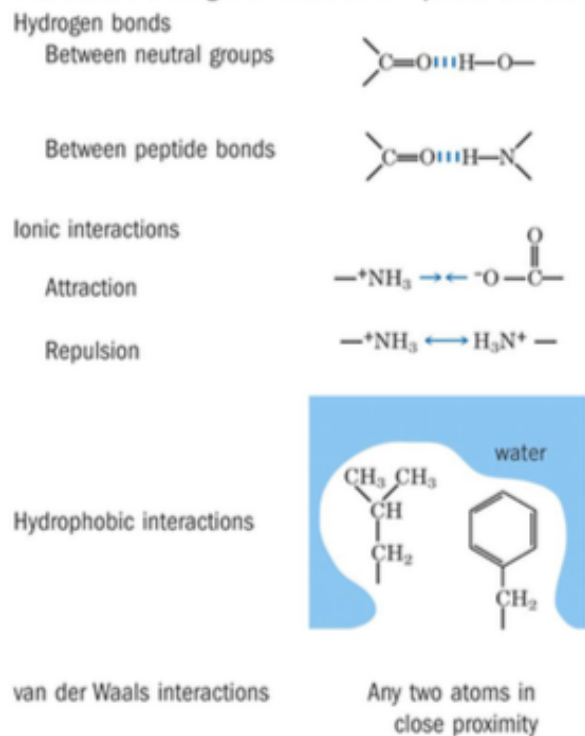
Protein structure

- **Primary structure** – the sequence of amino acid residues bonded by amide/peptide bonds. Structure of protein is based on this sequence.
- **Bioinformatics** – the study of protein sequencing data e.g. alignment of protein sequences of two related proteins reveal homology (carries the same function with difference sequence)
- There is some level of conservation amongst similar proteins but they can vary between different species. Invariant – (never change). Conservative (replaced)

Secondary structure

- **Secondary structure** – is the regular recurring arrangements at a local level within a protein.
- Includes **alpha helices, beta pleated sheets** and **disordered coils**.
- It is stabilised by weak forces such as H bonds, hydrophobic interactions, van der Waal's forces and ionic interactions (salt bridge)
- Hydrophobic groups come together to exclude water, allowing water to form as much bonds with water as possible
- **Disulphide bonds** – cysteine
- Hydrogen bonds are most important in stabilising secondary structures
- Prolene breaks alpha helices as it doesn't have NH

TABLE 2-5 Four Types of Noncovalent ("Weak") Interactions among Biomolecules in Aqueous Solvent



Beta pleated sheets

- Beta strands go from an N to C direction forming strong, robust structures
- **Antiparallel** Beta sheets - N to C, C to N,
- **Parallel** beta sheets – N to C, N to C,

Fibrous proteins

- Structural proteins which are most abundant in our bodies
- Elongated, filamentous chains usually joined by cross-linkages
- Mainly composed of a single secondary structure element e.g. keratin, collagen – alpha helix, silk – beta pleated sheets
- Large molecules made up of 2 or more polypeptide chains held by H bonds in long fibrous chains (repetitive)
- Usually insoluble in water