

AMINO ACIDS, PEPTIDES AND PROTEINS

المرحلة الثالثة / قسم الكيمياء / الفصل الثاني
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Classification of Proteins on the Basis of Biological Role:

1) Structural Proteins

Provide mechanical support to cells and organisms

Give strength to bones, skin and tendons: collagen, elastin

2) Enzymes

Proteins that serve as biological catalysts for chemical reactions in cells

3) Transport and Storage

Carriers for small biomolecules to cellular destinations for use in metabolism or in construction of cell components

Examples: oxygen, ferritin (iron in liver), lipoproteins that transport cholesterol

4) Muscle Contraction and Mobility

Actin and myosin are components of skeletal muscle

5) Immune Proteins and other Protective Proteins

Proteins used for defensive purposes

Example: Antibodies are proteins that bind and destroy foreign substances like viruses and bacteria

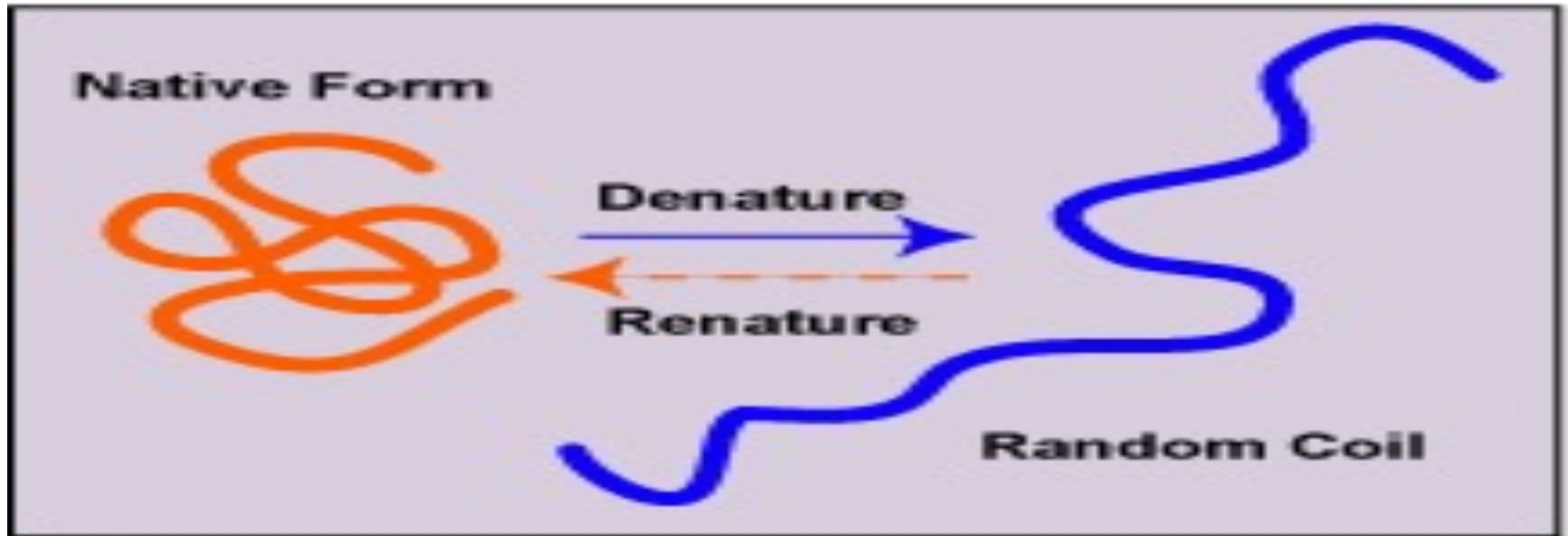
6) Regulatory and Receptor Proteins

Proteins that regulate cellular and physiological activity

- Hormones**
- DNA Binding Proteins – assist in regulation of protein synthesis**
- Receptors**
- Proteins that mediate hormone signals and transmit the signal to the inside of the cell**

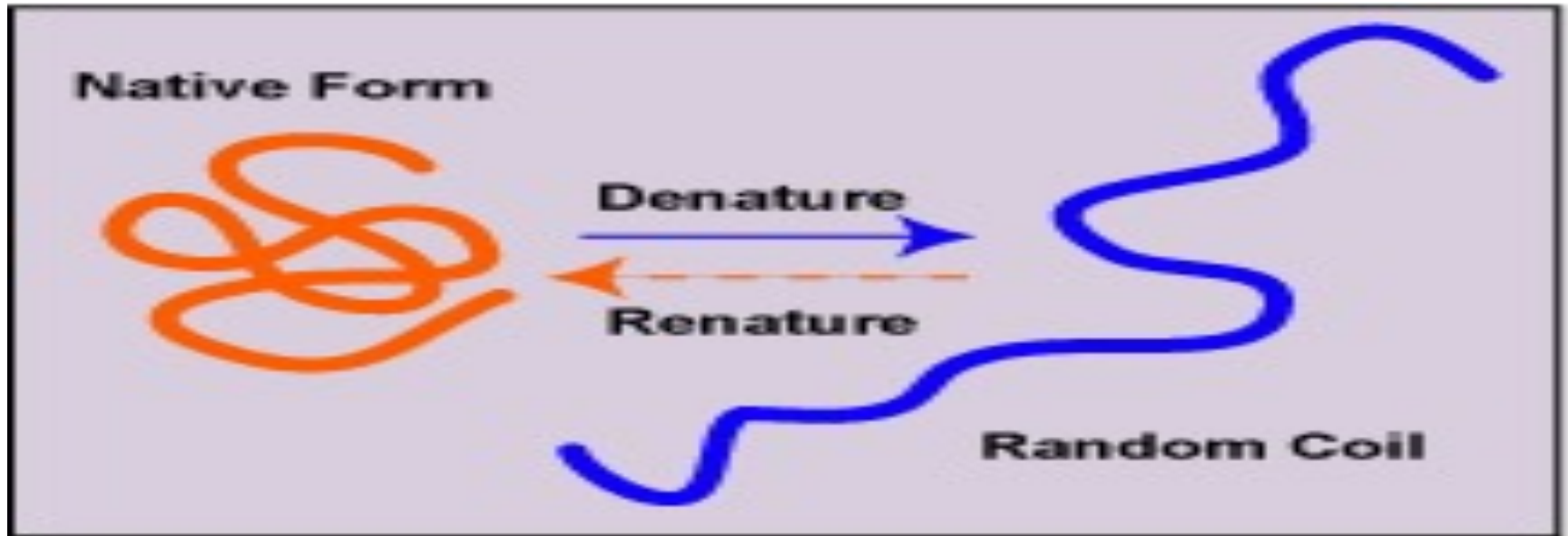
Denaturation of Proteins:

All Proteins can undergo denaturation under certain conditions. The proteins are extremely sensitive to small changes in their environments. When these changes occur, proteins lose all or part of their biological activity. That is, the proteins are denatured. Denaturation occurs at the molecular level by disruption of the attractive forces (hydrogen bonds, disulfide bonds, hydrophobic attractions, and salt bridges) that maintain the unique secondary and tertiary structures of proteins.



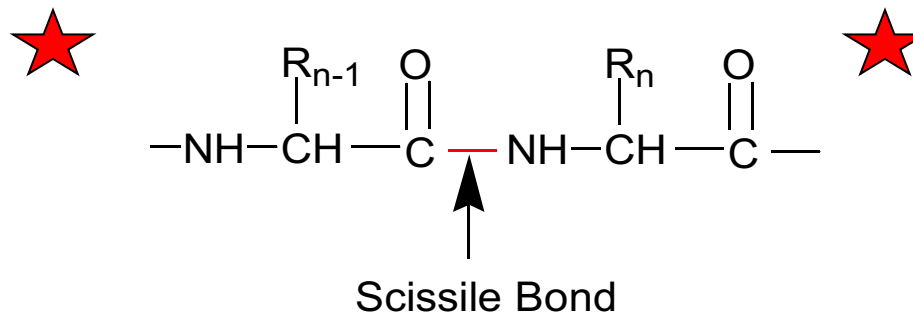
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Long peptides have to be broken to shorter ones to be sequenced

Endopeptidases cleave proteins at specific sites within the chain.



Trypsin. positively charged residues (Lys,Arg,His)(C)

Chymotrypsin Aromatic (Phe,tyr,trp) (C)

Pepsin. Aromatic (Phe,tyr,trp) (N)

Cyanogen Bromide M

Cleave the large protein using i.e trypsin, separate fragments and sequence all of them. (We do not know the order of the fragments!!)

Cleave with a different reagent i.e. Cyanogen Bromide, separate the fragments and sequence all of them. Align the fragments with overlapping sequence to get the overall sequence.

