



PROTEINS

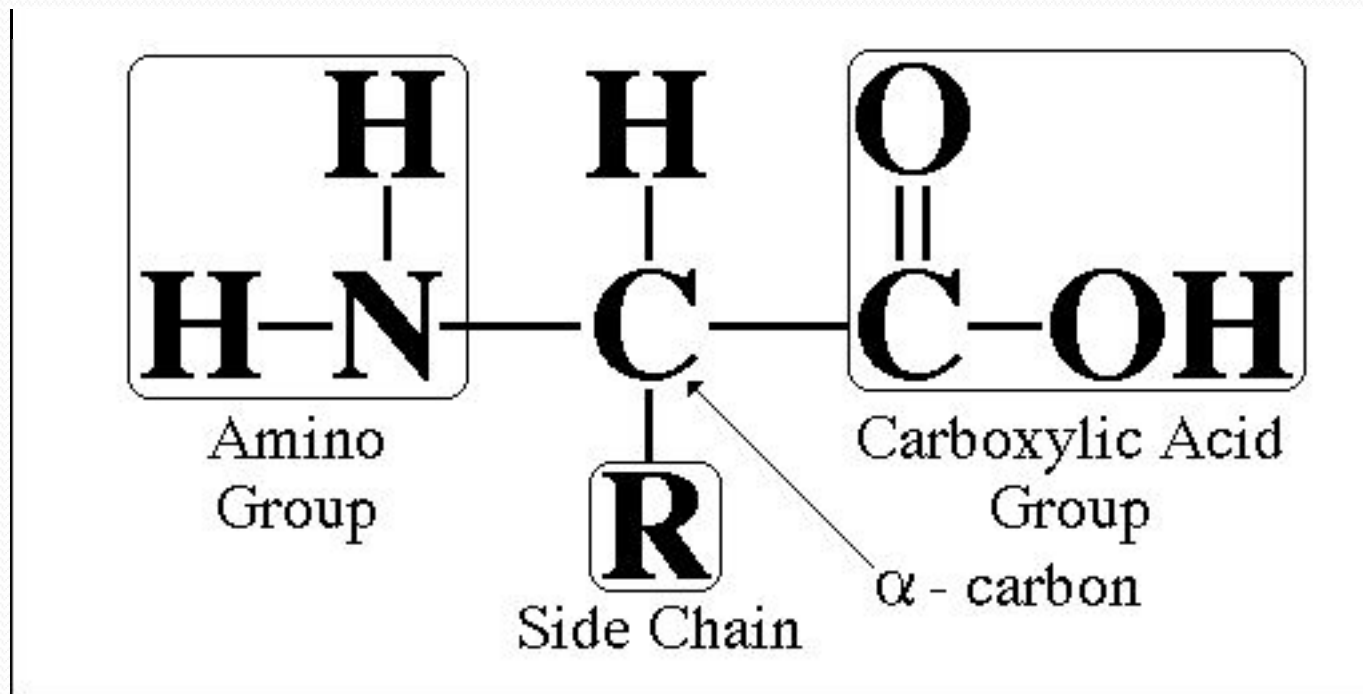


COMPOSITION AND FUNCTION

- Always contain C, H, O, N plus sometimes S
- Function as structural components of muscle, ligaments, and tendons
- Enzymes are special proteins that facilitate chemical reactions
- Membrane proteins assist in the movement of molecules into and out of the cell
- Hormones (such as insulin and oxytocin)
- Plasma proteins in blood plus hemoglobin in RBCs

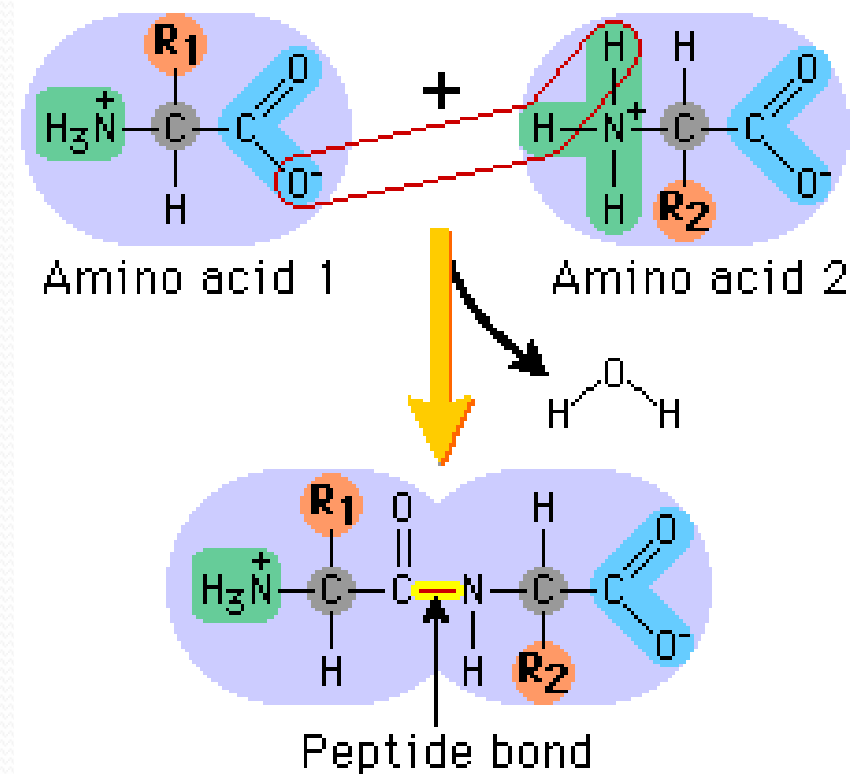
AMINO ACIDS

- The monomers that make up proteins are amino acids
- There are 20 different amino acids but all have the same basic structure



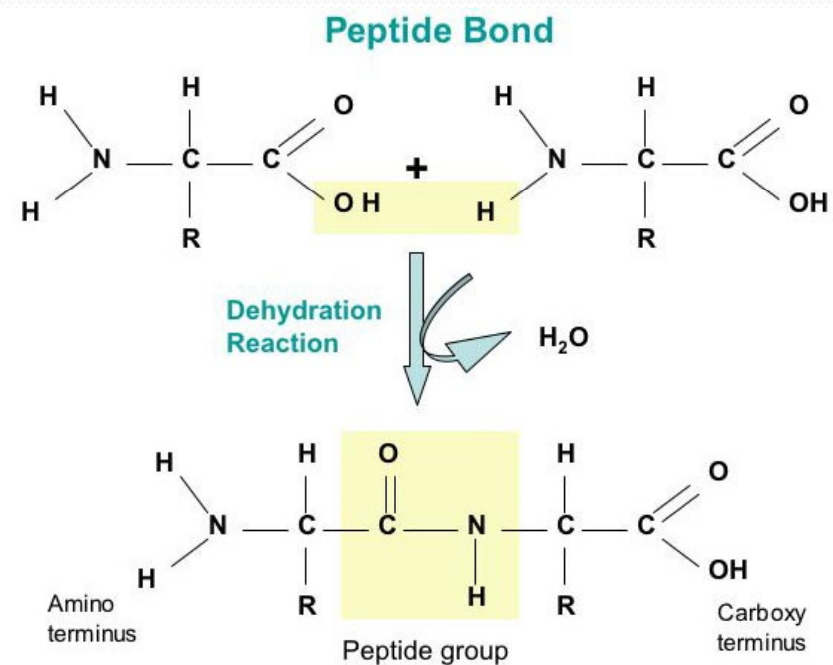
PEPTIDE BONDS

- When 2 amino acids are joined through dehydration synthesis a peptide bond is formed
- 2 amino acids make up a dipeptide
- 3 amino acids make up a tripeptide
- More than 3 amino acids make up a polypeptide



Dehydration Synthesis/Hydrolysis

- Dehydration synthesis of proteins occurs in the liver and body cells
- Hydrolysis occurs in the stomach and small intestine (during digestion)



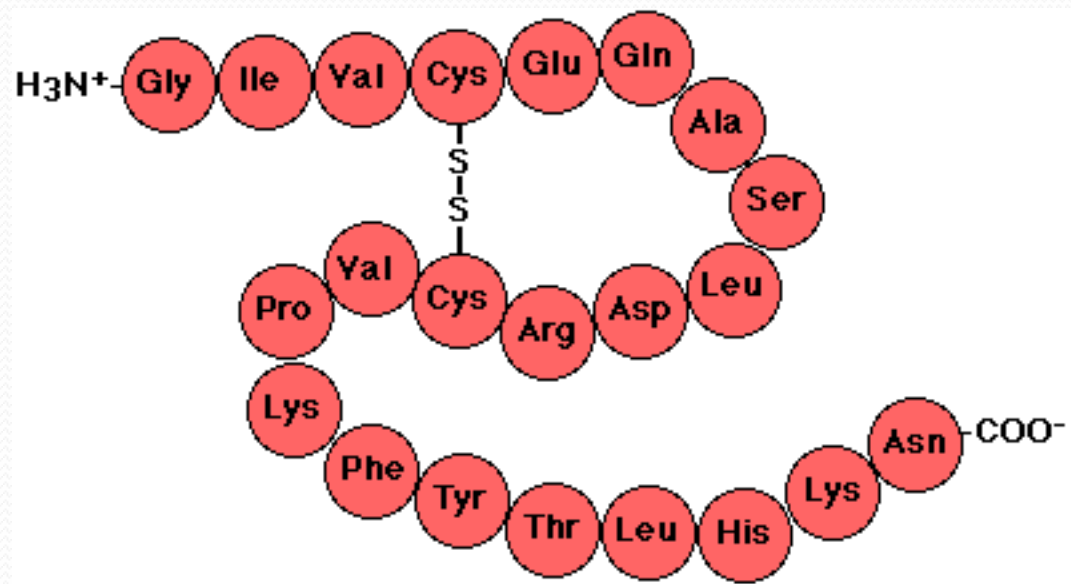


LEVELS OF PROTEIN STRUCTURE

- Proteins are grouped into 'levels' according to their structure (shape and bonding)
- The shape of a protein is very important to its function
- Exposure to extreme temperatures, pH, and heavy metals will permanently change the shape of a protein by destroying bonds (denatures the protein)
- Denatured proteins are no longer able to function

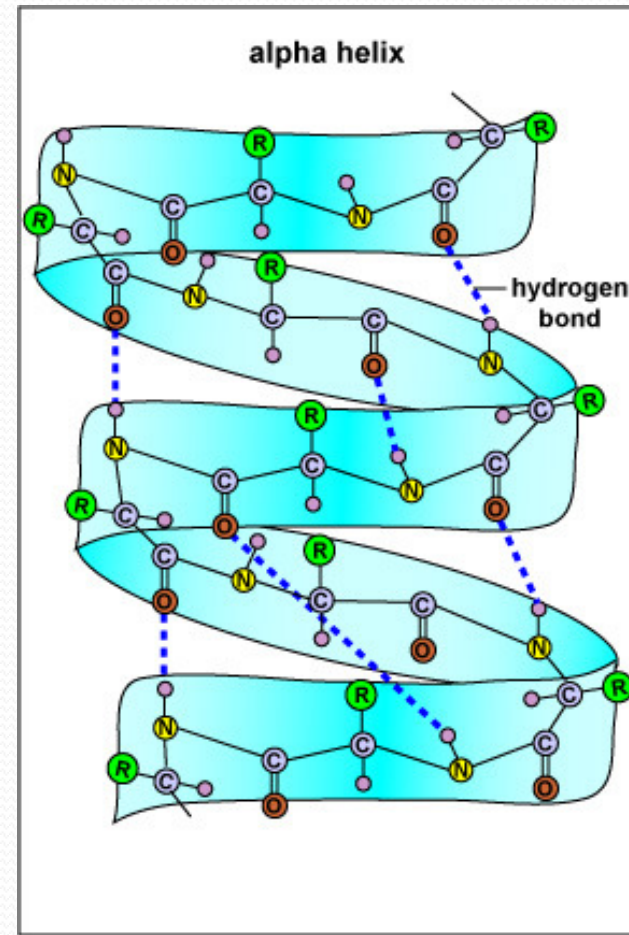
PRIMARY STRUCTURE 1°

- Linear sequence of amino acids joined by peptide bonds
- Polypeptides differ in the sequence and number of amino acids



SECONDARY 2° STRUCTURE

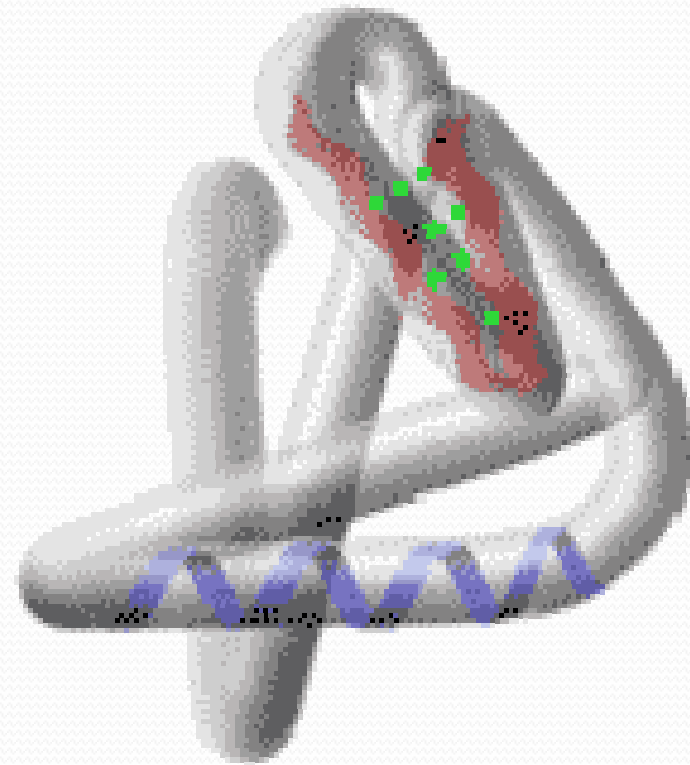
- Alpha helix (like a chain of DNA)
- Held together by peptide bonds but H-bonds stabilize the turns of the helix
- Eg: collagen, keratin



TERTIARY 3° STRUCTURE

- Forms a 3-dimensional shape (alpha helix is twisted, bent, and/or folded)
- Held together by covalent & ionic bonds plus H-bonds of the R-groups
- Eg: enzymes (amylase, pepsin, trypsin...)

Tertiary Structure of Proteins



QUATERNARY 4° STRUCTURE

- 2 or more linked polypeptides
- Held together by bonding between subunits plus the bonds of the individual polypeptides
- Eg: hemoglobin

