

## BIOLOGICAL FRAMEWORKS FOR ENGINEERS

---

### Session #5a [nm: Protein Form]

#### General Objectives:

- ✓ Discuss general functions of proteins and diversity in subunits within the biopolymer
- ✓ Overview of protein structures with respect to their function

#### Central Framework:

- ✓ A protein is a complex, high-molecular-weight, organic compound that consists of amino acids joined by peptide bonds and is essential to the structure and function of living cells.

#### Interactive Activity:

- ✓ Worksheet on the relationship between DNA and proteins.

#### Session Outline:

I. Protein Definition

II. Protein Form and Function

III. The weak can be strong if there are many...

Ionic bonds

Hydrogen bonds

Hydrophobic bonds

van der Waals

## IV. Amino Acids form Polypeptides

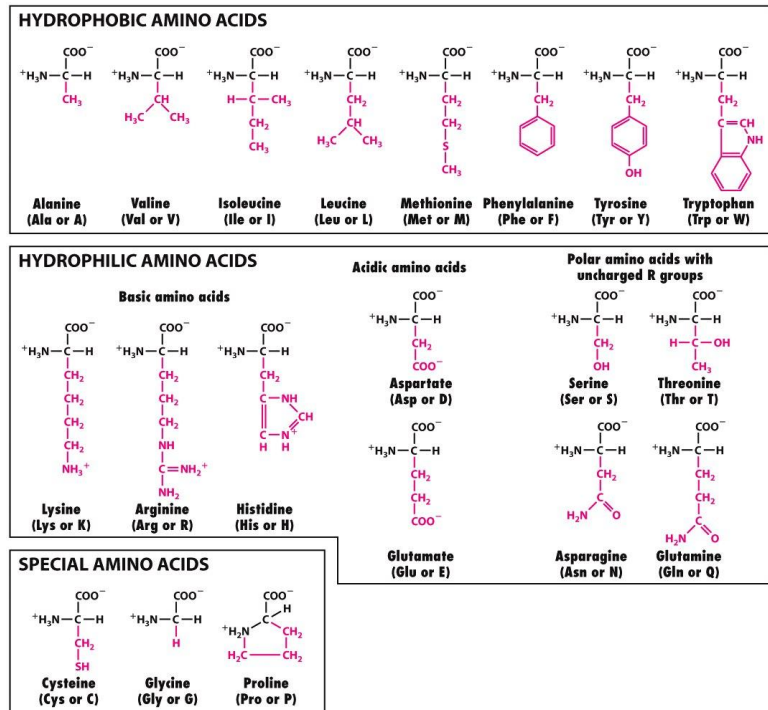


Figure 2-14  
*Molecular Cell Biology, Sixth Edition*  
 © 2008 W. H. Freeman and Company

## V. Structure of Proteins

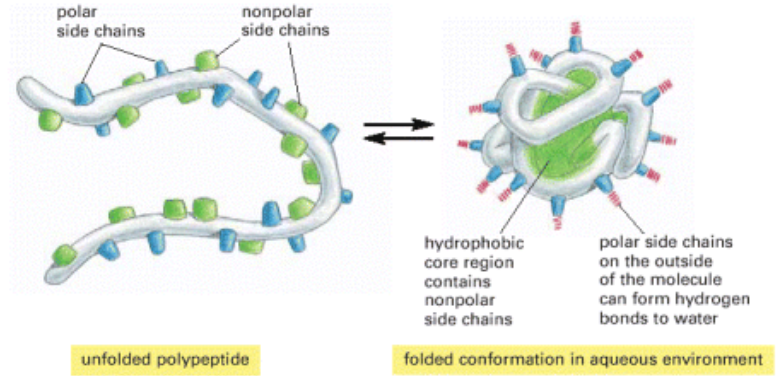
Primary structure:

Secondary structure:

Tertiary structure:

Quaternary structure:

VI. Protein Folding



Spontaneous Folding

Assisted Folding

VII. Post translational modifications

WORKSHEET: DNA Sequence to Protein Function

What is the relationship between:

- a. DNA sequence in a gene and amino acid sequence?
- b. amino acid sequence and structure?
- c. protein structure and protein function?
- d. DNA sequence in a gene and protein function?