6.1 The Molecules of Living Systems

In this section, you will:

• **Describe** the chemical nature of carbohydrates, lipids, and **proteins**
• **Explain**, in general terms, how carbohydrates, lipids, and **proteins** are synthesized and how they are broken down (hydrolyzed)
• **Explain** enzyme action and factors influencing their action
• **Understand how to perform** standard tests to identify macromolecules

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**Protein Function**

• Build cells
• Repair cells
• Maintain cells

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**Proteins**

• Most cellular structures are made of proteins
• Assembled from smaller subunits – **amino acids**
• Amino acids bond together to form peptide bonds
• A chain of several amino acids bonded together is called a peptide
• **Proteins**
Amino Acid

- Central carbon atom bonded to a hydrogen and three other groups of atoms
  - Amino group
  - Acid group (carboxyl group)
  - R group.
- R group is a group of one or more atoms that determines identity
- Amino acids must undergo additional changes before becoming protein

An amino acid is the subunit of proteins.

Synthesis of a Dipeptide

4 Types of Proteins

- Primary
- Secondary
- Tertiary
- Quaternary

• Basic Protein Structure
Primary Proteins
- Amino acid sequences in a linear arrangement.
- Connected by a peptide bond.
- A chain of amino acids is termed a polypeptide.
- Ex. Cow Insulin

Secondary Proteins
- Ordered arrangement or conformation of amino acids.
- α-helix.
- β-pleated sheet.

Tertiary Proteins
- Are the overall 3D folding of a protein.
- Stabilized by disulphide bonds.
- Ex. Myoglobin

Quaternary Proteins
- Made up of multiple tertiary protein chains.
- Fibrous or globular.
- Ex. Fibrous- Keratin
- Ex. Globular- Hemoglobin
Protein Alterations

- **Denaturation** - temporary change in a protein’s shape
- **Coagulation** - permanent change in a protein’s shape

- What might cause this?

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**Demo**

- Test for Proteins
- Pg. 212

**Homework**

- Section 6.1 Review
- Pg. 216 #5.