



12086CH16

Unit 16 Chemistry in Everyday Life

Objectives

After studying this Unit you will be able to

- visualise the importance of Chemistry in daily life;
- explain the term 'chemotherapy';
- describe the basis of classification of drugs;
- explain drug-target interaction of enzymes and receptors;
- explain how various types of drugs function in the body;
- know about artificial sweetening agents and food preservatives;
- discuss the chemistry of cleansing agents.

*From living perception to abstract thought, and from this to practice.
V.I. Lenin.*

By now, you have learnt the basic principles of chemistry and also realised that it influences every sphere of human life. The principles of chemistry have been used for the benefit of mankind. Think of cleanliness — the materials like soaps, detergents, household bleaches, tooth pastes, etc. will come to your mind. Look towards the beautiful clothes — immediately chemicals of the synthetic fibres used for making clothes and chemicals giving colours to them will come to your mind. Food materials — again a number of chemicals about which you have learnt in the previous Unit will appear in your mind. Of course, sickness and diseases remind us of medicines — again chemicals. Explosives, fuels, rocket propellents, building and electronic materials, etc., are all chemicals. Chemistry has influenced our life so much that we do not even realise that we come across chemicals at every moment; that we ourselves are beautiful chemical creations and all our activities are controlled by chemicals. In this Unit, we shall learn the application of Chemistry in three important and interesting areas, namely – medicines, food materials and cleansing agents.

16.1 Drugs and their Classification

Drugs are chemicals of low molecular masses (~100 – 500u). These interact with macromolecular targets and produce a biological response. When the biological response is therapeutic and useful, these chemicals are called **medicines** and are used in diagnosis, prevention and treatment of diseases. Most of the drugs used as medicines are potential poisons, if taken in doses higher than those recommended. Use of chemicals for therapeutic effect is called **chemotherapy**.

16.1.1
Classification of
Drugs

Drugs can be classified mainly on criteria outlined as follows:

(a) On the basis of pharmacological effect

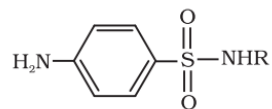
This classification is based on pharmacological effect of the drugs. It is useful for doctors because it provides them the whole range of drugs available for the treatment of a particular type of problem. For example, analgesics have pain killing effect, antiseptics kill or arrest the growth of microorganisms.

(b) On the basis of drug action

It is based on the action of a drug on a particular biochemical process. For example, all antihistamines inhibit the action of the compound, histamine which causes inflammation in the body. There are various ways in which action of histamines can be blocked. You will learn about this in Section 16.3.2.

(c) On the basis of chemical structure

It is based on the chemical structure of the drug. Drugs classified in this way share common structural features and often have similar pharmacological activity. For example, sulphonamides have common structural feature, given below.



Structural features of sulphonamides

(d) On the basis of molecular targets

Drugs usually interact with biomolecules such as carbohydrates, lipids, proteins and nucleic acids. These are called target molecules or drug targets. Drugs possessing some common structural features may have the same mechanism of action on targets. The classification based on molecular targets is the most useful classification for medicinal chemists.