

3.1. SULPHONAMIDES

3.1.1. Introduction

Several groups of drugs are derived from **sulphonamides** (or **sulpha drugs**). These are synthetic antimicrobial agents containing sulphonamide group. However, some sulphonamides such as anticonvulsant sultiame lack antibacterial activity. Sulphonamides are used for preventing and treating bacterial infections, diabetes mellitus, oedema, hypertension, and gout. Sulfonylureas and thiazide diuretics are newer groups of drugs that are derived from antibacterial sulphonamides.

Sulphonamide was the first antimicrobial agent which acted against pyrogenic bacterial infections. Its molecular structure resembles to the structure of *p*-Aminobenzoic acid (PABA), required as a substrate of dihydropteroate synthetase enzyme for synthesising tetrahydrofolic acid (THF) in bacteria. Metabolic processes in bacteria requiring PABA are inhibited by the sulphonamides derived from sulphanilamide.

Allergies commonly occur on administering sulphonamides. Data shows that the adverse drug reactions related to sulpha antibiotics are 3%; so, they are prescribed cautiously. Sulpha drugs are different from other sulphur-containing compounds (such as sulphates and sulphites) which are not chemically related to sulphonamide group and also don't cause the hypersensitivity reactions caused by sulphonamides. Kernicterus (brain damage due to excess bilirubin) is a potential side effect of sulphonamide as it displaces bilirubin from albumin.

3.1.2. Classification

Sulphonamides are classified as follows:

1) Based on their Duration of Action

- i) **Short Acting Sulphonamides:** These have 4-8 hours of duration of action, e.g., Sulphadiazine and Sulphamethoxazole.
- ii) **Intermediate Acting Sulphonamides:** These have 8-16 hours of duration of action, e.g., Sulphaphenazole and Sulphamethoxazole.
- iii) **Long Acting Sulphonamides:** These have 1-7 days of duration of action, e.g., Sulphaphenazole and Sulpha di-methoxine.

2) Based on their Pharmacological Action

- i) Used in systemic infections, e.g., Sulphadiazine.
- ii) Used in eye infections, e.g., Sulphacetamide.
- iii) Used in intestinal infections, e.g., Sulphapyridine.
- iv) Used in urinary tract infections, e.g., Sulphamethoxazole.