

**PHB**



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**Course Name : D. Pharm**

**Year : First Year**

**Subject Name : Pharmaceutical Chemistry**

**Topic Name : Sulphonamides**

Sulfonamides, sometimes called sulfa drugs, are medicines that prevent the growth of bacteria in the body. The first antimicrobial agent effective against pyogenic bacterial infections PRONTOSIL RED, A dye used to treat experimental streptococcal infections in mice was found to be HIGHLY EFFECTIVE used to cure infants with staphylococcal septicemias.

### **Classification of Sulfonamide Drugs:**

#### **I. On the basis of site of action**

- 1. Sulphonamides for general infections: E.g.:** Sulphanilamide, Sulphapyridine, Sulphadiazine, Sulphamethocine, Suphamethoxazole.
- 2. Sulphonamides for intestinal infections: E.g.:** Phthalyl sulphathiazole, Succinyl sulphathiazole, Sulphasalazine.
- 3. Sulphonamides for local infections: E.g.:** Sulphacetamide, Mafenamide, Silver sulphadiazine.
- 4. Sulphonamides for dermatitis: E.g.:** Dapsone, Solapsone.
- 5. Sulphonamide Combination: E.g.:** Sulphamethoxazole with Trimethoprim

#### **II. On the basis of pharmacokinetic properties**

- 1. Poorly absorbed Sulphonamides: E.g.:** Sulphasalazine, Phthalyl sulphathiazole
- 2. Rapidly absorbed and excreted Sulphonamides: E.g.:** Sulphamethoxazole, Sulphisoxazole, Sulphadiazine

#### **III. On the basis of chemical classification**

- 1. N1- substituted Sulphonamides: E.g.:** Sulphadiazine, Sulphacetamide, Sulphadimidine.
- 2. N4 – substituted Sulphonamides (pro drugs): E.g.:** Prontosil, Sulphaguanidine,
- 3. Both N1 and N4 - substituted Sulphonamides: E.g.:** Succinyl sulphathiazole, Phthalyl sulphathiazole.
- 4. Non-aniline Sulphonamides: E.g.:** Mefenide sodium.

#### **IV. On the basis of pharmacological activity**

- 1. Antibacterial agents: E.g.:** Sulphadiazine, Sulphisoxazole.
- 2. Oral hypoglycemic agent: E.g.:** Tolbutamide.
- 3. Diuretics: E.g.:** Furosemide, Bumetanide, Chlorthalidone.
- 4. Dermatitis: E.g.:** Dapsone

## **V. On the basis of route**

### **A. Orally Absorbable:**

- 1. Short Acting (4-8 hrs): E.g.:** Sulfadiazine, Sulfacytine, Sulfamethizole, Sulfisoxazole
- 2. Intermediate Acting (8-12hrs): E.g.:** Sulfamethoxazole, Sulfamoxole
- 3. Long Acting (~7 days): E.g.:** Sulfadoxine, Sulfamethopyrazine
- 4. Ultra-long acting Sulphonamides:** (half-life greater than 50 hours) **E.g.:** Sulphasalazine, Sulphacetamide, Sulphalene.

**B. Orally Non- Absorbable: E.g.:** Sulfasalazine, Olsalazine, Balsalazine

**C. Topical Agents: E.g.:** Silver sulfadiazine, Mafenide, Sulfacetamide sodium

### **Mechanism of Action**

Sulphonamides are bacteriostatic in nature. The sulphonamide sensitive micro-organisms require p-Amino benzoic acid (PABA) for the synthesis of folic acid which is essential for the synthesis of DNA and RNA. Sulphonamides block the biosynthesis of this folate coenzyme resulting into the arrest of bacterial growth and cell division.