

Chemotherapy

General Principles of Chemotherapy

- Chemotherapy in pharmacology refers to the use of chemical agents to destroy or inhibit the growth of infectious organisms or cancer cells.
- In the context of **antimicrobial chemotherapy**, it primarily targets bacteria, viruses, fungi, and parasites.

Key Concepts

1. Selective Toxicity

- The drug should target microbes without harming the host.

2. Spectrum of Activity

- **Narrow-spectrum:** Targets specific bacteria (e.g., *Penicillin G*).
- **Broad-spectrum:** Covers a wide range (e.g., *Tetracyclines*).

3. Bactericidal vs. Bacteriostatic

- **Bactericidal:** Kills microbes (e.g., *Penicillin*).
- **Bacteriostatic:** Inhibits growth, aiding the immune system (e.g., *Chloramphenicol*).

4. Combination Therapy

- Used for synergy, resistance prevention, or broad coverage.

5. Resistance

- **Natural:** Inherent to the organism.
- **Acquired:** Via mutations or gene transfer (e.g., plasmids).

6. Prophylactic vs. Therapeutic Use

- **Prophylactic:** Prevents infection (e.g., before surgery).
- **Therapeutic:** Treats existing infection.

Sulfonamides (Sulfa Drugs)

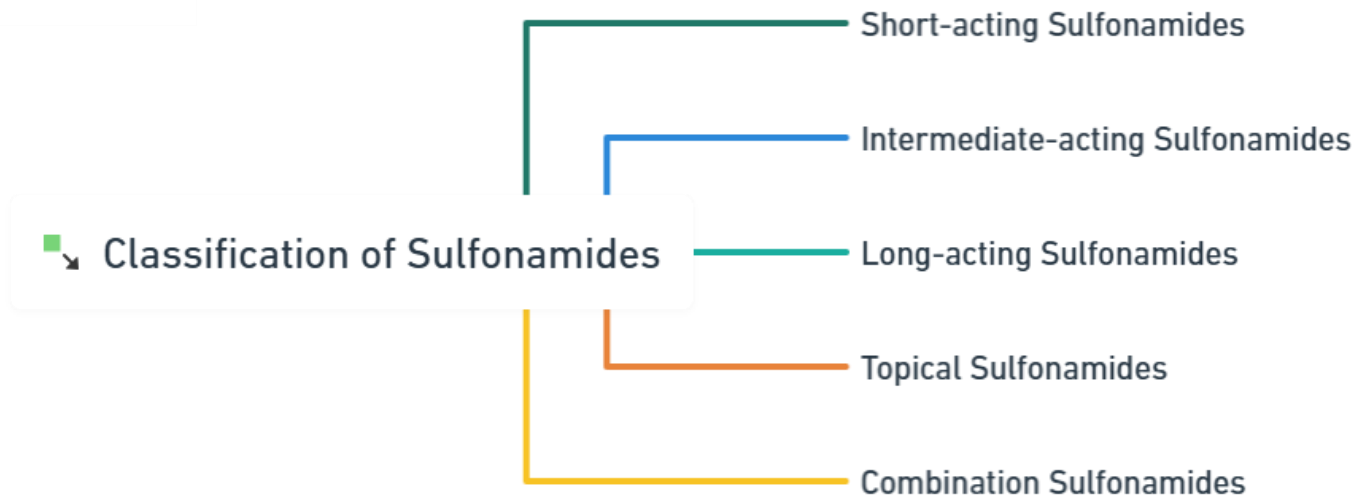
Definition

- Sulfonamides are synthetic antimicrobial agents used to treat bacterial infections.
- Available in oral and topical forms (tablets, creams, solutions).

Mechanism of Action

- They inhibit dihydropteroate synthase, an enzyme involved in folic acid synthesis, essential for bacterial DNA/RNA production — resulting in a bacteriostatic effect.

Classification of Sulfonamides



Sulfonamides, or **sulfa drugs**, are classified based on their **half-life** and **route of use**:

1. Short-acting Sulfonamides

- Short half-life; require frequent dosing.
- *Examples:* **Sulfisoxazole, Sulfamethoxazole, Sulfadiazine**

2. Intermediate-acting Sulfonamides

- Moderate half-life; less frequent dosing.
- *Examples:* **Sulfadimethoxine, Sulfadoxine**

3. Long-acting Sulfonamides

- Long half-life; given once daily or less.
- *Examples:* **Sulfamethazine, Sulfamethoxypyridazine**

4. Topical Sulfonamides

- Applied to skin or mucosa for localized infections (e.g., burns, wounds, eyes).
- *Examples:* **Silver sulfadiazine, Mafenide acetate**

5. Combination Sulfonamides

- Combined with other antimicrobials to enhance efficacy.
- *Examples:* **Sulfamethoxazole + Trimethoprim (Co-trimoxazole), Sulfadiazine + Pyrimethamine**

Uses

- UTIs
- Respiratory infections
- Skin/soft tissue infections
- Toxoplasmosis

- Rheumatic fever prophylaxis

Adverse Effects

- **Hypersensitivity reactions** (e.g., rash, Stevens-Johnson syndrome)
- **GI issues** (nausea, vomiting)
- **Blood disorders** (anemia, leukopenia)
- **CNS effects** (dizziness, headache)
- **Photosensitivity**
- **Renal/liver toxicity**

Cotrimoxazole (Trimethoprim + Sulfamethoxazole)

- Cotrimoxazole is a combination antibiotic containing sulfamethoxazole and trimethoprim.

Mechanism of Action

- **Sulfamethoxazole:** Inhibits dihydropteroate synthase, blocking folic acid synthesis → inhibits DNA/RNA production.
- **Trimethoprim:** Inhibits dihydrofolate reductase, further blocking folic acid formation.
- **Combined effect:** Sequential blockade of folic acid synthesis enhances antibacterial activity.

Pharmacokinetics

- **Absorption:** Rapid and complete via GI tract
- **Distribution:** Wide—lungs, kidneys, prostate
- **Metabolism:** Not significantly metabolized
- **Excretion:** Mostly unchanged in urine; some in feces

Uses

- **Effective against gram-positive and gram-negative bacteria. Common indications include:**
 - Urinary tract infections
 - Respiratory tract infections
 - Gastrointestinal infections
 - Skin and soft tissue infections
 - Pneumocystis jirovecii pneumonia (especially in immunocompromised patients)

Adverse Effects

- Common side effects may include:
 1. **GI symptoms** (nausea, vomiting)



FREE PREVIEW

[Click here to visit our website](#)

PHARMACY PREMIUM NOTES

Complete subject and semesters are available on FirstHope app only.



[Scan or click here](#)

Click here to get the app



Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram



[Scan or click here](#)

@FirstHopeNotes

Instagram

@firsthope.official

[Click here to follow >](#)

YouTube channel

FirstHope-Pharmacy / Live streams

[Click here to watch >](#)

WhatsApp channel

Follow FirstHope on WhatsApp

[Click here to join >](#)

FirstHope website

firsthopenotes.com

[Click here to visit >](#)

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Preview notes. Complete subjects and semesters in the FirstHope app.