

Antifungal Agents

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- Antifungal agents treat fungal infections by targeting the cell wall, cell membrane, or intracellular components to inhibit fungal growth.

Mechanisms of Action

1. Cell Wall-Targeting Agents

- Inhibit **beta-glucan** synthesis, weakening the fungal cell wall.
- **Examples:** Echinocandins (caspofungin, anidulafungin).

2. Cell Membrane-Targeting Agents

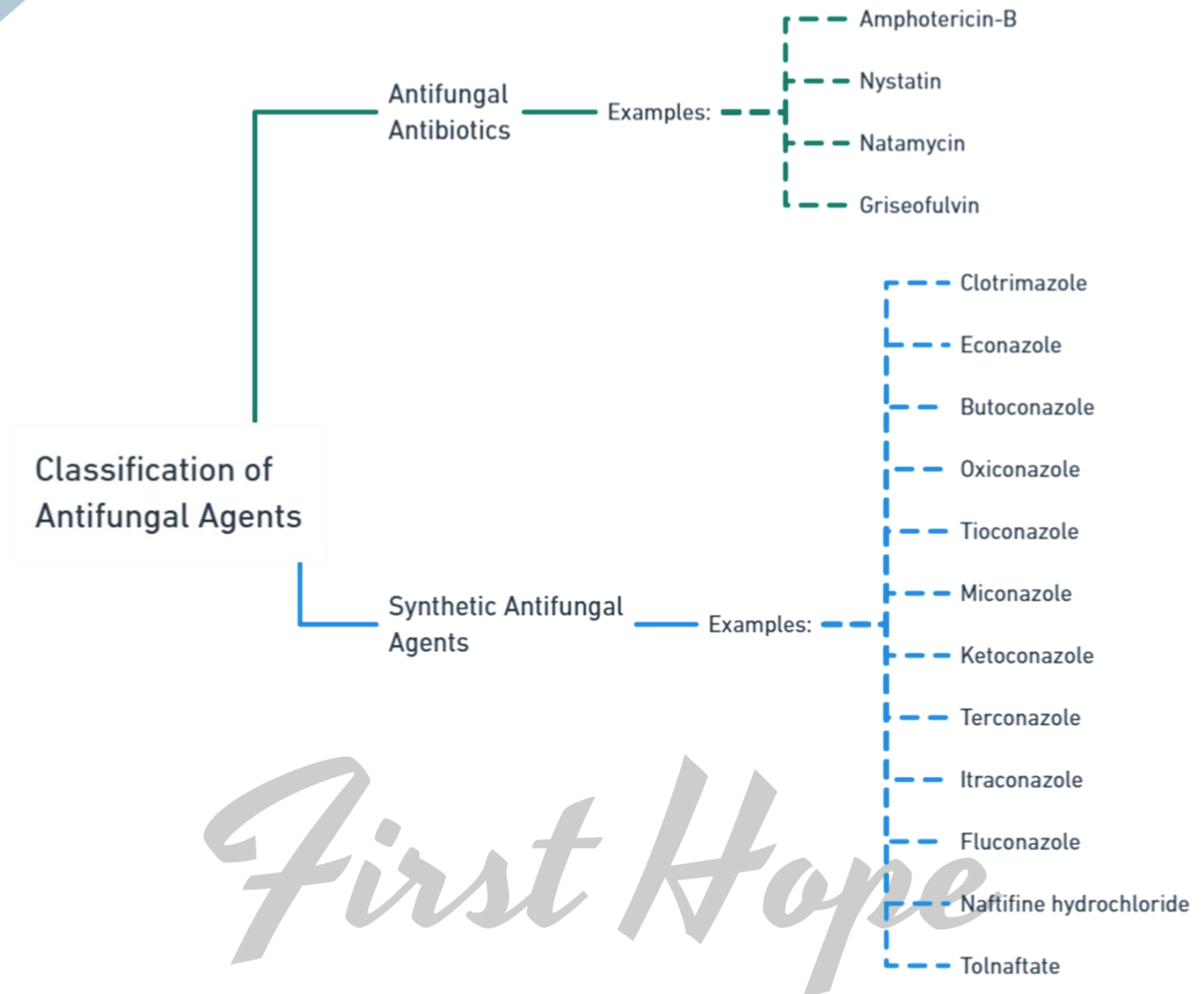
- Disrupt **ergosterol** synthesis, compromising membrane integrity.
- **Examples:**
 - **Azoles:** Fluconazole, Itraconazole.
 - **Polyenes:** Amphotericin B.

3. Intracellular Component-Targeting Agents

- Inhibit nucleic acid synthesis (e.g., flucytosine) or cell wall synthesis (e.g., terbinafine).

Classification of Antifungal Agents

They can be broadly classified into two categories:



1. Antifungal Antibiotics:

- These are naturally derived antifungal agents produced by microorganisms.
- **Examples include:**
 - Amphotericin-B
 - Nystatin
 - Natamycin
 - Griseofulvin

2. Synthetic Antifungal Agents:

- These are chemically synthesized antifungal drugs used for various fungal infections.
- **Examples include:**
 - Clotrimazole
 - Econazole
 - Butoconazole

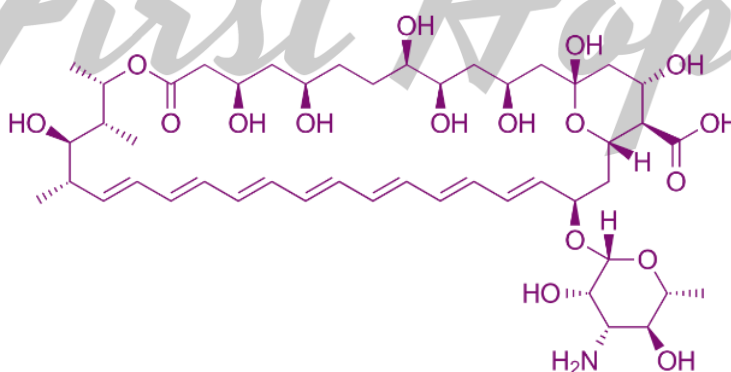
- Oxiconazole
- Tioconazole
- Miconazole*
- Ketoconazole
- Terconazole
- Itraconazole
- Fluconazole
- Naftifine hydrochloride
- Tolnaftate

Various Antifungal Antibiotics (Drugs)

1. Amphotericin B

Chemical Structure / Formula

- **Formula:** $C_{47}H_{73}NO_{17}$
- **Structure:** A polyene macrolide with a hydrophilic and hydrophobic region.



Mechanism of Action

- Binds to **ergosterol** in fungal cell membranes, creating pores that lead to leakage of ions (K^+ , Mg^{2+}), causing fungal cell death.

Uses

- Systemic fungal infections:
 - Aspergillosis, Histoplasmosis, Cryptococcosis, Mucormycosis.
 - Candida infections (severe, invasive cases).

Side Effects

- Nephrotoxicity (dose-dependent, reversible).
- Infusion reactions (fever, chills, hypotension).



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