PHARM.D • YEAR 3

Advanced Pharmacology

CHAPTER 3.7

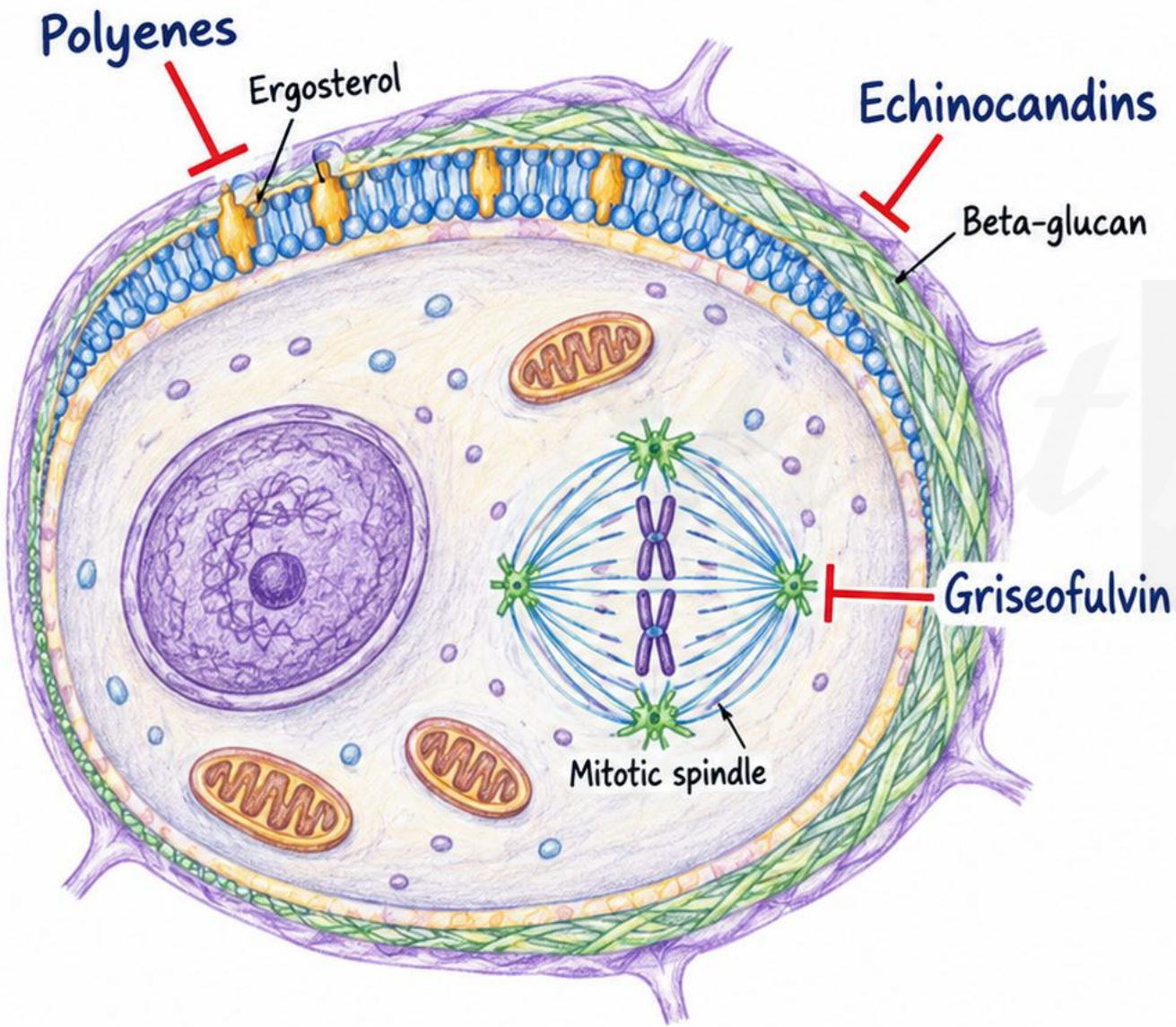
Antifungal Antibiotics



PPT CHAPTER COVER

DOCTOR OF PHARMACY

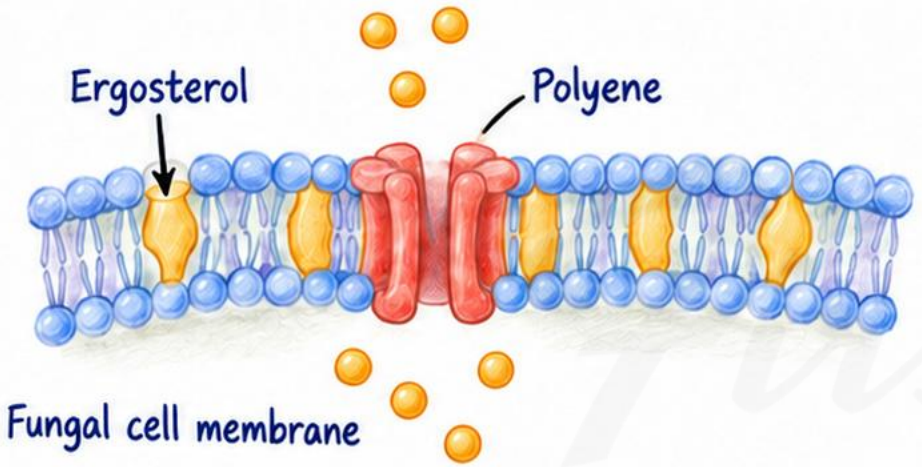
Antifungal antibiotics: three targets



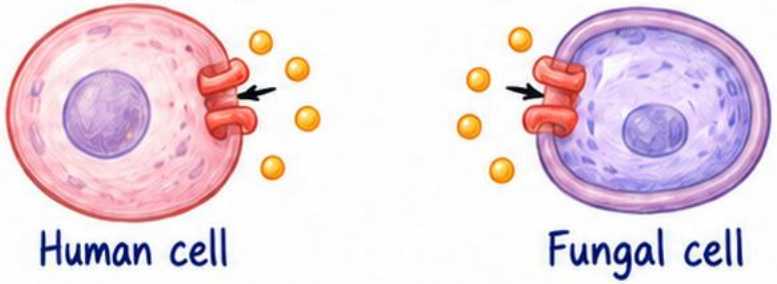
- This chapter groups antifungal antibiotics by their principal target rather than by bacterial-antibiotic generation.
- Polyenes, including amphotericin B and nystatin, disrupt ergosterol-containing fungal membranes.
- Echinocandins, including caspofungin, micafungin and anidulafungin, inhibit beta-glucan synthesis in the fungal cell wall.
- Griseofulvin interferes with fungal microtubules and mitosis.
- The agents differ in spectrum, route and systemic availability. Superficial and invasive infections need different treatment approaches; a shared antifungal label does not establish coverage of every fungus or suitability for every infection site.

Polyenes: mechanism and pharmacokinetics

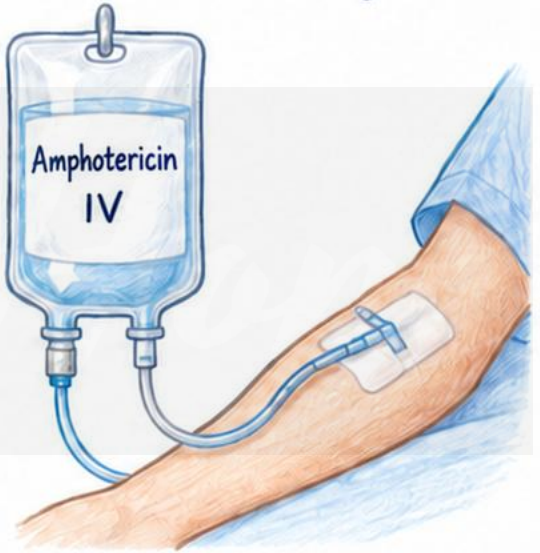
Amphotericin and nystatin interact with membrane ergosterol, disturbing permeability and allowing cellular contents to escape.



Human-cell toxicity remains possible despite partial selectivity for fungal sterols; membrane activity is not a guarantee of safety.

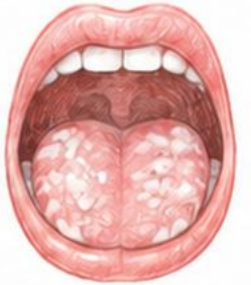


Amphotericin is administered intravenously for systemic action and binds extensively to tissues. Conventional and lipid products differ in dosing and tolerability.

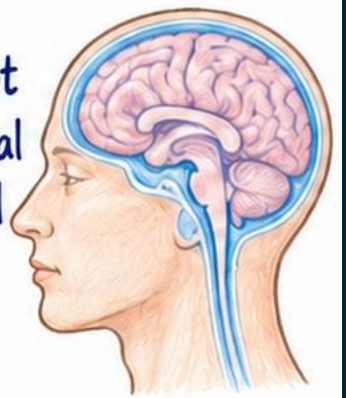


Nystatin is poorly absorbed orally and is used locally for suitable Candida infections.

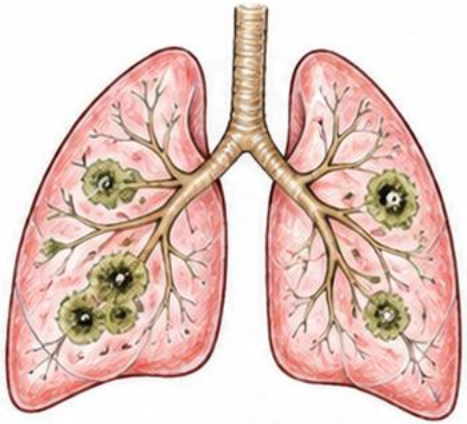




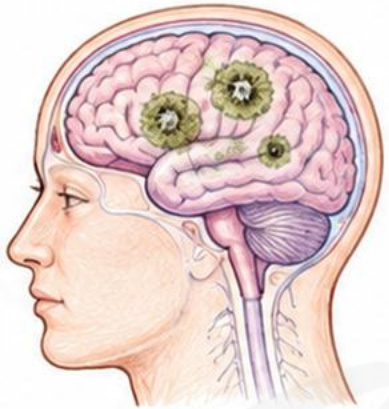
Low amphotericin CSF concentration does not preclude IV treatment in appropriate CNS fungal regimens. Intrathecal therapy is exceptional specialist use.



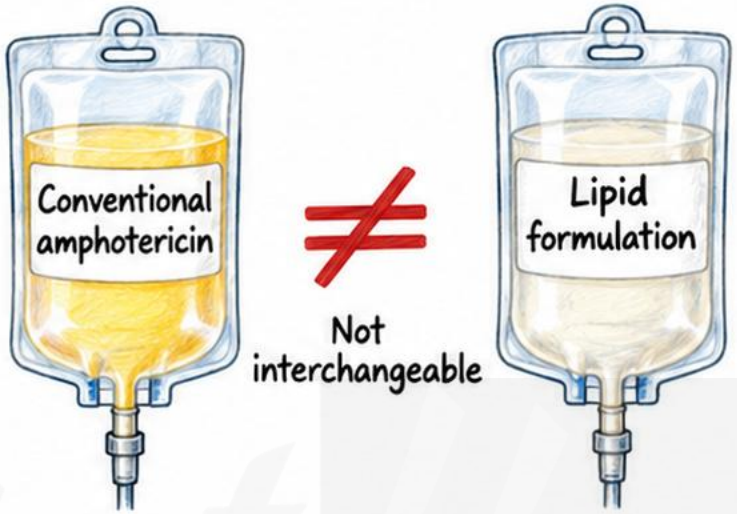
Amphotericin: applications and precautions

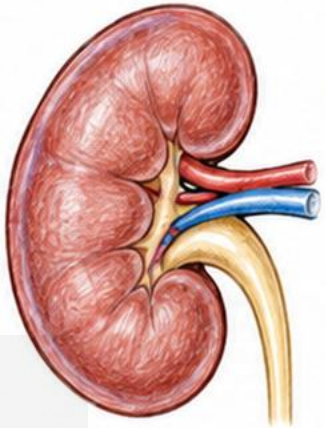


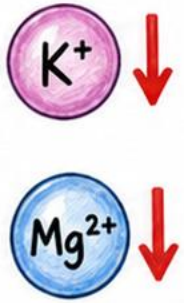
Invasive fungal lung disease



CNS disease







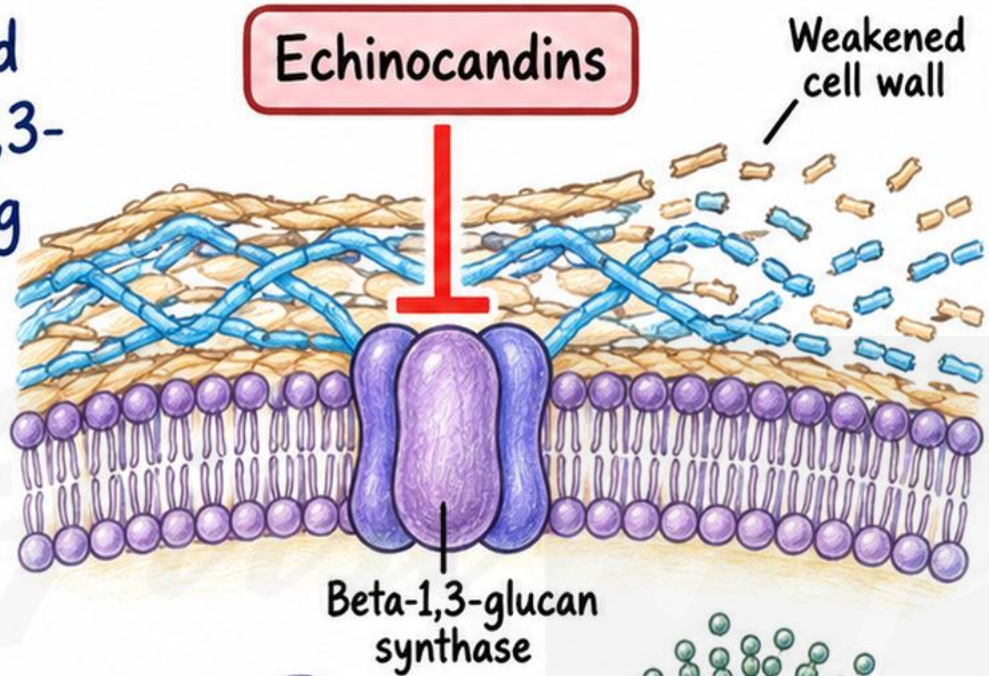


Monitor

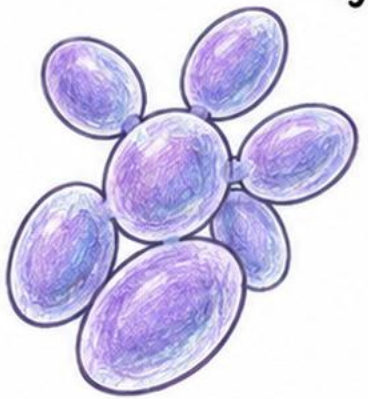
1. Amphotericin treats selected serious fungal infections, including appropriate cryptococcal, invasive Candida and mold-infection regimens.
2. Choice of formulation and combination treatment depends on organism, site and severity.
3. Infusion reactions, nephrotoxicity, potassium and magnesium loss, anemia and local thrombophlebitis are important concerns.
4. Additional nephrotoxins can increase renal risk; hypokalemia can worsen digoxin or arrhythmia-related toxicity.
5. Monitor kidney function, electrolytes, blood counts and infusion tolerance. Lipid formulations reduce some toxicity but are not interchangeable with conventional amphotericin milligram for milligram. Numerical doses require the specific product and indication.

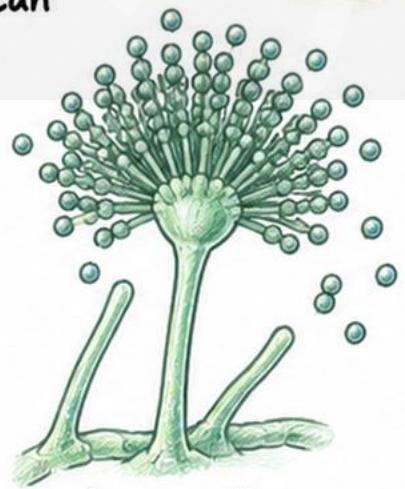
Echinocandins: wall synthesis and uses

Caspofungin, micafungin and anidulafungin inhibit beta-1,3-glucan synthesis, weakening the fungal cell wall.



These drugs are given intravenously because oral absorption is inadequate for systemic treatment.


Candida


Aspergillus

They are useful against susceptible Candida and have selected Aspergillus roles, but do not cover all fungal species.

Uses include appropriate invasive-candidiasis treatment and selected empiric or salvage situations.

Infusion reactions and liver-enzyme abnormalities can occur. Assess the organism and infection site; limited penetration into some compartments means broad laboratory activity alone does not establish suitability for every fungal infection.

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