Fungal infections more difficult to treat than bacterial infections [require longer treatment]=> fungi grow slowly + occur in avascular tissues [***Superficial fungal infections occur in areas which have a relatively lower blood supply***; cutaneous surfaces and mucous membrane surfaces.]

life-threatening fungal infections are becoming more common due to increase in the number of immunocompromised patients.

Antifungal agents	Formulations / structure	MOA	Uses	Side effects
Amphotericin B	- **Conventional amphotericin B** [polyene] - **Liposomal amphotericin B/** AmBisome [lipid-associated formulation of the polyene amphotericin B]	Binding to a sterol moiety present in the membrane of sensitive fungi → the formation of pores or channels increase the permeability of the membrane → leakage of a variety of small molecules from the inside of the fungal organism → death.	Infections occur in immunocompromised hosts [example; after cancer chemotherapy] = **systemic serious fungal infections: 1- invasive aspergillosis. 2- locally invasive mucormycosis. 3- disseminated fungal infections.** [IV + monitoring] **Liposomal amphotericin B ➔** active against clinically relevant yeasts and moulds, including Candida spp.	Very toxic immediate reaction [N, V, Fever, Renal damage.]
Flucytosine = 5-fluorocytosine	fluorinated pyrimidine analogue of cytosine [pyrimidine antimetabolite, was originally synthesized for possible use as an antineoplastic agent]	Incorporation of 5-FUTP into fungal RNA → inhibit protein synthesis	an alternative or together **with amphotericin B**, for **serious Candida infections and cryptococcosis**	
Nystatin = Mycostatin	Polyene [with a ring structure similar to that of amphotericin B]	identical to that of amphotericin B [binds to the wall of the fungus]	Poorly absorbed, very toxic if given IV. **➔ Given to work locally [not systematically]**: - GIT infections: tablets, not absorbed - oral cavity infections: solution - vaginal infections: cream/ suppository	
Azoles	Synthetic with broad-spectrum fungistatic activity. Contain the azole nucleus in their structure. ✓ **the older imidazole agents** in which the azole nucleus contains **two** nitrogens. ✓ **The newer triazole compounds** in which the azole nucleus contains **three** nitrogens. ➔ fluconazole, itraconazole, ketoconazole, voriconazole	bind and inhibit cytochrome P450 enzymes [responsible for the demethylation of lanosterol to ergosterol] → Reduced fungal membrane ergosterol concentrations → damaged leaky cell membranes.	Modern drugs for fungal infections, widely used. Good for Candida and other fungi. **Given locally and systemically.** **Fluconazole:** very effective in the treatment of infections with most Candida spp. + end-stage AIDS patients + infections refractory to nystatin, clotrimazole, and ketoconazole [oral] **Metronidazole:** very important antimicrobial drug, widely used. [Amebiasis, Trichomoniasis, Giardiasis, Anaerobic bacterial infections: dental infections, prophylaxis before surgery, also used after surgeries.] // used by all routes of administration, and by all ages, **except by pregnant ladies**.	Can cause liver damage Nausea, metallic taste. Headache. Skin rashes. Teratogenic.

Griseofulvin			chronic fungal nail and skin infections. Slow acting and usually used for long periods.	GIT upset, Drug interactions

Note from the sheet: metronidazole is not an antifungal drug. We are talking about it because it's an azole. (This was said by the doctor. However, metronidazole actually belongs to a different drug class).