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Antiparasitic Drugs

Pharmacology

Antimalarials, antiamoebic drugs, anthelmintics and drugs used to treat other parasitic infections.

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CHAPTER 15 / PHARMACOLOGY 15. Antiparasitic Drugs

1. Introduction

Antiparasitic medicines treat infections caused by protozoa, helminths and ectoparasites. Drug selection depends on parasite species, life cycle, tissue involvement, severity, resistance, age and pregnancy status. A single drug may not eliminate all stages of a parasite.

2. Antimalarial drugs

Malaria is caused by Plasmodium species and transmitted primarily by infected female Anopheles mosquitoes. Blood-stage infection causes clinical illness; P. vivax and P. ovale may form dormant liver hypnozoites, causing relapse. Diagnose suspected malaria promptly using approved parasitological methods where possible; severe illness requires urgent treatment.

Drug / class	Action or clinical role	Safety points
Artemisinin derivatives - artesunate, artemether	Rapid blood-stage parasite killing	Used in appropriate combination regimens; IV artesunate in severe malaria; monitor post-treatment haemolysis where indicated.
ACTs - artemether-lumefantrine and others	Artemisinin plus longer-acting partner	Choice depends on national guidelines and resistance; adherence and food instructions matter.
Chloroquine	Interferes with parasite haem detoxification	Use only where species and susceptibility support it; QT effects, overdose danger.
Primaquine / tafenoquine	8-aminoquinolines; selected radical cure and transmission indications	G6PD-related haemolysis; assess eligibility and pregnancy/breastfeeding restrictions.
Quinine	Blood-stage activity	Cinchonism, hypoglycaemia, QT effects; selected alternative protocols.
Atovaquone-proguanil	Mitochondrial and folate-related effects	Selected treatment/prophylaxis; renal and interaction review.

Current malaria regimens should follow national/state protocols and WHO recommendations [9]. Artemisinin monotherapy is not appropriate routine oral treatment. Radical cure of vivax/ovale requires clinical consideration of G6PD status, appropriate agent and other contraindications. Severe malaria can present with impaired consciousness, severe anaemia, respiratory distress, hypoglycaemia or organ dysfunction and requires inpatient emergency management.

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3. Antiamoebic and other antiprotozoal drugs

Drug	Clinical use and mechanism	Important precautions
Metronidazole / tinidazole	Nitroimidazoles; invasive amoebiasis, giardiasis, trichomoniasis and selected anaerobic infections	GI effects, metallic taste; interactions and alcohol-related product advice.
Paromomycin / other luminal amoebicides	Eliminate organisms remaining in intestinal lumen	Follow availability and specialist plan; GI effects.
Nitazoxanide	Selected protozoal diarrhoeal infections	Indication and immune status matter; not for every diarrhoeal illness.
Liposomal amphotericin B	Selected visceral leishmaniasis regimens	Infusion reactions, renal and electrolyte monitoring.
Miltefosine	Selected leishmaniasis regimens	GI effects, pregnancy contraindications and contraceptive guidance.

In invasive Entamoeba histolytica disease, a tissue-active nitroimidazole is usually followed by a luminal agent to eradicate residual intestinal infection. Detection of nonpathogenic amoebae does not justify the same treatment. Trichomoniasis requires prescribed patient and partner management guidance to reduce reinfection.

4. Anthelmintic drugs

Class / example	Action and representative use	Adverse effects / cautions
Benzimidazoles - albendazole, mebendazole	Disrupt parasite microtubules; many intestinal nematodes	Abdominal symptoms; prolonged systemic courses require liver and CBC monitoring.
Ivermectin	Activates parasite chloride channels; strongyloidiasis and selected other infections	Neurological or inflammatory reactions in selected contexts; specialist assessment for certain co-infections.
Praziquantel	Alters parasite calcium permeability; schistosomiasis and selected cestodes	Dizziness, GI symptoms; tissue infections need specialist care.
Pyrantel	Neuromuscular paralysis of susceptible nematodes	GI discomfort; indication-specific use.
Diethylcarbamazine (DEC)	Selected lymphatic filariasis regimens	Inflammatory reactions; not safe for all co-endemic filarial infections.

Neurocysticercosis treatment requires assessment of cyst location, inflammation and seizures; empiric deworming may be harmful in selected CNS or ocular disease. Strongyloides infection can disseminate during immunosuppression; assess epidemiological exposure before high-risk immunosuppressive treatment when indicated.

5. Ectoparasiticides

Permethrin is used topically for selected scabies and lice formulations; concentration, application site and duration differ. Oral ivermectin is used in selected cases under medical guidance. Treat appropriate close contacts and manage bedding/clothing according to protocol. Persistent itching after scabies treatment does not always mean treatment failure; reassess before repeating medicines. Avoid inappropriate insecticide exposure.

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6. Prevention and nursing responsibilities

In malaria, monitor temperature, consciousness, glucose, haemoglobin, urine output and treatment response. For intestinal parasites, assess nutrition, hydration and symptoms, and collect specimens according to laboratory guidance. Verify pregnancy, G6PD and other relevant tests before high-risk medicines. Reinforce vector control, insecticide-treated nets, safe water, sanitation, hand hygiene and food safety. Community mass drug administration follows programme eligibility and exclusion criteria, not individual self-prescription.

7. Examination questions

Long answer questions

1. 1. Classify antimalarial medicines and discuss nursing care.
2. 2. Explain antiamoebic and anthelmintic drugs with mechanisms and adverse effects.

Short answer questions

- ACT; primaquine; G6PD testing; metronidazole; albendazole; ivermectin; DEC.

Very short answer questions

- Which parasite species can form hypnozoites? - P. vivax and P. ovale.
- Important test before selected radical-cure medicines? - G6PD assessment.
- Which drugs disrupt helminth microtubules? - Benzimidazoles such as albendazole.

8. Quick revision

Malaria treatment depends on species and severity; severe malaria is an emergency. Tissue and luminal amoebicides have different roles. Anthelmintic selection depends on parasite species and location; prevention reduces reinfection.

Conclusion

Antiparasitic treatment is most effective when the correct organism, life stage and patient-specific safety risks guide the prescribed regimen.

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Practice questions

Choose one best answer. The answer key and explanations follow the questions.

1. Which Plasmodium species can form dormant liver hypnozoites that cause relapse?

A. P. vivax and P. ovale
B. P. falciparum and P. malariae
C. P. knowlesi and P. falciparum
D. P. malariae and P. knowlesi

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2. Which safety issue must be considered before primaquine or tafenoquine use?

A. Iron-related gastrointestinal intolerance

B. G6PD-related haemolysis risk

C. Vitamin K-related bleeding risk

D. Folate-related marrow suppression

3. Why is a luminal agent usually given after a tissue-active nitroimidazole for invasive amoebiasis?

A. To provide routine malaria prophylaxis

B. To replace the need for tissue-active treatment

C. To eradicate residual intestinal infection

D. To reverse nitroimidazole-related nausea

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Answer key and explanations

1. A - P. vivax and P. ovale

P. vivax and P. ovale can form dormant liver hypnozoites.

2. B - G6PD-related haemolysis risk

These 8-aminoquinolines have G6PD-related haemolysis risk and require eligibility assessment.

3. C - To eradicate residual intestinal infection

Tissue therapy is usually followed by a luminal agent to clear residual intestinal infection.

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