

Anti-helminthic Drugs

Three major groups of helminthes (worms), nematodes, trematod, and cestodes, infect humans. As in all antibiotic regimens, the anthelmintic drugs are aimed at metabolic targets that are present in the parasite but are either absent from or have different characteristics than those of the host.

DRUGS FOR THE TREATMENT OF NEMATODES

Nematodes are elongated roundworms that possess a complete digestive system. They cause infections of the intestine as well as the blood and tissues.

Mebendazole

Mebendazole, a synthetic benzimidazole compound, is effective against a wide spectrum of nematodes. It is a drug of choice in the treatment of infections by whipworm (*Trichuris trichiura*), pinworm (*Enterobius vermicularis*), hookworms (*Necator americanus* and *Ancylostoma duodenale*), and roundworm (*Ascaris lumbricoides*).

Mebendazole acts by

- 1- interfering with the assembly of the parasite's microtubules
- 2- decreasing parasite's glucose uptake.

Mebendazole is insoluble in aqueous solution. Little of an oral dose is absorbed, unless it is taken with a high-fat meal, thus it is relatively free of toxic effects. Patients may complain of abdominal pain and diarrhea.

Pyrantel pamoate

Pyrantel pamoate, along with mebendazole, is effective in the treatment of infections caused by roundworms, pinworms, and hookworms. It acts as a depolarizing, neuromuscular-blocking agent to the parasite.

Thiabendazole

It is another synthetic benzimidazole, effective against strongyloidiasis caused by *Strongyloides stercoralis* (threadworm), cutaneous larva migrans, and early stages of trichinosis.

Thiabendazole, affects microtubular aggregation. The drug is readily absorbed on oral administration. It is hydroxylated in the liver and excreted in urine. The adverse effects most often encountered are dizziness, anorexia, nausea, and vomiting. There have been reports of central nervous system (CNS) symptomatology. There have been a number of fatalities among the cases of erythema multiforme and Stevens-Johnson syndrome reportedly caused by thiabendazole. Its use is contraindicated during pregnancy.

Ivermectin

Ivermectin is the drug of choice for the treatment of onchocerciasis (river blindness) and for cutaneous larva migrans and strongyloidiasis.

Diethylcarbamazine

Diethylcarbamazine is used in the treatment of filariasis, and Combined with albendazole, in the treatment of *Wuchereria bancrofti* and *Brugiamalayi* infections.

DRUGS FOR THE TREATMENT OF TREMATODES

The trematodes (flukes) are leaf-shaped flatworms that are generally characterized by the tissues they infect. For example, they may be categorized as liver, lung, intestinal, or blood flukes

Praziquantel

Trematode infections are generally treated with praziquantel. This drug is an agent of choice for the treatment of all forms of schistosomiasis and other trematode infections and for cestode infections like cysticercosis.

Drug is act by increasing the permeability of the parasite's cell membrane to calcium, causing contracture and paralysis.

Praziquantel is rapidly absorbed after oral administration and distributes well in the body fluids. The drug is extensively metabolized, resulting in a short half-life.

Common adverse effects include drowsiness, dizziness, malaise, and anorexia as well as gastrointestinal upset.

Drug interactions due to increased metabolism with dexamethasone, phenytoin, and carbamazepine.

Cimetidine, which inhibits cytochrome P450 isozymes, causes increased praziquantel levels.

DRUGS FOR THE TREATMENT OF CESTODES

The cestodes, or "true tapeworms", typically have a flat, segmented body and attach to the host's intestine.

Niclosamide

Niclosamide is the drug of choice for most cestode (tapeworm) infections. Its action by inhibition of the parasite's mitochondrial phosphorylation of adenosine diphosphate.

Anaerobic metabolism may also be inhibited. The drug is lethal for the cestode's scolex and segments of cestodes but not for the ova. A laxative is administered prior to oral administration of niclosamide.

Albendazole

Albendazole is a benzimidazole that inhibits microtubule synthesis and glucose uptake in nematodes.

Therapeutic indications:

- treatment of cestodal infestations, such as cysticercosis (caused by *Taenia solium* larvae)
- hydatid disease (caused by *Echinococcus granulosus*) with long drug course (3 months).

Albendazole is absorbed after oral administration, and this absorption is enhanced by a high-fat meal.

Adverse effects are mild and transient (with short-course therapy) like headache and nausea; But they are serious with long course therapy (for treatment of hydatid disease) including hepatotoxicity and agranulocytosis or pancytopenia (very rare).

Medical treatment of neurocysticercosis is associated with inflammatory responses to dying parasites in the CNS, including headache, vomiting, hyperthermia, convulsions, and mental changes.