

Anthelmintic

Anthelmintic Agents

What Are Anthelmintics?

- Anthelmintics (also called antihelminthic or vermifuge drugs) are medications used to eliminate parasitic worms (helminths) from the human or animal body.

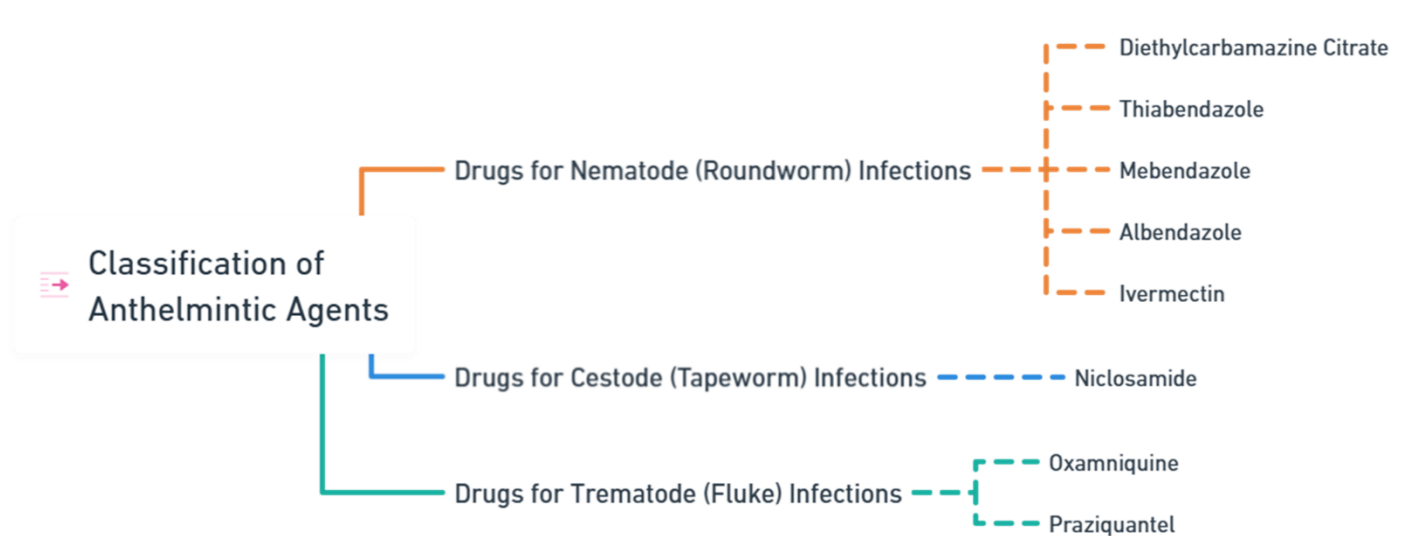
Helminths (Parasitic Worms)

- Helminths are **multicellular, worm-like organisms** that cause various infections.
- They are classified into three major groups:
 - Nematodes (Roundworms):** e.g., *Ascaris lumbricoides*, *Hookworms*
 - Cestodes (Tapeworms):** e.g., *Taenia saginata*, *Taenia solium*
 - Trematodes (Flukes):** e.g., *Schistosoma* species

Mechanism of Action of Anthelmintic Drugs

- Anthelmintic drugs work by targeting specific biological processes in parasites, leading to:
 - Immobilization** (paralysis of the worm)
 - Death** (disrupting metabolism or structural integrity)
 - Expulsion** (elimination from the body)
- The exact mechanism depends on the type of drug and the helminth being treated.

Classification of Anthelmintic Agents



1. Drugs for Nematode (Roundworm) Infections

- Diethylcarbamazine Citrate
- Thiabendazole
- Mebendazole

- Albendazole
- Ivermectin

2. Drugs for Cestode (Tapeworm) Infections

- Niclosamide

3. Drugs for Trematode (Fluke) Infections

- Oxamniquine
- Praziquantel

Anthelmintic drugs play a vital role in controlling parasitic worm infections and improving overall health outcomes. The choice of drug depends on the **type of helminth**, **severity of infection**, and **patient condition**.

Brand Names Of Important Marketed Products

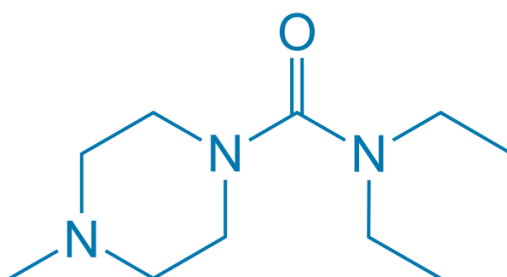
Drug Name	Brand Name(s)	Formulation	Use
Albendazole	Zentel, Alworm	Tablet, Suspension	Roundworm, Hookworm, Tapeworm
Mebendazole	Vermox, Mebenstar	Tablet	Broad-spectrum
Ivermectin	Ivecop, Stromectol	Tablet	Strongyloidiasis, Scabies
Pyrantel Pamoate	Helmintox, Combantrin	Suspension, Tablet	Pinworm, Roundworm
Praziquantel	Biltricide, Prazitel	Tablet	Schistosomiasis, Tapeworm
Levamisole	Decaris, Levacide	Tablet	Ascariasis

Various Anthelmintic Agents

1. Diethylcarbamazine Citrate (DEC)*

Chemical Structure / Formula

- **Formula:** C₁₀H₂₁N₃O · C₆H₈O₇ (Citrate salt)
- **Structure:** A piperazine derivative with a urea (-NHCONH-) group.



Mechanism of Action

- Inhibits arachidonic acid metabolism in microfilariae, making them more susceptible to immune attack.
- Interferes with neuromuscular transmission, causing paralysis and death of the worms.

Uses

- Filarial infections (*Wuchereria bancrofti*, *Brugia malayi*, *Loa loa*).
- Tropical eosinophilia (Weingarten's syndrome).

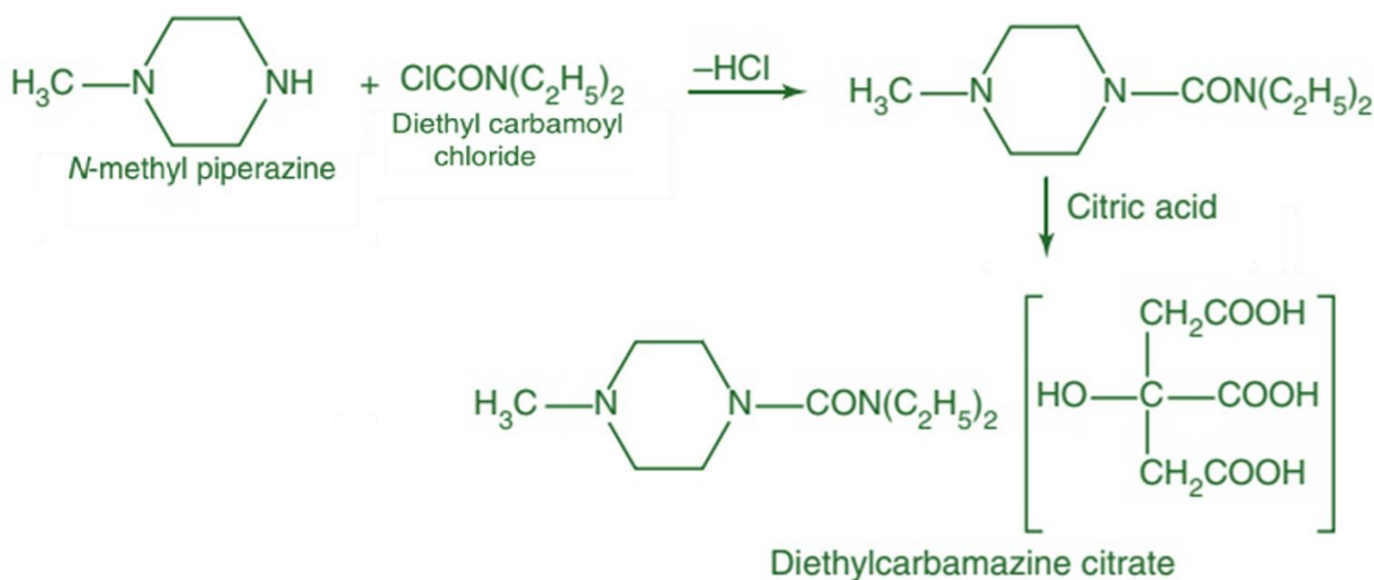
Side Effects

- **Mazzotti reaction** (fever, rash, hypotension due to rapid worm death).
- GI disturbances, headache, dizziness.

Structure-Activity Relationship (SAR) of Diethylcarbamazine Citrate

Structural Feature	SAR Insight
Piperazine ring	Contributes to CNS effects and pharmacokinetics.
Diethyl groups on nitrogen	Required for anti-filarial activity; influence lipophilicity and uptake.
Citrate salt form	Improves solubility and absorption.
Small alkyl groups preferred	Bulky substitutions reduce activity.

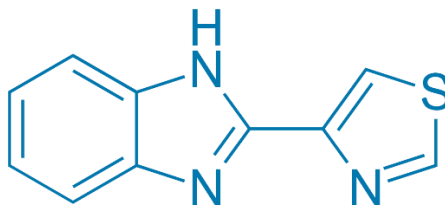
Synthesis of Diethylcarbamazine Citrate



2. Thiabendazole

Chemical Structure / Formula

- **Formula:** C₁₀H₇N₃S
- **Structure:** A benzimidazole derivative with a thiazole ring.



Mechanism of Action

- Inhibits microtubule synthesis, disrupting worm metabolism and reproduction.
- Inhibits mitochondrial fumarate reductase, affecting parasite energy production.

Uses

- Strongyloidiasis, cutaneous larva migrans, Trichinosis.

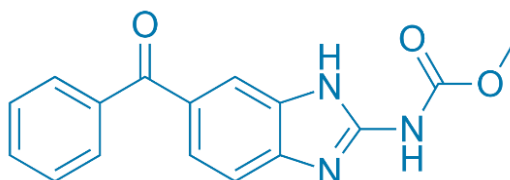
Side Effects

- GI upset, dizziness, hepatotoxicity.
- Hypersensitivity reactions (Stevens-Johnson syndrome).

3. Mebendazole (MBZ)*

Chemical Structure / Formula

- **Formula:** C₁₆H₁₃N₃O₃
- **Structure:** Benzimidazole derivative with carbamate (-NHCOO-) group.



Mechanism of Action

- Binds to β -tubulin, preventing microtubule formation, leading to worm paralysis and death.

Uses

- Broad-spectrum anthelmintic for ascariasis, trichuriasis, hookworm, enterobiasis (pinworm), strongyloidiasis.

Side Effects

- GI discomfort, hepatotoxicity.



FREE PREVIEW

[Click here to visit our website](#)

PHARMACY PREMIUM NOTES

Complete subject
and semesters are
available on
FirstHope app only.



[Scan or click here](#)

Click here to get the app



Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram



[Scan or click here](#)

@FirstHopeNotes

Instagram

@firsthope.official

[Click here to follow >](#)

YouTube channel

FirstHope-Pharmacy / Live streams

[Click here to watch >](#)

WhatsApp channel

Follow FirstHope on WhatsApp

[Click here to join >](#)

FirstHope website

firsthopenotes.com

[Click here to visit >](#)

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Preview notes. Complete subjects and semesters in the FirstHope app.