

Anti-protozoal Agent & Anthelmintic

Presented By:-

Mr. Samarpan Mishra (Assistant Professor)

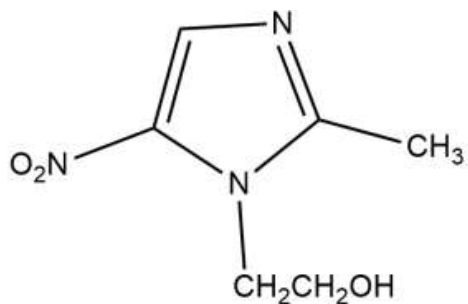
Specialization - Pharmaceutical Chemistry

Anti-protozoal Agent ?

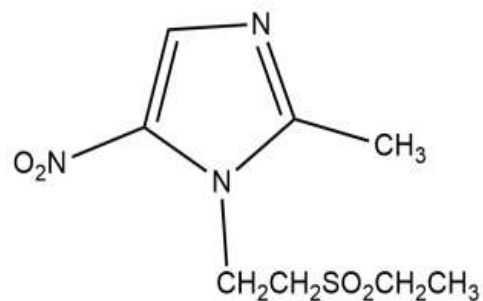
- An **anti-protozoal agent** is a type of medication or substance specifically designed to kill or inhibit the growth of **protozoa**, which are single-celled microorganisms.
- Protozoal infections can affect various parts of the body (e.g., intestines, blood, or tissues) and are responsible for diseases such as malaria, amoebiasis, giardiasis, and trichomoniasis.

Anti-Protozoal Agents – MOA and Uses

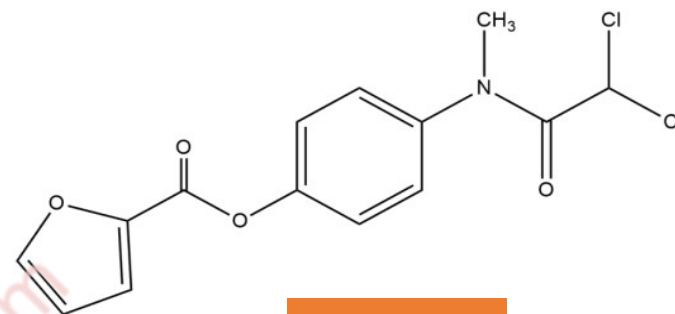
Drug	Mechanism of Action (MOA)	Clinical Uses
Metronidazole	Produces reactive nitro radicals that damage DNA and inhibit nucleic acid synthesis	Amoebiasis, Giardiasis, Trichomoniasis, Anaerobic infections
Tinidazole	Similar to metronidazole; generates free radicals that disrupt DNA	Amoebiasis, Giardiasis, Trichomoniasis
Ornidazole	Nitro group reduction leads to DNA strand breakage and cell death	Amoebiasis, Giardiasis, Trichomoniasis
Diloxanide Furoate	Unknown precise MOA; possibly affects protozoal protein synthesis	Luminal amoebiasis (asymptomatic cyst carriers)
Iodoquinol	Chelates ferrous ions needed for protozoal metabolism; exact MOA unclear	Luminal amoebiasis (non-invasive infections)
Pentamidine Isethionate	Binds to DNA and interferes with replication and RNA synthesis	African trypanosomiasis, Leishmaniasis, Pneumocystis pneumonia
Atovaquone	Inhibits mitochondrial electron transport at cytochrome bc ₁ complex	Malaria, Babesiosis, Toxoplasmosis, Pneumocystis pneumonia
Eflornithine	Irreversible inhibitor of ornithine decarboxylase → inhibits polyamine synthesis	Late-stage African trypanosomiasis (CNS involvement)



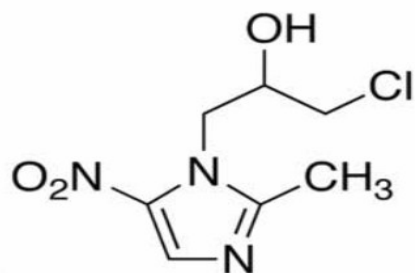
Metronidazole



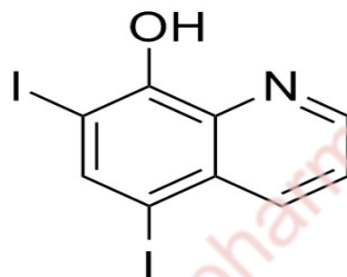
Tinidazole,



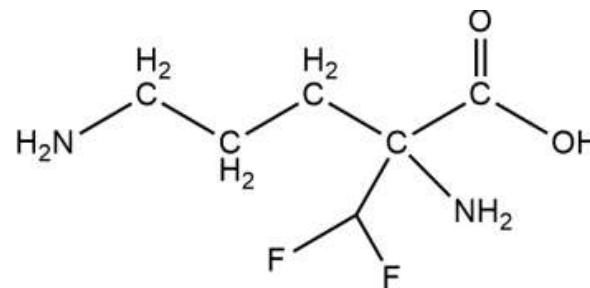
Diloxanide,



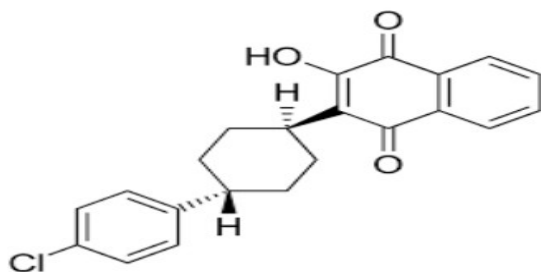
Ornidazole,



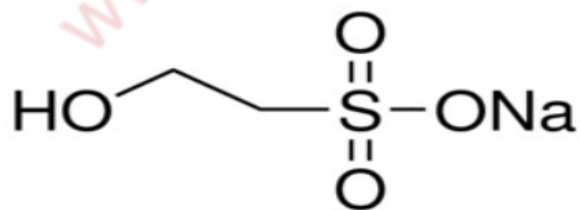
Iodoquinol,



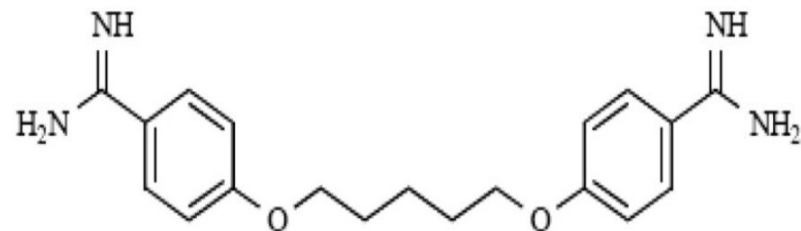
Eflornithine.



Atovaquone,

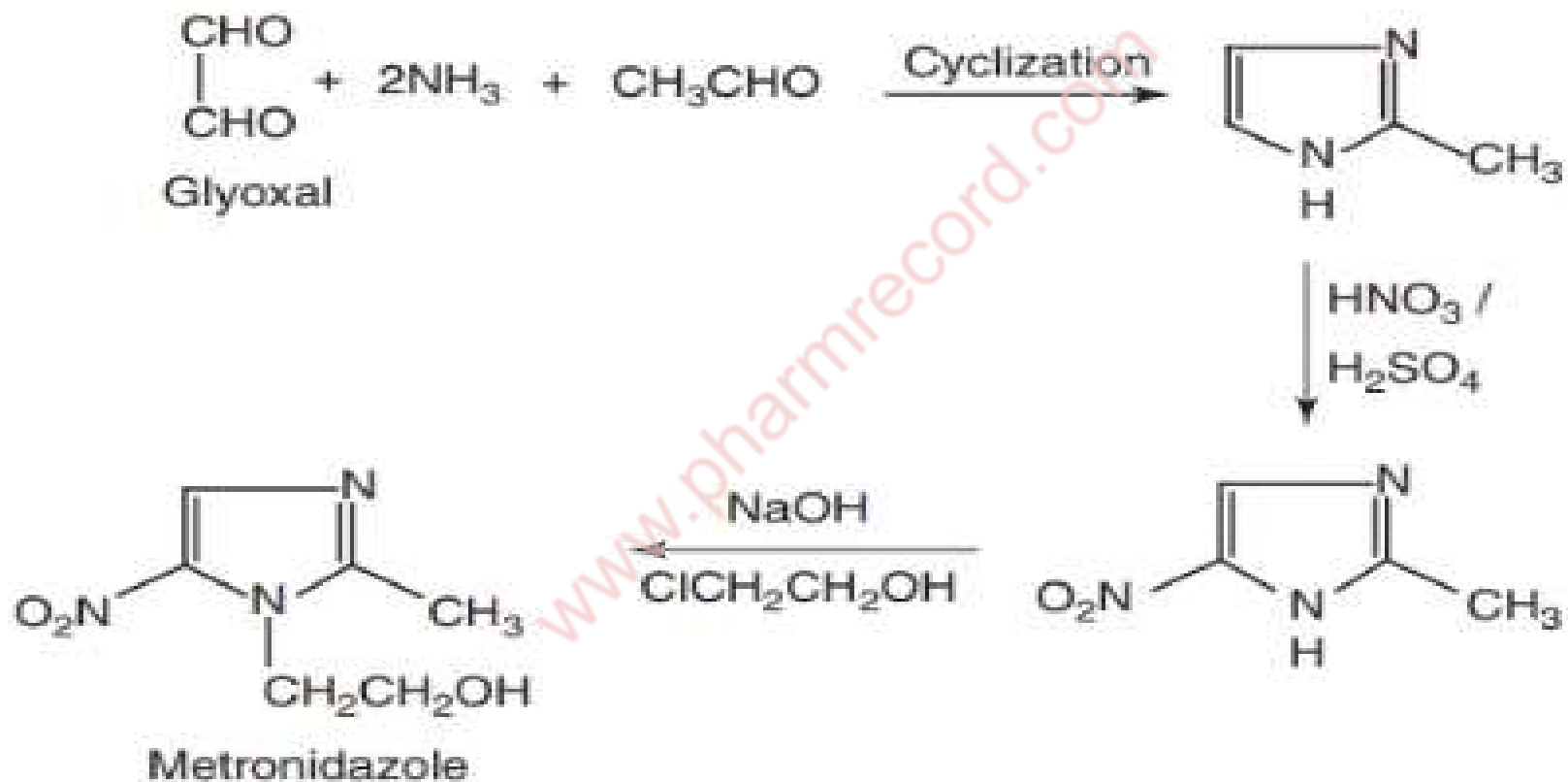


Isethionate,



Pentamidine

Synthesis of Metronidazole



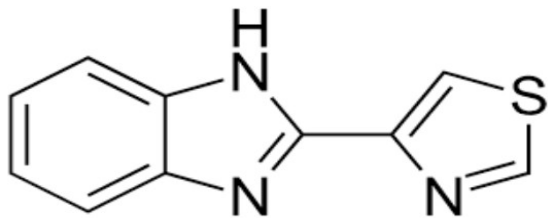
Anthelmintic ?

Anthelmintics are drugs used to **treat infections caused by helminths** (parasitic worms), including:-

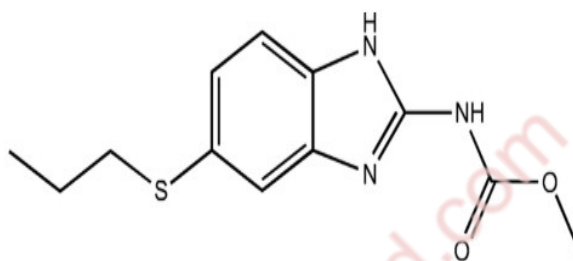
- **Nematodes** (roundworms)
- **Cestodes** (tapeworms)
- **Trematodes** (flukes)

Anthelmintic Drugs – MOA and Uses

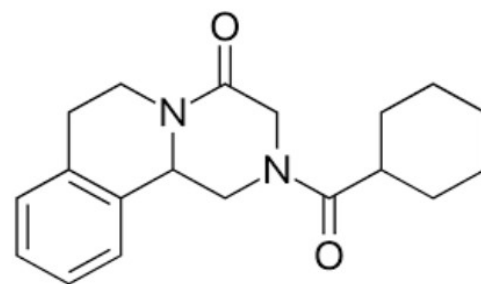
Drug	Mechanism of Action (MOA)	Clinical Uses
Diethylcarbamazine citrate	Alters parasite surface membrane and enhances host immune response; immobilizes microfilariae	Lymphatic filariasis, Loiasis
Thiabendazole	Inhibits fumarate reductase and microtubule synthesis	Strongyloidiasis, Cutaneous larva migrans
Mebendazole	Inhibits microtubule formation → blocks glucose uptake and depletes energy stores	Ascariasis, Enterobiasis (pinworm), Trichuriasis, Hookworm
Albendazole	Similar to mebendazole; inhibits microtubules and glucose uptake	Broad-spectrum: neurocysticercosis, hydatid disease, roundworms, hookworms
Niclosamide	Inhibits oxidative phosphorylation in mitochondria → disrupts ATP production	Intestinal tapeworms (e.g., Taenia, Diphylobothrium)
Oxamniquine	Causes DNA damage and paralysis in schistosomes	Schistosomiasis (Schistosoma mansoni)
Praziquantel	Increases calcium permeability in worm membranes → paralysis and death	Schistosomiasis, Tapeworms, Liver flukes
Ivermectin	Binds to glutamate-gated chloride channels → hyperpolarization, paralysis, and death	Onchocerciasis, Strongyloidiasis, Lymphatic filariasis, Scabies



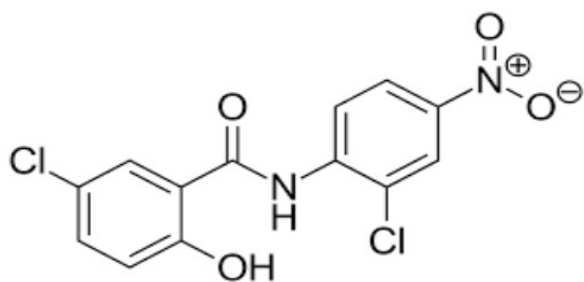
Thiabendazole,



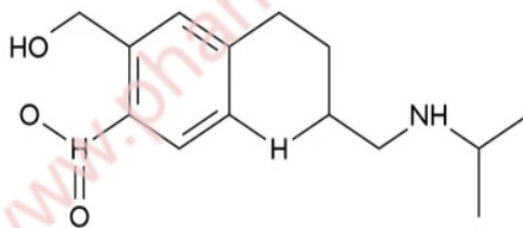
Albendazole,



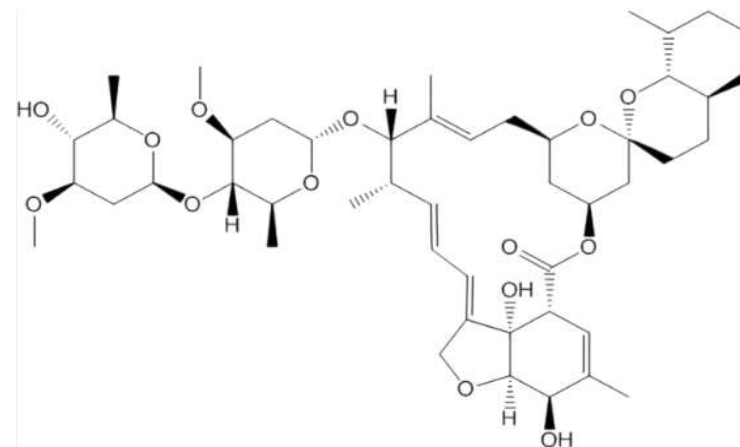
Praziquantel,



Niclosamide,

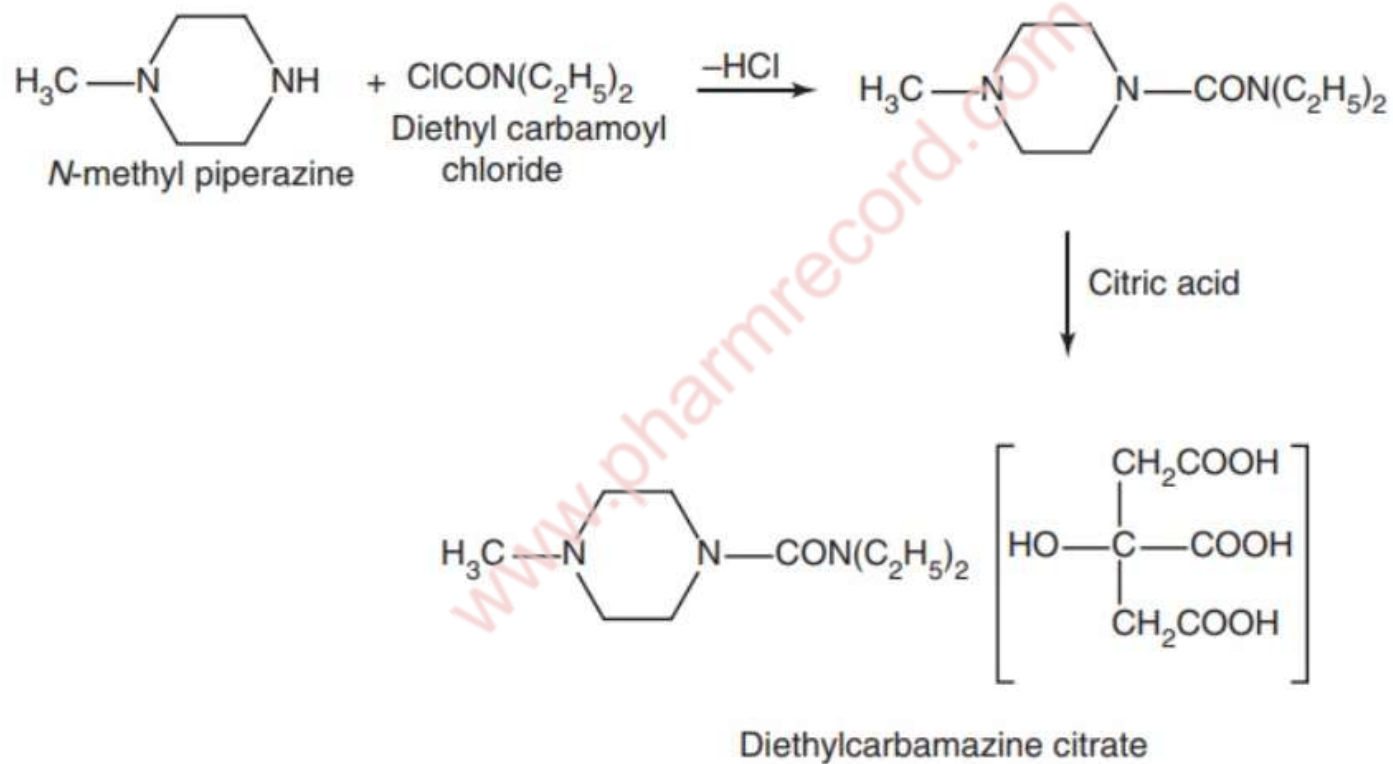


Oxamniquine,

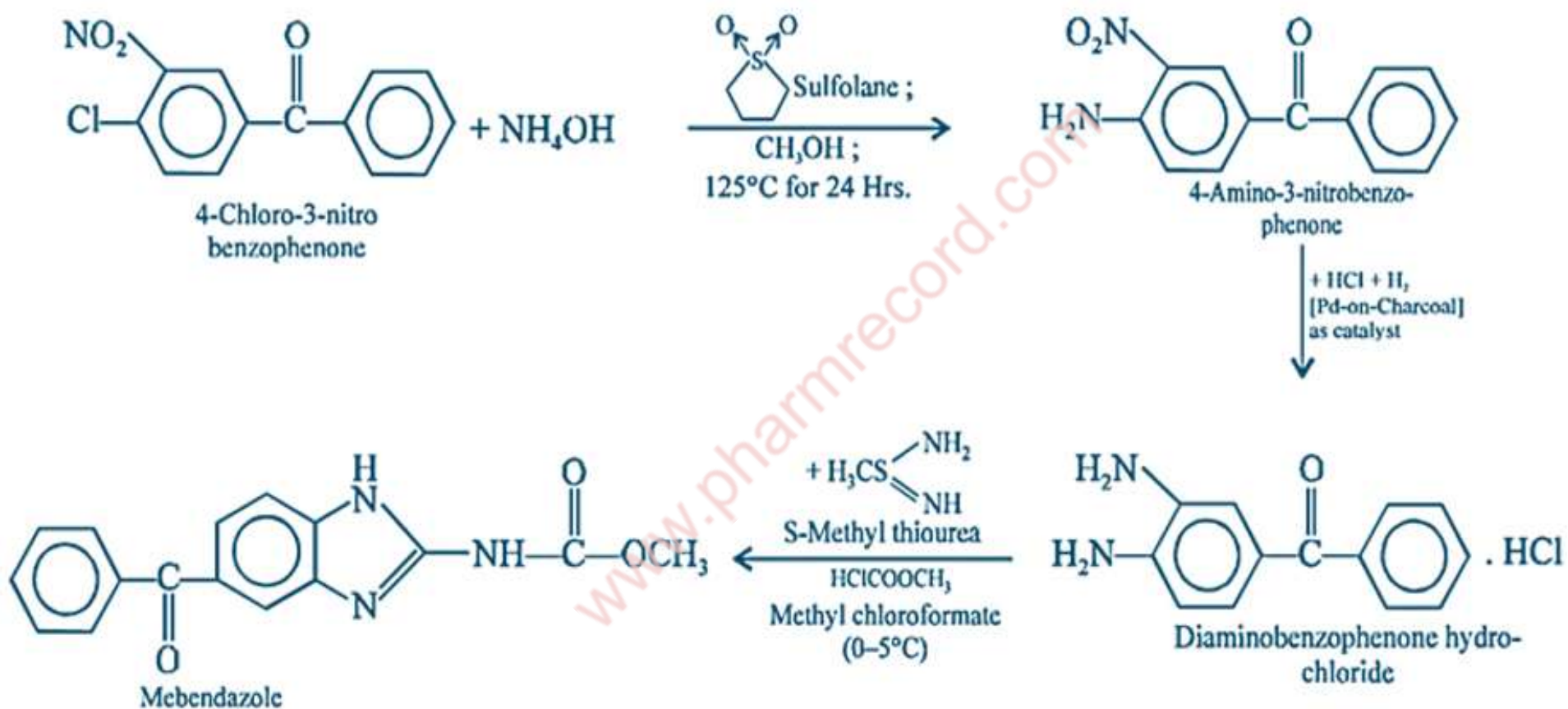


Ivermectin.

Synthesis of Diethylcarbamazine citrate



Synthesis of Mebendazole



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Thank You