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Opinion

All about Helminths and Anthelmintics

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Helminths are a general term for parasitic worms. They are widely distributed in tropical and subtropical areas with more prevalently occurring in sub-Saharan Africa, America, China and east Asia. Humans harbour nearly 300 species of parasitic worms either derived from their primate ancestors or domestic animals. And, as the people infected with them are usually asymptotic, no one actually cares about it unless they are in large numbers. They are multicellular, eukaryotic, invertebrate animals generally requiring a living host to survive. Helminths are distinguished in having specific attachment organs like hooks and suckers, lips, teeth and dentary plates as their mouth parts. These are either nematodes (roundworms), cystodes (tapeworms) or trematodes (flatworms or flukes). Roundworms are usually found cylindrical in shape and appear round in cross section. Similarly, while tapeworms are always segmented flatworms, the trematodes are unsegmented flatworms or flukes. They are usually transmitted via contaminated soil water or food. Sometimes, these worms are entered in the body by actively penetrating the skin [1-3].

Further, it appears that the helminths have had never been problematic and lethal to us due to certain effective medications available to expel out them gradually from the body. But, in certain circumstances, if patients are not treated well within time it may develop some life threatening diseases like bowel obstruction, jaundice and even neurocysticercosis in human [4-11].

Similarly, some of these helminths also cause cancer in human as *Schistosoma haematobium* causes bladder cancer and *Opisthorchis viverrini* and *Chlonorchis sinensis* develop cholangiocarcinoma [12-16].

Several powerful anthelminthic drugs are now available to treat the helminths parasitizing in human. These medicines are found very much effective in paralyzing, killing and expelling the parasites from the human body [17-19].

The most important broad spectrum drug used to treat the helminths parasitizing in human is mebendazole. It works on the inhibition of microtubules and the blockage of glucose uptake in worms leading the death of parasites. The drug is used for the treatment of a variety of helminths like roundworm, hookworm, whipworm, threadworm, pinworm infections and the hydatid disease [20-22].

The second most drug used to treat the helminths is albendazole. It also causes the disruption of microtubules formation in parasites. This is used to treat the *Ancylostoma duodenale, Necator americanus, Ascaris lumbricoides, Trichuris trichura, Enterobius vermicularis, Strongyloides stercoralis, Taenia* species and *Hymenolepsis nana* infecting humans [23,24].

The third in the series anthelminthic drug is ivermectin. It works by parasitizing and killing the parasites. It is used for onchocerciasis (river blindness), strongyloidiasis, trichuriasis, ascariasis and in lymphatic filariasis [25,26].

An anthelmintic drug praziquantel is basically a veterinary medicine. It works by paralyzing the helminths. This is used to treat some cancer-causing helminths found in human as *schistosoma haematobium, Opisthorchis viverrini* and *Chlonorchis sinensis*. In addition, tapeworm infections, cysticercosis, hydatid disease and other fluke like infections are also being treated with the same medicine. However, the praziquantel is not used in eye infections [27-30].

Similarly, another class of drug as piperazines also have an anthelmintic property. They paralyze the worms to expel out from the body. The piperazines are used to treat the ascariasis and enterobiasis infections in human. One of the most important derivatives discovered in 1947 is diethylcarbamazine (DEC) used to treat the lymphatic filariasis or elephantiasis in human [31,32].

Further, while pyrantel is used to treat ascariasis, hookworm and pinworm infections, trichostrongyliasis and trichinellosis, the livanisole is used in ascariasis and hookworm infections both in humans and animals. Lastly, the niclosamide is also found effective in the treatment of taeniasis, hymenolepiasis and diphyllobothriasis [33-35].

Therefore, in a nutshell, there are certain effective anthelminthic drugs are now available today to either vermifuge or to kill the helminths expelling out from the human body without causing any significant harm to the host. But, in cases where these infestations are overlooked, certain lethal complications may occur as bowel and bladder obstructions and bleeding, Jaundice, neurocysticercosis, brain hemorrhage, seizures and even cancer of the respective organs.

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