Helminths and Human diseases

Helminths include the animals belonging to the **Phylum Platyhelminthes** and **Phylum Aschelminthes**. Many of the parasitic forms of this group are popularly known as **parasitic worms**. These are the **endoparasites** of the gut and blood in the human body and cause various diseases collectively called **helminthiasis**. Their primary victims are children often from poor, under-fed and ill-educated families.

The following three types of helminthiasis are most common and widespread:

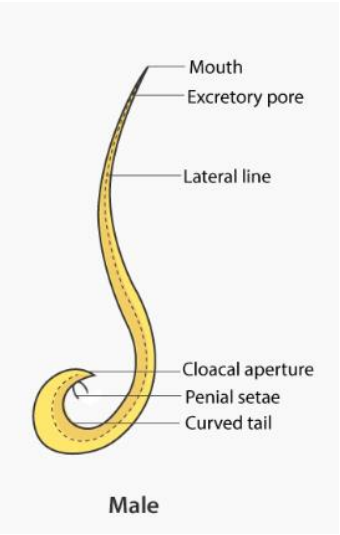
1. Nematodiasis,
2. Trematodiasis
3. Cestodiasis.

Nematodiasis

The diseases caused by the nematode worms constitute **nematodiasis**. More than 50 species are parasites of man, but there are four predominant nematode worms that affect humans. They are **roundworm, hookworm, pinworm** and **whipworm**.

a) Ascariasis

The most common of worms which infect humans are the **roundworms**. Ascariasis is a highly prevalent disease caused by ***Ascaris lumbricoides***. It is light brown or pink in colour. The male Ascaris measures about 15 to 25 cm in length and the female measures about 25 to 40 cm in length. The female lays about 200,000 eggs daily that pass out with faeces and remain alive in the soil for several days.



Infection is by swallowing ripe eggs with raw vegetables cultivated on soil fertilized by infected human excreta. Infection also occurs by drinking contaminated water. In the larval development begins. The juveniles penetrate the intestinal wall and migrate to the liver and from there to the heart and lungs. Finally, they return back into the intestine and develop into adult parasites.

For most victims, roundworms do not mean death. With adult Ascaris residing in the intestine, the patient complains of abdominal pains, weakness, vomiting, headache, dizziness, nervous disorder and fever. Treatment of human ascariasis has been fairly successful through the oral administration of **Piperazine citrate** or by **hexyl-resorcinol** tablets.

b) Ancylostomiasis

Ancylostomiasis is caused by two **hookworms**, ***Ancylostoma duodenale*** and ***Nector americanus***. Both nematodes are parasites within the intestine. Female hookworms produce 5000-10000 eggs per day which pass out in the stools. They are most frequent in rural areas. Hookworms thrive in warm and moist climates. Researchers proved that people habitually bearing chappals or shoes suffered far less infection than the barefoot. The hookworm sucks blood and tissue juices of the host.

The characteristic symptoms of ancylostomiasis are gastrointestinal disturbances, anaemia and nervous disorders. In the treatment of hookworm, the safe and effective drugs are tetrachloroethane and carbon tetrachloride.

c) Enterobiasis

This disease is caused by ***Enterobius vermicularis***, commonly called **pinworms**. These are small white worms about 6 to 7 mm long and inhabit the upper part of the colon. The females migrate out through the colon and rectum and deposit the enormous number of eggs in the skin folds about the anus, where they cause intense itching. The eggs hatch in the stomach and the juveniles migrate to the colon and develop into adult worms.

The infection is more frequent in children than adults. The symptoms of the disease include severe itching around the anus, loss of appetite, sleeplessness, nausea and vomiting. **Piperazine** is the most effective drug in the treatment of pinworms.

d) Trichuriasis

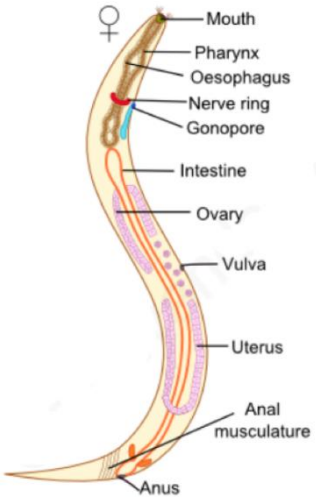
This disease is caused by Trichuris, commonly called whipworms. These worms inhabit the large intestine mainly the caecum of the vermiform appendix. The female lays an enormous number of eggs daily that pass in the stools. In the intestine, the eggs hatch and the larvae develop into adult whipworms.

The patient suffering from whipworm disease complains of nausea, vomiting, diarrhoea, eosinophilia and headache. The drugs most commonly used for the expulsion of whipworms are **thiobendazole** and **mebendazole**.

e) Filariasis

The causative organism for this disease is a nematode, ***Wuchereria bancrofi***, commonly called the filaria worm. The tiny worms live in the lymphatic system and connective tissues of the body and are also found in the circulating blood at night. Infection is spread through the **culex mosquito**.

The infection of the filaria worm causes enlargement of the limbs, scrotum and mammae. There is no effective drug for the eradication of filaria worms. **Diethylcarbamazine** may be used for some success.



Trematodiasis

The diseases caused by the trematode helminths constitute trematodiasis. Some common such human diseases are as follows:

a) Opisthorchiasis

This disease is caused by **Opisthorchis sinensis** which inhabits the bile ducts. The disease is widespread in China, Japan, Vietnam and India. Human infections are acquired through eating raw or under-cooked fish. All the fresh water fish should be thoroughly cooked before eating.

Thousands of adult flukes are found in bile ducts, causing the thickening of the duct walls. Severe cases usually lead to cirrhosis and ultimate death. Gentian violet and **chloroquin**e prove helpful in curing infections.

b) Fasciolopsiasis

This disease is caused by the **intestinal fluke**, **Fasciolopsis** in India. It utilizes the snail as the intermediate host. Infections are acquired by eating these water plants, particularly the water nuts.

The worms cause erosion of the intestinal lining, resulting in bleeding and pain. **Tetrachloroethylene** is helpful in the eradication of intestinal flukes.

c) Schistosomiasis

This disease is caused by three species of **blood fluke, Schistosoma mansoni**. They live in the bloodstream. The females lay a number of eggs in the bloodstream from where they find their way either into the intestine or the urinary bladder.

The blood flukes cause asthmatic attacks and hepatitis. They may be followed by fever, sweating, diarrhoea, weight loss and loss of appetite. For treatment of the disease, **antimony compounds** are recommended.

d) Paragonimiasis

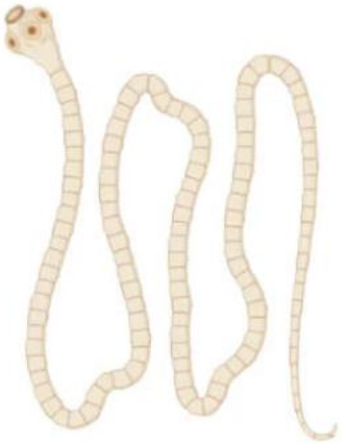
This disease is caused by the **lung fluke, Paragonium westermani**. Infection is widespread in Asia, Africa and America. The flukes are found in the lungs. Man acquires infection from eating raw or under-cooked crabs and crayfish.

The lung flukes cause chronic cough with emission of bloody sputum, fever and anaemia. **Emetine hydrochloride** and **sulpha** drugs are recommended for the treatment of lung flukes.

Cestodiasis

Cestodiasis is caused by tapeworms. The two common forms of this disease are as under:

a) Taeniasis



This disease is caused by the species belonging to the genus Taenia, which includes mainly ***Taenia solium*** (pork tapeworm) and ***Taenia saginata*** (beef tapeworm). Man acquires the infection by eating raw or undercooked pork or beef. The presence of tapeworms in the intestine causes gastrointestinal disorders. Anaemic conditions may also develop. Atabrin or quinacrine hydrochloride is the drug of choice. Prevention requires the eating of thoroughly cooked pork or beef.

b) **Hydatid disease**

This disease is caused by the hydatid worm, ***Echinococcus ganulosus***. The primary host of this worm is a dog. The eggs of hydatid worms pass out in faeces and develop into **onchospheres**. Man acquires infection by eating food or drinking water contaminated with onchospheres. They cause inflammation of the tissues in the brain and kidney. Atabrin or quinacrine hydrochloride is the drug of choice.