

PATHOGENIC MICROORGANISMS

Asst. Prof. Maisam Balasim Naeem

Lecture 3

Classification of Parasites

Parasites of humans are classified in a number of major divisions:

They include the Protozoa (amebae, flagellates, ciliates, sporozoans, and coccidian), the Platyhelminthes or flatworms (cestodes, trematodes and Nematode), and the Arthropods (insects, spiders, mites, ticks, and so on).

Protozoa (Amebae)

Entamoeba histolytica are pathogenic amoeba that are widely known for causing intestinal and extra intestinal infections in human beings. This parasite causes dysentery by invading the mucosa and sub mucosa layers of the large intestine in human beings.

Stages of this Parasite

Parasite occurs in three stages:

- Trophozoite
- precyst
- Cyst
- **Diagnosis:-**

General Stool Examination (GSE).

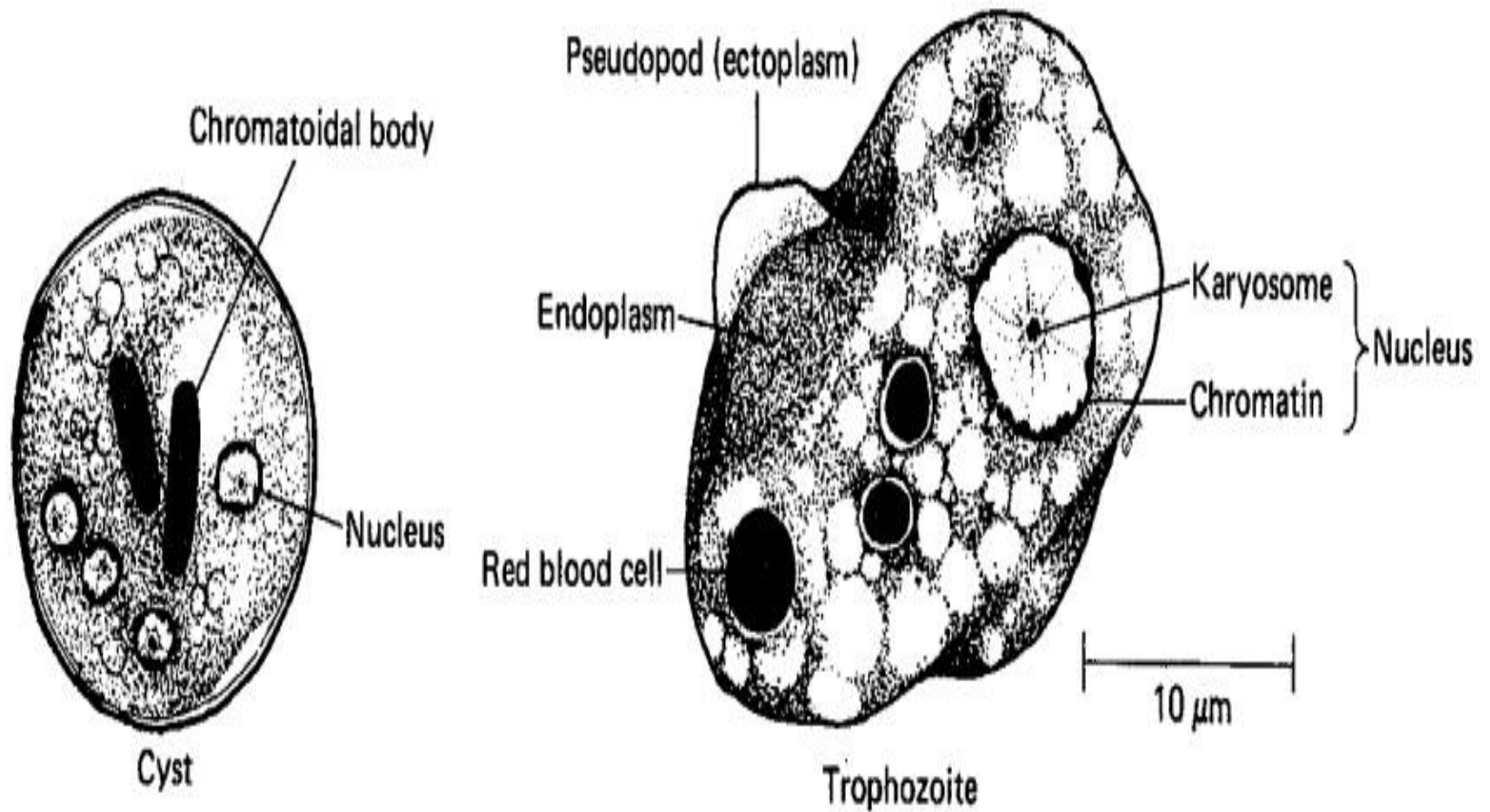


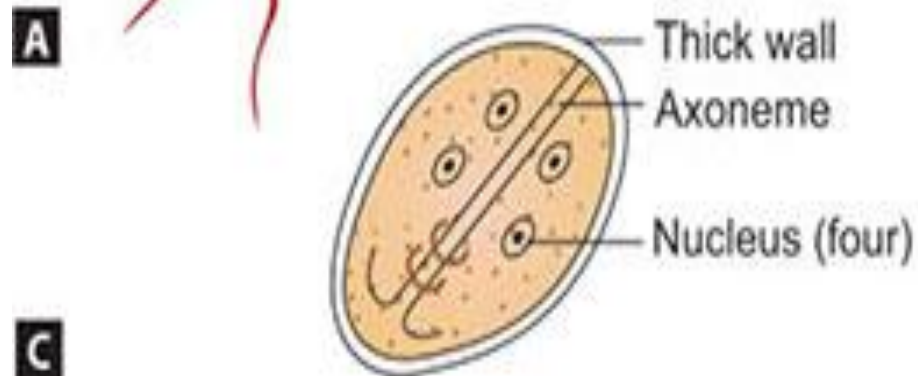
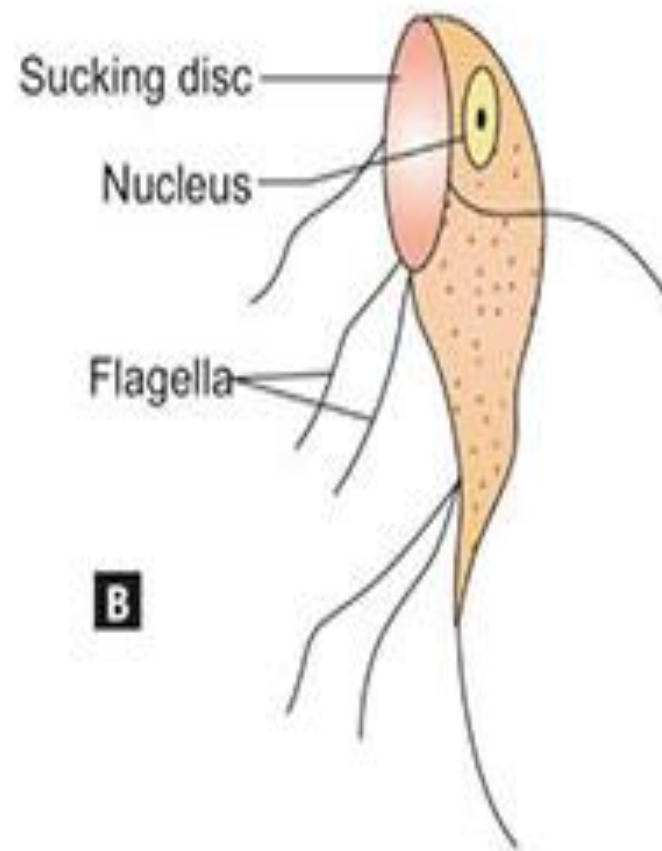
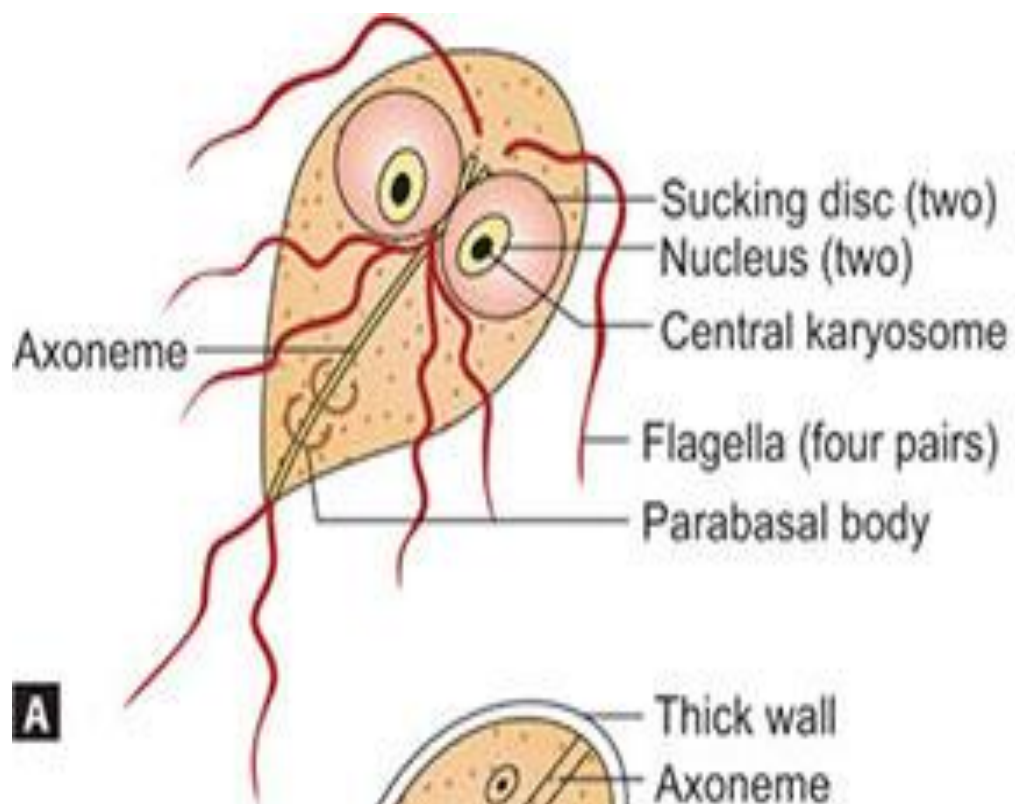
FIGURE *Entamoeba histolytica*.

Protozoa (Flagellates)

Giardia lamblia appeared pear-shaped flagellate is a common and well-known flagellated protozoan parasites colonize in human small intestines *Giardia* can cause long-lasting symptoms and serious problems, especially in children.

* *Giardia* could transform between **cyst stage** and **trophozoite stage**. This parasite can spread through contaminated water and food by cyst stage. The pathogenicity of this parasite begin in acute stage characterized by acute watery diarrhea and chronic oily diarrhea (steatorrhoea)(fat + mucous but without blood).

* **Diagnosis: accrued by (GSE).**



Protozoa (Sporozoa)

Plasmodium spp., the genus of the class of Sporozoa that includes the obligate parasites of vertebrates and insects, that causes malaria.

Four species are considered true parasites of humans, *P. falciparum*, *P. vivax*, *P. ovale* and *P. malariae*.

*The life cycle of malaria involves two hosts, final host is female *Anopheles* (mosquito)(inoculates sporozoites into the human host) and intermediate host is human.

Protozoa (Coccidian)

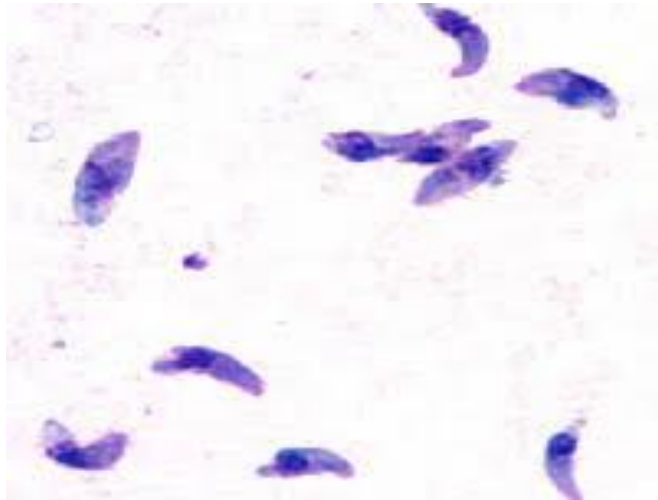
Toxoplasma gondii is a protozoan parasite that can infect a wide range of warm-blooded animals, including humans. There are three stages in their life cycle:-

1- Tachyzoites

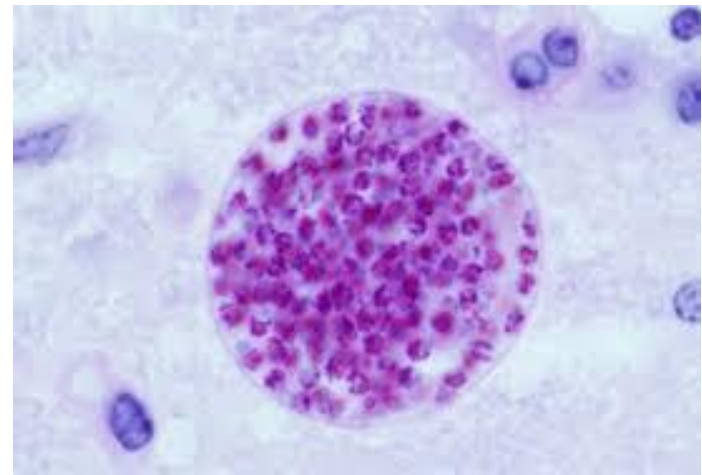
2- Tissue cysts

3- Oocysts

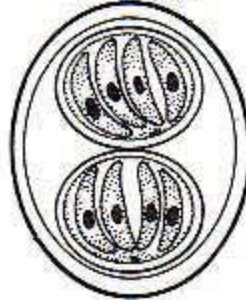
Tachyzoites



Tissue cyst



Sporulated
oocyst



Transmission mode of infection

Humans can become infected through several routes, including consuming undercooked or raw meat containing tissue cysts, ingesting oocysts from contaminated food, water, or surfaces, and from handling cat litter or soil contaminated with cat feces.

* **Diagnosis** typically involves serological tests to detect antibodies or PCR tests to detect the parasite's DNA.

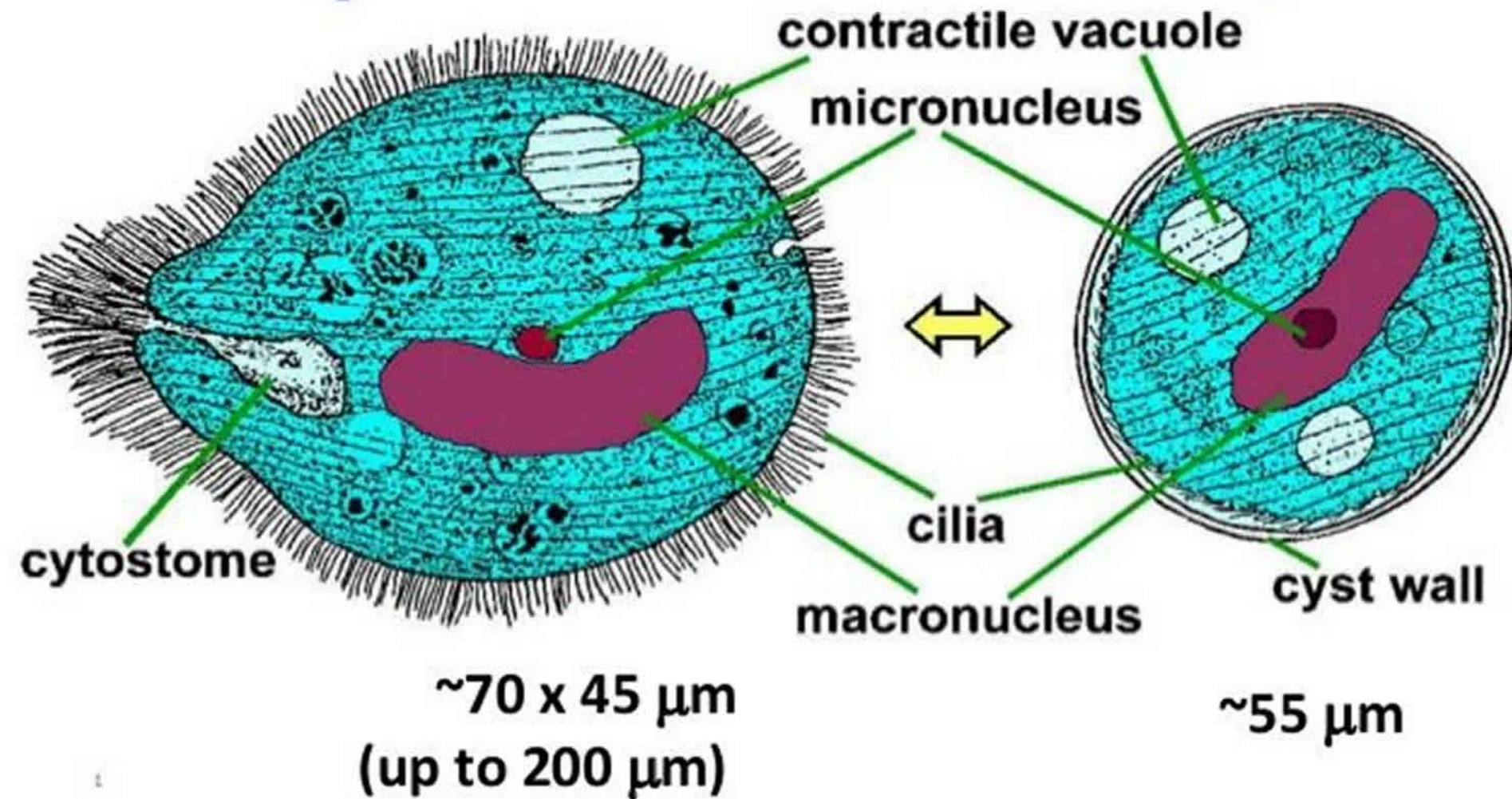
Protozoa (Ciliates)

- *Balantidium coli* is a ciliated protozoan parasite that causes the disease known as Balantidiasis.
- **This parasite** has a direct life cycle involving only one host. It exists in **two forms**: the **cyst form**, which is infectious and can survive outside the host in the environment, and the **trophozoite form**, which is the active, motile stage found in the large intestines.
- **Transmission:** Infection occurs through the ingestion of cysts from contaminated food or water.

Balantidium coli

trophozoite

cyst



Platyhelminthes (Trematodes)

Schistosoma is a genus of trematodes, commonly known as blood flukes. They are parasitic flatworms responsible for a highly significant group of infections in humans termed schistosomiasis also known as bilharziasis.

There are three main species infecting humans are *Schistosoma haematobium*, *S. japonicum*, and *S. mansoni*.

* **Intermediate hosts** are different species of snails according to different species of *Schistosoma*, while the **Final host** for all species is human.

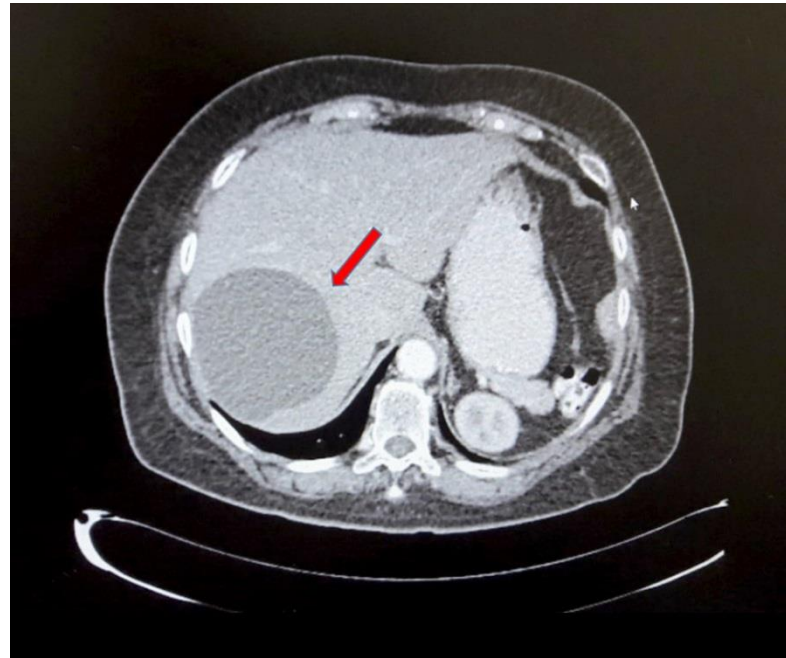
* **Pathology** of *S. haematobium* include hematuria, while Pathology associated with *S. mansoni* and *S. japonicum* includes various hepatic complications from inflammation and granulomatous reactions.

***Human infection** begins with the penetration of the cercaria through the skin.

***Diagnosis** is established by demonstrating eggs in feces or urine by direct wet mount

Platyhelminthes (Cestodes)

Echinococcus granulosus, also called the Hydatid worm, dog tapeworm (common name), is a cestode that present in the small intestine of dogs, wolfs, foxes as an adult (final hosts), but which has important intermediate hosts such as humans, cattles, and sheeps an where it causes cystic echinococcosis, and also called Hydatid disease.



Platyhelminthes (Nematodes)

Enterobius vermicularis is nematode (roundworm) widely known as the human pinworm due to the female's long, pointed tail.

The pinworm, also known as threadworm or seat worm (common name of parasite), it is a common intestinal parasite or helminth, especially in humans.

Mode of Infection

Accidentally swallowing pinworm **eggs** causes a pinworm infection. The infection of this parasite acquire during ingestion of egg by contaminated food, drink or fingers.

Treatment

- Metronidazole (Metrocream, Metrogel-Vaginal, Metrolotion, Flagyl) is an inexpensive drug used to treat certain kinds of protozoal infections.
- Other intestinal worm infections are also treated with medicines that kill the parasite without harming the person, such as albendazole, mebendazole, and praziquantel. The worms are then usually passed out of the body.

A decorative wreath made of pink cherry blossoms and branches, with several petals scattered around it, framing the text.

Thank you