

Introduction

Parasites are usually negligible, but they can cause disease [chronic disease mostly] and can cause mortality. The main feature of parasites is their complicated lifecycles and different morphologies.

Terminology

The Primary Host: The host in which the parasite reaches maturity and, if possible, reproduces sexually.

The Secondary/Intermediate Host: The host which harbors the parasite only for a short transition period, during which (usually) some developmental stage is completed, asexual reproduction can happen in the secondary host. [Humans are the secondary host for Malaria, so this naming isn't related to the pathogenicity of the parasite]

Parasite Categories

1. **Ectoparasites:** live outside the body, on the skin for example, such as **Pediculosis** [can be spread by direct contact].
2. **Endoparasites:** live inside the body either in **a) Tissues:** tissue parasites, for example in the blood like **malaria**, the liver, subcutaneous tissue, etc. or **b) Lumens:** luminal parasites in the GI tract such as **worms**.

Transmission

1. **Through different morphologies** (intermediate morphology): The active morphology of the parasite is too delicate and cannot survive outside the body, so it needs a better protected inactive morphology which can survive to transmit the disease. For example, **the Amoeba** [a genus of Protozoa] exists in two morphologies, one known as **trophozoite**, which is the **active** form inside the body which divides feeds and causes the disease but is **too delicate** to survive outside the body, and the other morphology known as a **cyst**, which is **inactive** but **able to survive** outside the body in order to transmit the disease or the infection from one person to another.
If you eat an **Amoeba trophozoite, you won't be infected because** it will die under the effect of the GI tract; however, if you **eat an amoeba cyst**, it will survive the GI tract, and it will be opened at the small intestine due to hydrolytic enzymes there, releasing the nuclei which will develop into trophozoites, which will move to the large intestine and colonize there **causing disease**.
2. **Through an intermediate host: Tapeworms** move from one person to another through cows or pigs. **Malaria** is transmitted through mosquitoes [note that in Malaria, the human is the intermediate host, and the mosquito is the primary host, because the sexual reproduction takes place in the mosquito, while in the human only asexual reproduction takes place]

3. **Directly:** *Pediculosis* and *Trichomonas Vaginalis*, which is a protozoan that lives in the vagina in females, and the urethra in males. It causes a sexually transmitted disease, and because the **trophozoite** gets passed directly from one body to the other, **it isn't exposed and so is able to survive**. [Note that *malaria* can be transmitted directly by blood transfusion from an infected person]

Schistosomiasis also known as Bilharzia caused by the parasite Schistosoma, causes blindness.

Diagnosis

1. **Directly:** *Ascaris* worm might leave the body on its own.
2. **Looking for forms of the parasite:** Protozoa --> Look for **cysts**, worms --> look for **eggs** in samples of feces, blood, urine, or tissue biopsy.
3. **Serological test:** look for specific antibodies produced against parasites, usually of IgE class, but can also be of IgM.
4. Usually there is **an increase** in the number of WBC **eosinophils** due to parasitic infection.

Reproduction, mainly by binary fission, which can be:

- a) **Asexual:** no gametocytes, usually in the secondary host
- b) **Sexual:** some parasites transform into male gametocytes, other into female gametocytes, they fuse forming a zygote which divides into offspring, usually in the primary host

Protozoa can multiply within the host, while metazoa can't. That's why disease caused by protozoa s more serious and can more potentially cause death.

