Introduction to parasitology

Parasitology is the study of parasites, their hosts, and the relationship between them. As a biological discipline, the scope of parasitology is not determined by the organism or environment in question but by their way of life.

-Parasitology is the study of parasites and is traditionally limited to parasitic **protozoa, helminths,** and **arthropods**.

-Human parasitology is focused on **medical parasites** and includes **their morphology, life cycle, and the relationship with host and environment.**

Parasite :aliving organism which lives in (endoparasite) or on (Ectoparasite) another animal (Host)

- It depend on a host for its food.
- causes some degree of injury.
- **Parasitism:is asymbiotic interaction in where one organism derives its nutrient from another organism.**

Broadly speaking there are two types of parasites:

endoparasites and ectoparasites.

-Endoparasites live within the host.

They may be obligate parasites (dependent on their hosts and cannot live without the host), facultative parasites, and accidental parasites.

-Ectoparasites are parasites which live on the outer surface of the host.

-Life cycle of parasites varies. Some have simple life cycle where all the developmental stages are completed in a single host.

In others two different hosts are required.

1-One is the **definitive host** and the other **intermediate host**.

The definitive host is the one which harbors the adult parasite and where the parasite reproduces sexually.

The intermediate host is the host which harbors the larval stage or the asexual forms of the parasite.

Few parasites require two different intermediate hosts in addition to a definitive host.

Parasites are transmitted by various routes. These include:

1-oral route,

2-penetration by skin or mucous membrane,

3-inoculation by arthropod vectors,

4-and by sexual contact.

Clinical features:

as a result of parasitic infestations may vary; some are acute, whereas most are chronic.

Diagnosis of parasitic infections depends on

1-clinical diagnosis and

2-laboratory diagnosis. Laboratory diagnosis includes

-documentation of characteristic forms of the parasites in the feces, urine, sputum, body secretions, or blood. Serologic tests are also available for certain parasites.

Epidemiology and pathology of parasite:

-It is extremely important to understand the life cycle and have strong knowledge of the developmental stages of parasites for positive diagnostic identification to occur.

-**Immunologic mechanisms** to combat parasite pathogens are varied depending on the **size** and **number of organisms** and relative location of directed responses.

-Parasitic organisms may be **facultative** or require **obligate interactions** with the host. Knowledge of the life cycle and developmental stages of parasites are critical for diagnostic identification.

-**Intermediate hosts (or vectors)**may be **insects** serve only as temporary reservoirs, allowing physical metamorphosis to reach a human infective stage.

1-**Intestinal protozoa** are causative agents of gastrointestinal disorders, usually transmitted by **ingestion of contaminated food or water.**

-Organisms subsequently disseminate from the gut to alternate sites, leading to varied pathology and tissue damage. *Entamoeba histolytica* and *Cryptosporidium parvum* are two examples of this organism class.

1-**Extraintestinal protozoa** spread by vectors include the *Plasmodium* species, the causative agents of malaria. *Trypanosoma cruzi* (Chagas disease) and *Leishmania* spp. are transmitted to humans by blood-sucking insects, after completion of life-cycle stages in the arthropod host.

▪

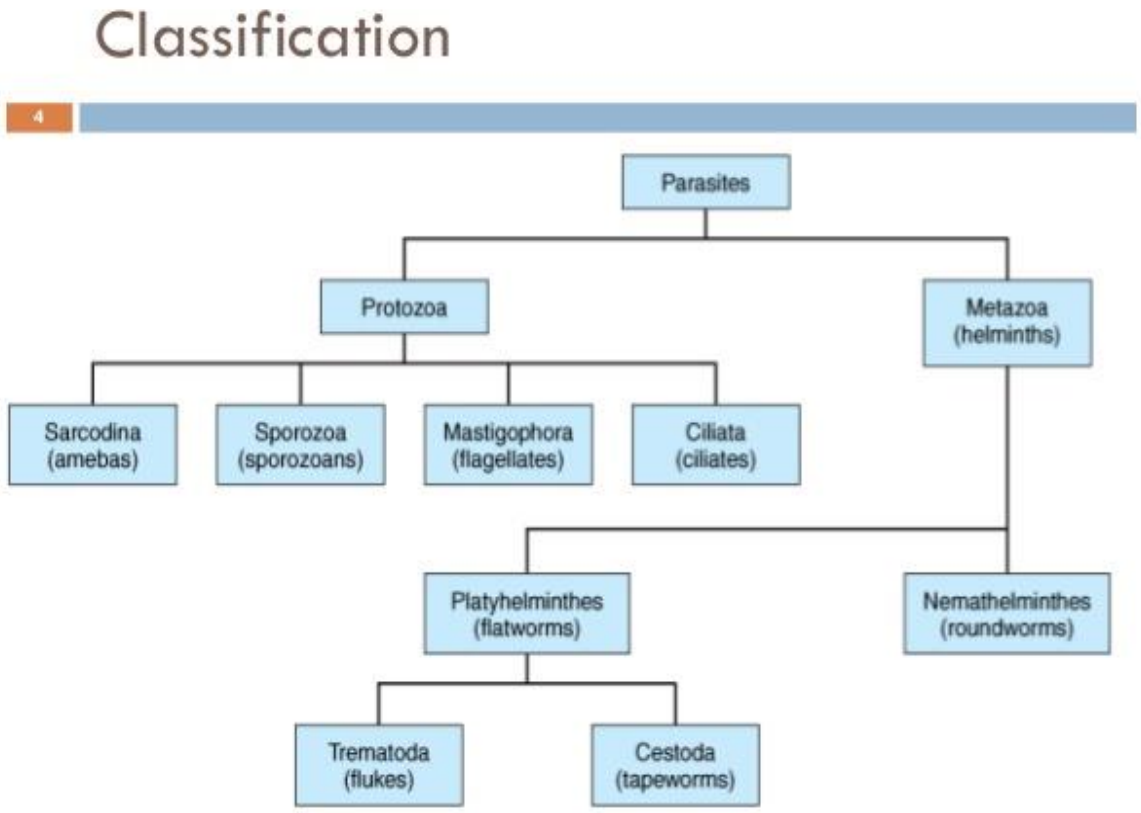
3-The nematodes (roundworms) are large parasites. The adult worms produce larvae or eggs. Ascariasis, caused by *Ascaris lumbricoides*, is the largest roundworm able to parasitize the human intestine. Strongyloides represents an infection that can affect both intestinal and pulmonary systems. *Onchocerca volvulus* causes river blindness (onchocerciasis); *Brugia* is the agent responsible for filariasis.

▪

4-Cestodes and 5- trematodes include the tapeworms and schistosomes, respectively. An example of a cestode with clinically relevant importance is *Taenia*, which causes cysticercosis. *Schistosoma* spp. are the causative agents of schistosomiasis. In many cases, ensuing pathology following infection with these organisms is due to immunologic responsiveness to foreign egg antigens deposited in host tissue.

▪

Many diverse immunologic mechanisms to combat parasite pathogens have evolved, dependent upon the size of the invading organism and the relative physical tissue location where directed responses occur.



Nomenclature of parasites

Each parasite possesses two names i.e. a **generic and a specific.**
the former begins with an initial capital and the latter with an initial small letter, after which comes the designator's name, followed by punctuation and finally the year.
The generic and specific names are in **italics** but not the designator's name.
for example, the common intestinal roundworm of man is named

Ascaris lumbricoides Linnaeus, 1758.

This means that it belongs to the Genus Ascaris and the name of the species lumbricoides was given by Linnaeus in the year 1758.