Diagnosis of Parasites

3rd stage/2nd Semester/2024-2025

Lec.1

Introduction

Clinical manifestations of parasitic diseases are so general that in most instances diagnoses based on symptomatology alone is inadequate. Although the experienced clinician may recognize the characteristic signs and symptoms of certain parasitic diseases, the symptoms in atypical cases may be so confusing that no clear clinical picture is presented. Likewise, many parasitic infections are asymptomatic or produce only mild symptoms thus; final diagnoses and proper methods of treatment require the identification of the parasite in the laboratory.

Initially, you have to now the following fundamentals about parasites:

What is parasitism?

Parasitism is one of the symbiotic relationships.

Symbioses: means that two different organisms living together.

Symbiosis includes three types of relationships which are**: Mutualism, Commensalism and Parasitism.**

Mutualism: mean that both organisms are benefited (example: bacteria in human bowel).

Commensalism: "eating at the same table" means that one organism is benefited, the other is unaffected.

Parasitism: means that weaker organism (the parasite) depends on stronger organism (the host), for food and shelter. The parasite is almost harmful to the host.

Thus, Parasitology is: the science that deals with the weaker organism, the parasite that lives in or on the stronger organism, the host, temporarily or permanently for food and shelter. Depending on the host physiologically and biochemically.

Otherwise; parasitology is the science that study **host-parasite relationship**.

Medical parasitology: study of parasites which infect human.

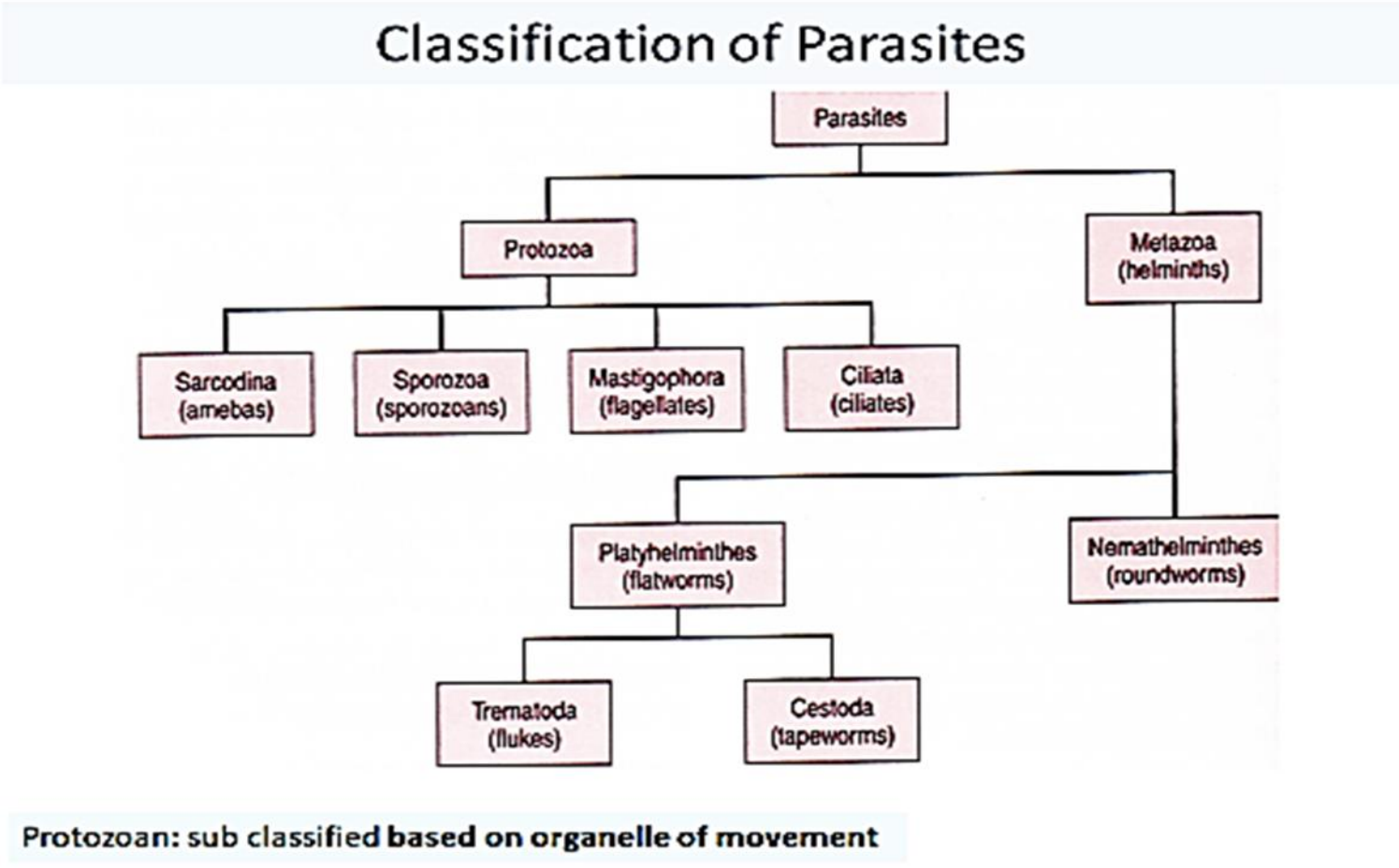
Parasite: is the organism that it's sustenance from another without making compensation. The uncompensated animal is the host.

Host: the partner that providing food and/or protection. Some parasites require more than one host to complete their life cycle; or may not require a host during some stages(s).

Vector: "carrier" of a parasite from one host to another, often an insect.

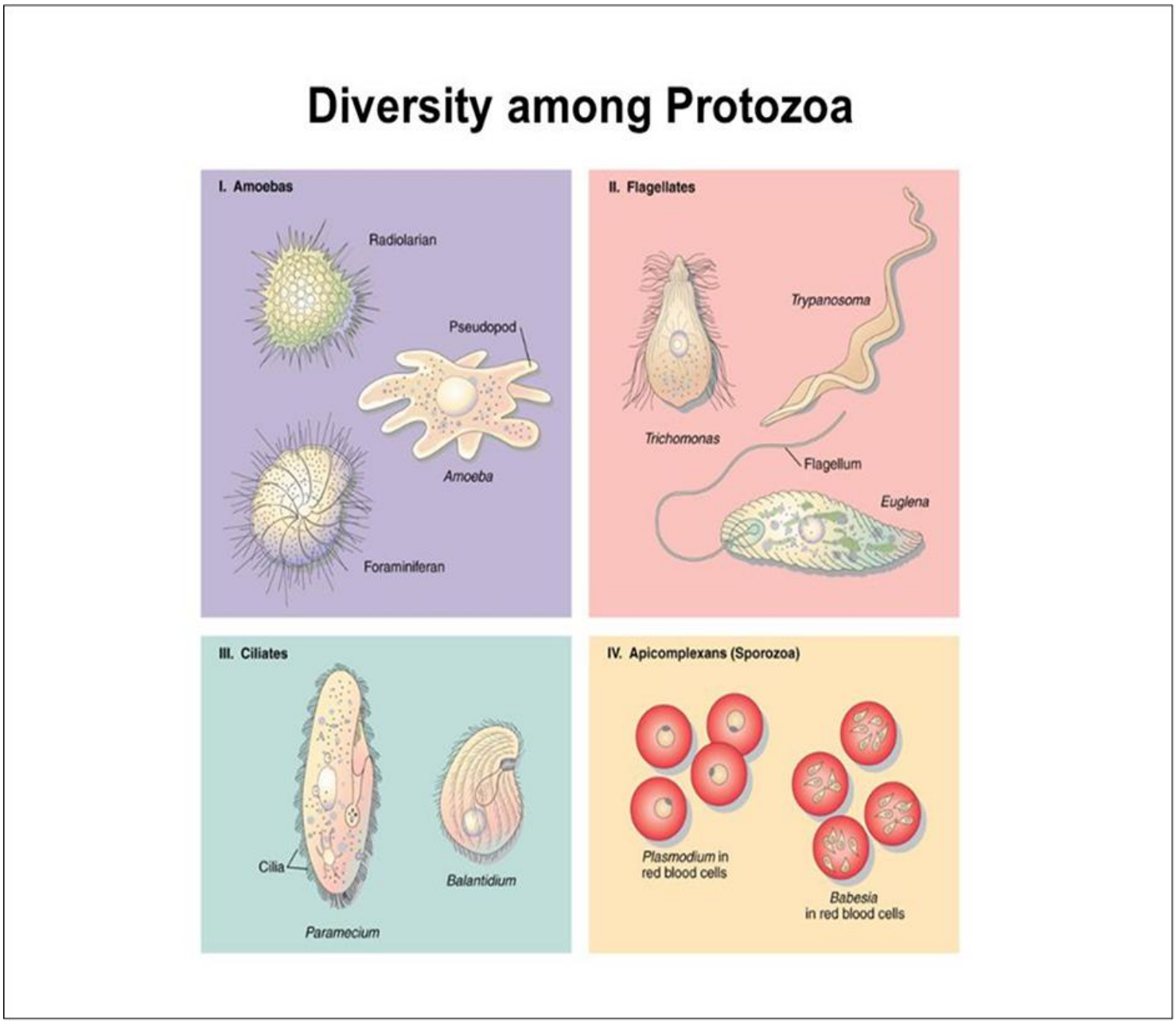
Classification of human parasites:

Human parasites are included within the following groups**: Protozoa, helminthes and arthropods.** In the following diagram there is a simple classification of parasites:



Protozoology: study of protozoan animals (primitive single cells).

The following figure illustrating different protozoan organisms, even parasites or free living:



Helminthology: study of helminthes (worms) including multicellular organisms including parasitic helminthes that have organs (also known as metazoan).

Entomology: study of insects arthropods.

Mode of infection in parasitic diseases:

Parasitic disease divided epidemiologically into the following types:

1-**Filth-borne disease (contaminative)**: called also feco-oral rout transmitted diseases, in which the fecal material contains infective stage of the parasite. Thus, when the person has low hygiene and sanitation is lacking, infective stage of the parasite remain viable for long time even in soil or water or under nails, tools, .etc. then giving the chance for recycling the parasite life.

2-**Soil or water borne disease**: helminthes egg when reach water, soil and dirt, they may developed to infective form like embrionated eggs, or hatch to liberate larvae which can penetrate human skin in infested water.

3-**Food-borne disease**: the infective form of the parasite found in fish, pork, beef or shell when they adequately cooked and ingested by human, they can recycling parasite life.

4-**Arethropod –borne disease**: arthropods act as biological vector for the parasite and can transport the parasitic disease even when ingested or during blood mailing of the arthropod. E.g. mosquito is the vector of malaria.

5-**Arethropod disease**: the arthropod themselves act as a parasitic disease, like head lice.

6-**Sexually transmitted disease (STD)**: almost when the infective form of the parasite found in the reproductive organs of the host, the parasitic infection can transmitted to man during sexual intercourse, like *Trichomonas vaginalis*.

7-**Vertically transmitted disease**: parasitic disease those transmitted from mother to her embryo, either during pregnancy or childbirth.

What are the differences between infective stage and diagnostic stage of the parasite?

Infective stage: the parasitic form that can enter the host and continue development within the host body.

Diagnostic stage: the developmental stage of the pathogenic organism that can be detected in stool, blood, urine, sputum, CSF (cerebrospinal fluid or other human body structures.

Diagnosis of parasitic diseases:

Parasitic disease initially diagnosed clinically through clinical manifestation, especially in endemic areas. The clinical diagnosis of parasitic disease should be proved laboratory.

What is the purpose of laboratory diagnosis of the parasitic disease?

1-Confirmation of the clinical manifestation.
2-Identification of unsuspected infection.

What are the most important specimens that can be used to make lab. diagnosis of human parasites?

1-Stool
2-Blood
3-Serum and plasma
4-Urine
5-Cerebrospinal fluid
6-Tissue and aspirates (like duodenal aspiration).
7-Others: like: anal swab, sputum, urogenital specimen.