

Tikrit University

College of Nursing

Basic Nursing Sciences



Second Year - 2023-2024

Microbiology

(Introduction to parasitology)

**by: assistant lecturer
Abdullah Musaa Kadhim**

Introduction to parasitology

Learning objectives:-

At the end of this lab the students should be able to:-

- 1-Know taxonomy of parasites.**
- 2-Define parasite and host.**
- 3-Recognise types of parasites.**
- 4-State host-parasite relationship**
- 5-Transmission of parasite, It depends upon :**
 - a)Source of infection.**
 - b)Mode of transmission.**
- 6-Life cycles of parasites**
- 7-Laboratory diagnosis of parasitic diseases.**

Medical Parasitology: deals with the study of animal parasites ,which infect and produce diseases in human beings.

Protozoa and helminthes(parasites animal) are studied in medical Parasitology, in addition to arthropods that directly causes diseases or acts as vectors of various pathogens. There are two types of vectors:

- 1-Mechanical vectors ex: house fly,cockroach.**
- 2-Biological vectors ex:Mosquitos, sand fly.**

Taxonomy of parasite: according to the binomial nomenclature as suggested by Linnaeus each parasite has two names :a genus and species name.The generic name of parasite always beings with an initial capital letter and species name with an initial small letter e.g *Entamoeba histolytica*.

These names are either derived from : names of discovers, the geographical area where they are found ,habitat of the parasite,or hosts in which parasites are found and its size and shape.

Parasite: parasite is a living organism, which lives in or upon another organism (host) and derives nutrients directly from it, without giving any benefit to the host.

1-Ectoparasite: They inhabit the surface of the body of the host without penetrating into the tissue. The infection by these parasites is called as infestation, e.g., fleas or ticks.

2-Endoparasite: They live within the body of the host (e.g., *Leishmania*). Invasion by the endoparasite is called as infection.

The endoparasites are following types:

- **Obligate parasite:** They can't exist without a parasitic life in the host (e.g., *Plasmodium* species).
- **Facultative parasite:** They can live a parasitic or free-living when the opportunity arises (e.g., *Strongyloides stercoralis*).
- **Accidental parasite:** They infect an unusual host (e.g., *Echinococcus granulosus*).

Host: is defined as an organism which harbors the parasite and provides the nourishment and protection to it.

The host may be one of the following types:

- **Definitive host** (final host): The host in which the adult parasites replicate sexually (e.g., *Anopheles* species), is called as definitive host. The definitive hosts may be human or nonhuman livings.
- **Intermediate host:** The host in which the parasite undergoes asexual multiplication is called as intermediate host. (e.g., in malaria parasite life cycle, humans are the intermediate hosts). Intermediate hosts are essential for the completion of life cycle for some parasites. Some parasites require two intermediate hosts to complete their different larval stages.
- **Reservoir host:** It is a host, which harbours the parasites and serves as an important source of infection to other susceptible hosts. (e.g., dogs is the reservoir host for Leishmaniasis diseases).

- **Paratenic host**: It is the host, in which the parasite lives but it cannot develop further and not essential for its life cycle is known as paratenic host (e.g., fresh water fish suitable host for plerocercoid larva of *Diphyllobothrium latum*). It functions as a transport or carrier host.

HOST-PARASITE RELATIONSHIP

- The relationship between the parasite and the host, may be divided into following types:
- **Symbiosis**: It is the close association between the host and the parasite. Both are interdependent upon each other that one cannot live without the help of the other. None of them suffer any harm from each other.
- **Commensalism**: It is an association in which the parasite only derives the benefit without causing any injury to the host. A commensal is capable of living an independent life.
- **Parasitism**: It is an association in which the parasite derives benefit from the host and always causes some injury to the host. The host gets no benefit in return.

TRANSMISSION OF PARASITES:

It depends upon:

A-Sources of infection:

- **Man**: is the source or reservoir for a majority of parasitic infections (e.g., amoebiasis, enterobiasis)
- **Animal**: the infection which is transmitted from infected animals to human is called as zoonoses. The infection can be transmitted to human directly or indirectly via vectors. (e.g., toxoplasmosis from cats).
- **Vectors**: vector is an agent, usually an arthropod that transmits the infection from one infected human being to another. Vectors can be biological or mechanical.

- **Contaminated soil and water:**Contaminated soil with feces of human containing eggs (e.g., *Ascaris* species)
- **water contaminated with human feces containing cysts of *Entamoeba histolytica* can acts as source of infection.**
- **Raw or under cooked meat:**Raw beef containing the larvae of *Cysticercus bovis* an example where undercooked meat acts as source of infection.

B-Mode of transmission:

- **Oral or feco-oral route.**
- **Penetration of the skin and mucous membranes.**
- **Sexual contact.**
- **Bite of vectors.**
- **Vertical transmission: mother to fetus □ Blood transfusion.**
- **Autoinfection**

LIFE CYCLE OF THE PARASITES

- **Direct/simple life cycle:**when a parasite requires only one host to complete its development.
- **Indirect/complex life cycle:**when a parasite requires two hosts to complete its development.

LABORATORY DIAGNOSIS

It is play an important role in establishing the specific diagnosis of various parasitic infections. Following techniques are used in diagnosis of the parasitic infections:

- **Microscopically or macroscopically diagnosis.(to examination samples of mens stool,urine,sputum,blood)**
- **Culture methods:NNN media for Leishmania**
- **Immunodiagnostic methods antibody and antigen detection tests:ELISA**
- **Molecular method:PCR**
- **Imaging techniques:x-ray, USG, CT**