Tikrit University

College of Nursing

Basic Nursing Sciences

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Microbiology

Parasitology

CLASSIFICATION OF PROTOZOA

By: assistant lecturer

Ghufran Ayad Ahmed

CLASSIFICATION OF PROTOZOA

The classification of the protozoa is based on the modified form of that proposed by Levine et. al. (1980). The subkingdom Protozoa is divided into 7 phyla of which 4 mainly Sarcomastigophora, Apicomplexa, Microspora and Ciliophora have representative that are parasitic

Kingdom - Protista

Sub-kingdom - Protozoa

Phylum - Sarcomastigophora - with flagella, pseudopodia or both single nucleus, No spore/cyst formation

Subphylum - Mastigophora - one or more flagella in trophozoite Asexual reproduction by binary fission

Class - Phytomastigophorea - chromatophores present, mostly free living No vet/medical importance

Class - Zoomastigophorea - chromatophores absent, one to many flagella present , predominantly parasitic

Order - Kinetoplastida - 1-4 flagella & Kinetoplast with mitochondria amenities, Mostly parasitic

Family - Tryponosomatidae- leaf like, May be rounded

Genera - Trypanosoma and Leishmeni

Order - Retortamonadida - 2 & 4 flagella, One fused posteriorly associated with ventral & cytostomal area

Family - Retortamonadidae - 2 or 4 flagella

Genus - Chilomastia

Order - Diplomonadida - Bilaterally symmetrical with two karyomastigoats each with four flagella mostly parasitic

Family - Hexamitidae - Bilaterally symmetrical, 6 or 8 flagella, 2 nuclei

Genera - Giardia and Hexamita

Order - Trichomonadida - Typically 4 or 6 flagella, One recurrent & attached to undulating membrane, parasitic

Family - Monocercomonadidae - 3-5 anterior flagella, recurrent flagellum usually free

Genera - Histomonas and Parahistomonas

Family - Trichomonadidae - 4-6 flagella, one recurrent & attached to an undulating membrane

Genera - Tritrichomonas , Trichomonas, Tetratrichomonas & Pentatrichomonas

Subphylum - Sarcodina - pseudopodia usually present asexual reproduction by fission

Super class - Rhizopoda - locomotion by formation of podia, nutrition phagotrophic

Class - Lobosea

Order - Amoebida - Naked, uninucleated

Family - Endamoebidae - parasitic is digestive tract

Genera - Endamoeba and Entamoeba

Phylum - Apicomplexa - apical complex including conoid, rhoptries micronemes

subpellicular microtubles, wall forming body etc. present at some stage. Single vesicular nuclear, cilia & flagella absent (expect microgametes) syngamy & cyst often present, all parasitic

Class - Sporozoea - apical complex well-developed, sexual & asexual reproduction, oocyst present

Sub-family - Toxoplasmatinae - psedocyst present, sporogamy outside the host

Family - Plasmodiidae - As character of sub order

Genera - Plasmodium, Haemoproteus and Leucocytozoon enera - Toxoplasma, Besnoitia and Hammondia

Phylum - Ciliophora - Cilia present in at least one stage of life cycle, usually two types of nucleus, Transverse binary fission, sexuality involving conjugation

Class - Kinetofragminophorea - do

Order - Trichostomatida

Family - Balantidiidae - Cytostome & oral cavity present, ciliation uniform holotrichous

Genus - Balantidium - Occurs in the digestive tract

Diagnostic parasitology
Medical parasitology

Medical parasitology deals with the parasites, which cause human infections and the diseases they produce. It is broadly divided into 2 parts: Protozoology and Helminthology.

Parasites: Parasites are living organisms, which depend on a living host for their nourishment and survival. They multiply or undergo development in the host. The term 'parasite' is usually applied to Protozoa (unicellular organisms) and Helminths (multicellular organisms).

Parasites can also be classified as:

1- Ectoparasite: Ectoparasites inhabit only the body surface of the host without penetrating the tissue. Lice, ticks, and mites are examples of ectoparasites. The term infestation is often employed for patriotization with ectoparasites.

2- Endoparasite: A parasite, which lives within the body of the host and is said to cause an infection is called an endoparasite. Most of the protozoan and helminthic parasites causing human disease are endoparasites.

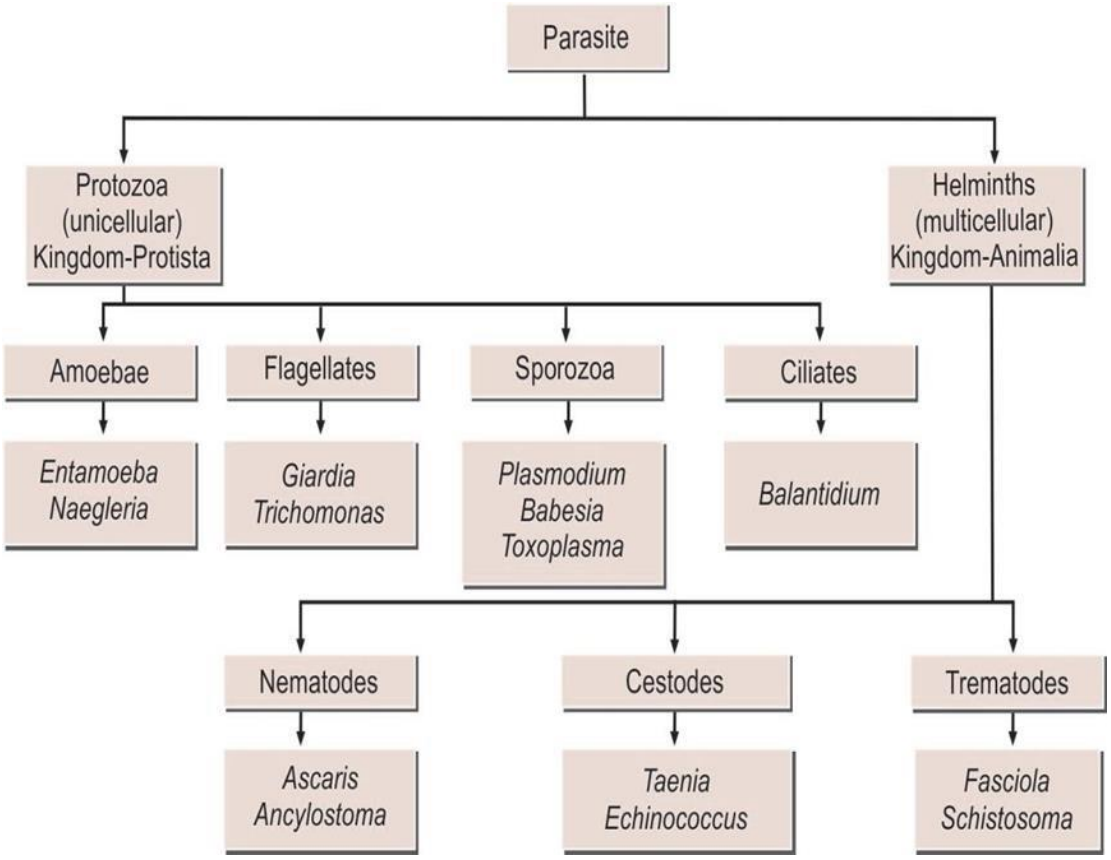
3-Free-living parasite: It refers to non-parasitic stages of active existence, which live independent of the host, e.g., cystic stage of Naegleria flowery. Endoparasites can further be classified as:

4-Obligate parasite: The parasite, which cannot exist without a host, e.g., Toxoplasma gondii and Plasmodium.

5-Facultative parasite: Organism which may either live as parasitic form or as free-living form.

6-Accidental parasites: Parasites, which infect an unusual host, are known as accidental parasites. Echinococcus granulosus infects man accidentally, giving rise to hydatid cysts.

7- Aberrant parasites: Parasites, which infect a host where they cannot develop further, are known as aberrant or wandering parasites, e.g., Toxocara canis (dog roundworm) infecting humans.



Host: Host is defined as an organism, which harbors the parasite and provides nourishment and shelter to latter and is relatively larger than the parasite.
The host may be of the following types:
1- Definitive host: The host, in which the adult parasite lives and undergoes sexual reproduction is called the definitive host, e.g., mosquito acts as definitive host in malaria. *The definitive host may be a human or any other living being. However, in majority of human parasitic infections, man is the definitive host (e.g., filarial, roundworm, hookworm).
2- Intermediate host: The host, in which the larval stage of the parasite lives or asexual multiplication takes place, is called the intermediate host. In some parasites, 2 different intermediate hosts may be required to complete different larval stages. These are known as first and second intermediate hosts, respectively.
3- Paratenic host: A host, in which larval stage of the parasite remains viable without further development is referred as a paratenic host. Such host transmits the infection to another host.

4-Reservoir host: In an endemic area, a parasitic infection is continuously kept up by the presence of a host, which harbors the parasite and acts as an important source of infection to other susceptible hosts, e.g., dog is the reservoir host of hydatid disease.
5- Accidental host: The host, in which the parasite is not usually found, e.g., man is an accidental host for cystic echinococcosis.
Parasites with man as intermediate or secondary host
Plasmodium spp.
Babesia spp.
Toxoplasma gondii
Echinococcus granulosus
Echinococcus multilocularis
Taenia solium
Spirometra spp.
Zoonosis: The word zoonosis was introduced by Rudolf Virchow in 1880 to include the diseases shared in nature by man and animals.
Defined zoonosis as: Those diseases and infections, which are naturally transmitted between vertebrate animals and man".
It is of following types:
* Protozoal zoonoses, e.g., toxoplasmosis, leishmaniasis, balantidiasis, and cryptosporodiasis
*Helminthic zoonoses, e.g., hydatid disease, taeniasis
* Anthropozoonoses: Infections transmitted to man from lower vertebrate animals, e.g., cystic echinococcosis
* Zooanthroponoses: Infections transmitted from man to lower vertebrate animals, e.g., human tuberculosis to cattle.