



MEDICAL PARASITOLOGY

37.1 INTRODUCTION

The study of protozoan and helminthic parasites of medical importance is included in medical parasitology. The first microscope was developed by Antony Van Leunhoek in 1683 and observed life forms in his primitive microscope which we now know were protozoan parasite. He termed them as animalicules. Goldfuss in 1817 coined the term protozoa. Parasites and ova were first isolated in 1782.



OBJECTIVES

- define terms used in parasitology
- classify parasites & helminths

37.2 DEFINITIONS AND TERMS

To understand parasitology it will be good to familiarize ourselves with the definitions and the terms used in parasitology

Definition of some medical terms used in parasitology

- (a) Parasitism: Living organisms who receive their nourishment and shelter from another organism (host) in whom the organism lives.
- (b) Symbiosis: A relationship in which both parasite and the host benefit from their association with each other.
- (c) Commensalism: A relationship where the parasite derives the benefit from the host without harming the host. Sometimes may benefit the host.
- (d) Host: Those who harbour the parasite are called hosts



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- (e) Definitive host: The host in which the adult stage of the parasite lives or where the parasite utilizes the sexual method of reproduction.
- (f) Intermediate host: The host in which the larval stage of parasite lives or the asexual multiplication takes place is called the intermediate host
- (g) Paratenic hosts: A host in which a parasite merely remains without further development is referred to as a paratenic host. They may transmit the infection to another host and hence are also called transport host. E.g. a fly may transfer infected amoebic cysts to food for human consumption..
- (h) Reservoir host: It is either an animal or man in which the parasite usually reside or one in which a parasite that infects man is able to be maintained in the absence of a human host.
- (j) Direct (Simple): When a parasite requires only one species of host to complete its development, it is referred to as direct life cycle. e.g. *E. histolytica*
- (k) Indirect life cycle (Complex): When a parasite requires two or more species of hosts to complete its development, then the life cycle is referred to as indirect life cycle. E.g. Filariasis, Plasmodium

37.3 CLASSIFICATION OF PARASITES

Parasites are divided into two phyla:

A. Protozoa : These are unicellular parasites

B. Metazoa : These are multi cellular parasites

A. Phylum protozoa: These parasites are unicellular eukaryotic organisms and the single cell carries out all the functions of the parasite like reproduction, digestion, respiration and excretion.

They usually measure from 1-150 μm .

Examples of protozoa are: *Entamoeba histolytica*, *Giardia lamblia*, *Plasmodia*, *Leishmania* and *Trypanosoma*

Classification

The protozoa are classified as given in the table

Phylum	Subphylum	Class	Order	Genus
Metamonada		Diplomonadea	Diplomonadida Enteromonadida Retortamonadida	Giardia Enteromoas Chilomastis Retortomonas

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Axostylata		Parabasalea	Trichomonadia	Trichomonas Pentatrichomonas Dientamoeba
Euglenozoa	Kinetoplasta	Trypanosomatidea	Trypanosomatida	Trypanosoma Leishmania
Amoebozoa		Lobosea	Amoebida	Entamoeba Iodamoeba Endolimax Acanthamoeba Hartmanella Balamuthia
Heterolobosa		Schizopyrenidea	Schizopyrenida	Naegleria
Alveolata	Apicomplexa	Coccidea	Emerida	Toxoplasma Isospora Cyclospora Sarcocystis Cryptosporidium
		Heamatozoa Piroplasmae	Haemosporida Piroplamida	Plasmodium Babesia
	Ciliophora	Litostomatea	Vestibuliferida	Balantidium
Microspora		Microsporea	Microsporida	Brachiola Encephalitozoon Enterocytozoon Microsporidium
Incerta			Pleistophorida	Pleistophora Trachipleistophora Blastocystis

According to the site of infection the protozoan parasites are classified as under:

Blood & Tissue Flagellates : Leishmania, Trypanosoma

Intestinal Flagellates : Giardis lamblia, Trichomonas hominis
Enteromonas hominis, Retromonas intestinalis

Oral flagellates: Trichomonas tenax

Genital flagellates: Trichomonas vaginalis

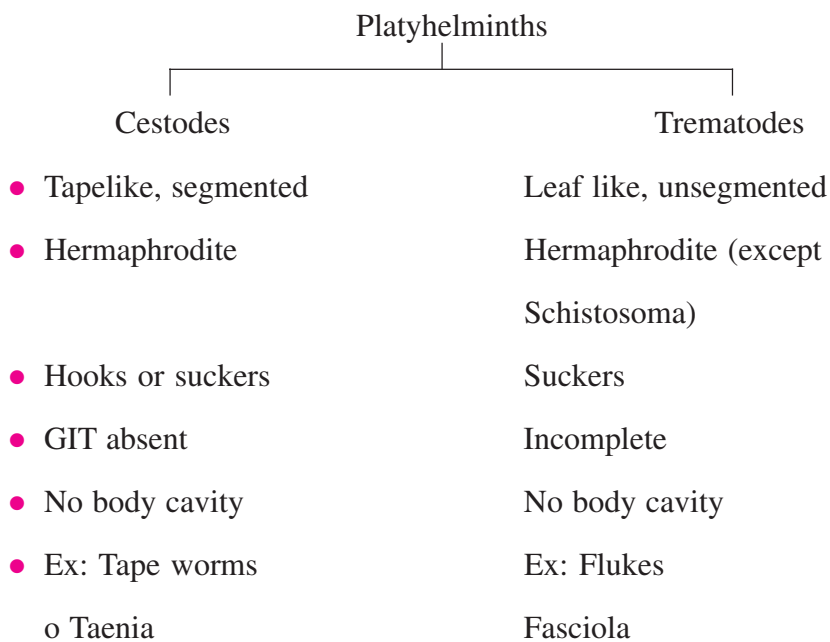
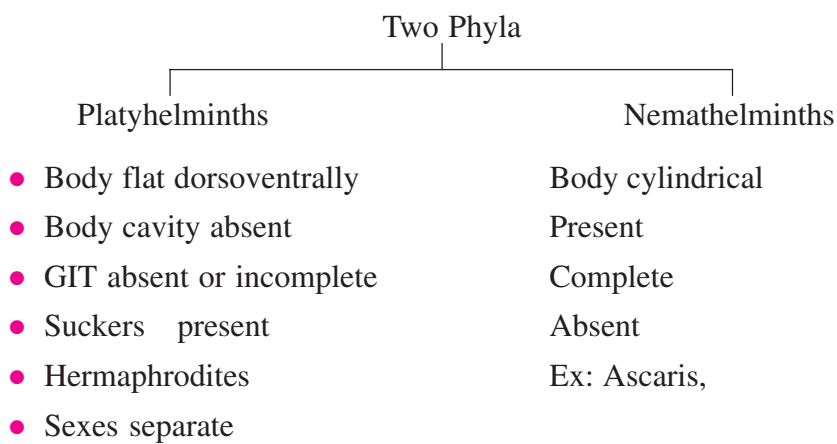
B. Phylum Metazoa: These parasites are multicellular. They consist of helminths. Examples of metazoan are Cestodes, Nematodes, and Trematodes. Helminths are further classified into platyhelminths and nematodes. The platyhelminths are further classified into cestodes and trematodes

Helminths: The common morphological features of helminths are as given under

- No organs of locomotion
- Have tough cuticle
- Gastro intestinal tract (GIT) absent or rudimentary or developed
- Nervous system primitive
- Very well developed reproductive system
- Hermaphrodites or separate sexes
- Enormous number of eggs produced
- Do not multiply in humans (generally)



Notes



**Notes****INTEXT QUESTIONS 37.1**

1. The study of protozoan and helminthic parasites of medical importance is included in medical
2. Living organism who receive their nourishment from another organism are
3. is where both organisms benefit from their association
4. is where the parasite only derives the benefit from the host without harming the host.
5. Phylum protozoa are parasites
6. Phylum metazoan are parasites
7. Helminths are further classified into &

**WHAT HAVE YOU LEARNT**

- The study of protozoan and helminthic parasites of medical importance is included in medical parasitology
- Parasites are divided into two phyla, Protozoa are unicellular parasites and Metazoa are multi cellular parasites
- Phylum protozoa are parasites are unicellular eukaryotic organisms like Entamoeba histolytica, Giardia lamblia, Plasmodia, Leishmania and Trypanosoma
- According to the site of infection the protozoan parasites are classified as Blood & Tissue Flagellates, Intestinal Flagellates, Oral flagellates, Genital flagellates
- Phylum Metazoa are multicellular parasites and they consist of helminths. Examples of metazoan are Cestodes, Nematodes, and Trematodes.
- Helminths are further classified into platyhelminths and nematodes.
- The platyhelminths are further classified into cestodes and trematodes

**TERMINAL QUESTIONS**

1. Define the following
 - (a) Parasitism
 - (b) Symbiosis

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- (c) Commensalism
 - (d) Paratenic hosts
 - (e) Reservoir host
2. Classify protozoan according to its site of infection



ANSWERS TO INTEXT QUESTIONS 37.1

1. Parasitology
2. Parasites
3. Symbiosis
4. Commensalism
5. Unicellular
6. Multicellular
7. Platyhelminths & nematodes

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