PARASITE

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OUTLINE

- Intruduction
- Important terms
- classification of hosts
- Mode of parasitic infections
- General Classification of parasites
- Specific Classification of parasites
- Protozoa
- Examples of clinically important protozoa with their life cycle
- Helminthes
- Examples of clinically important helminthes with their life cycle

INTRODUCTION (CHECK CHAPTER 21)

- **Paraitology :**

- **Parasitism :**

- **Parasite :**

Is an organism baring food and shelter temporarily or permanent and living in or on another organism.

Kind of parasite (according to habitat)

- **Endoparasite**
- **Ectoparasite**

KIND OF PARASITE (ACCORDING TO HABITAT)

- Endoparasite

- Ectoparasite

IMPORTANT TERMS

- **Parasites can be:**

1-Facultative parasite:

e.g. Strongyloides species.

2-Obligate parasite:

e.g. Trichomonos species.

3-Coprozoic (spurious) parasites:

foreign organisms which have been swallowed merely pass along alimentary canal of man (without establishment) to be recovered in faeces. (without affect)

HOST

- **Host :**

organism harboring the parasite species may be affected or not.

- **Classification of Hosts**

1-Definitive host or final host :

Eg: man.

2-Intermediate host:

- **Eg:** Taenia>>>>>>> adult------ man
  Larva –---- cattle

3-Reservoir host (carrier):

The carrier host is well adapted to the parasite and tolerates the infection but serve as source of the infection to other organisms

4-Vector:

An arthropod which carries the parasite from one host to another.

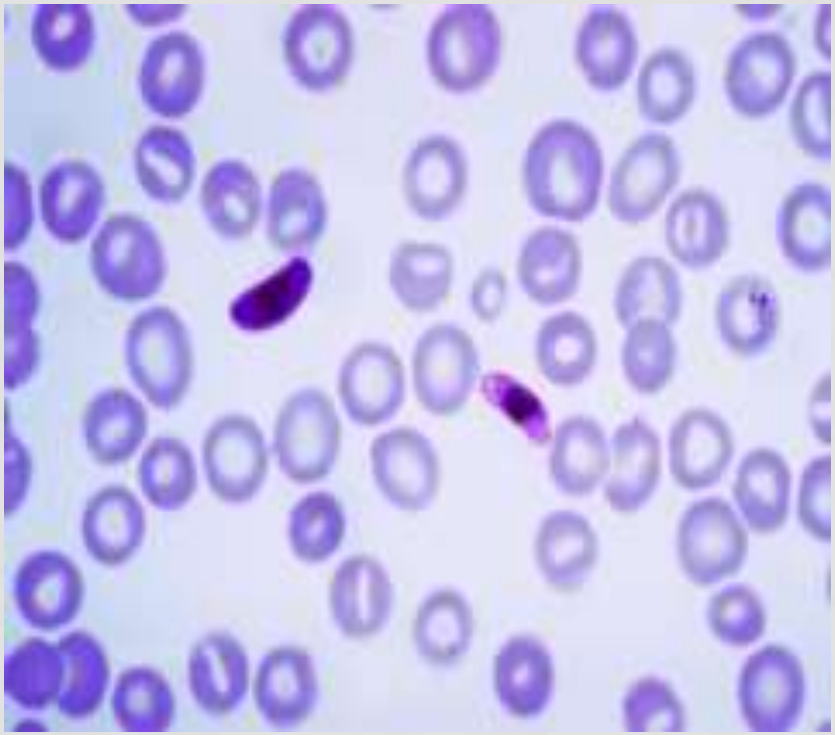
MODE OF PARASITIC INFECTIONS

1) Congenital from mother to fetus.
2) Sexually transmission
3) Ingestion of contaminated food and water or undercooked meat in which the infective stage has developed.
4) Penetration of the skin due to contact with infected soil or water stream.
5) Inhalation of dust carrying the infective stage of parasite.
6) Vectors: through the bite or faeces of infected vector or by swallowing the vector.

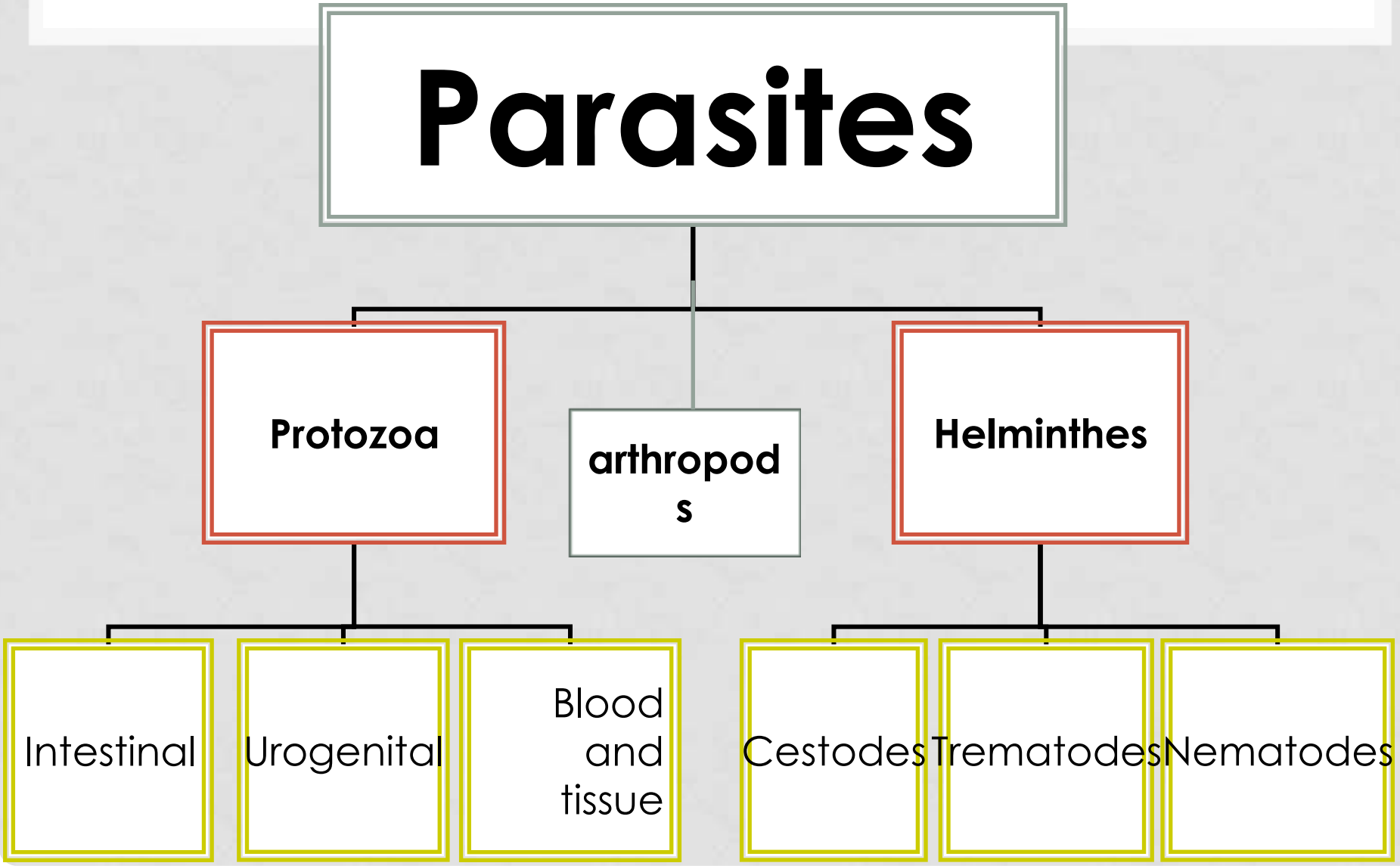
CLASSIFICATION OF PARASITES

- **General classification:** animal parasites are classified according to international code taxonomy – Each parasite belong to a:

- **Kingdom**
  Phylum
  Class
  Order
  Family
  Genus
  Species



CLASSIFICATION OF PARASITES

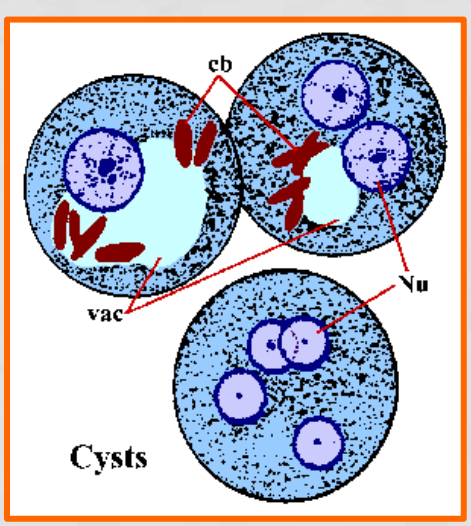


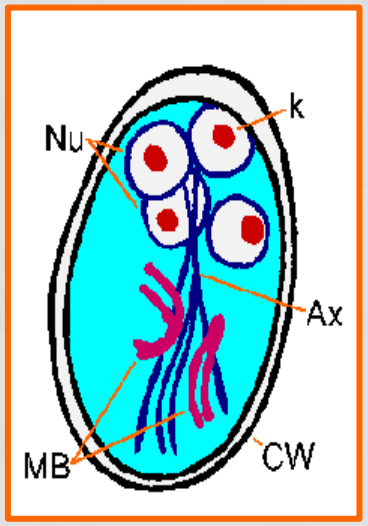
Protozoa

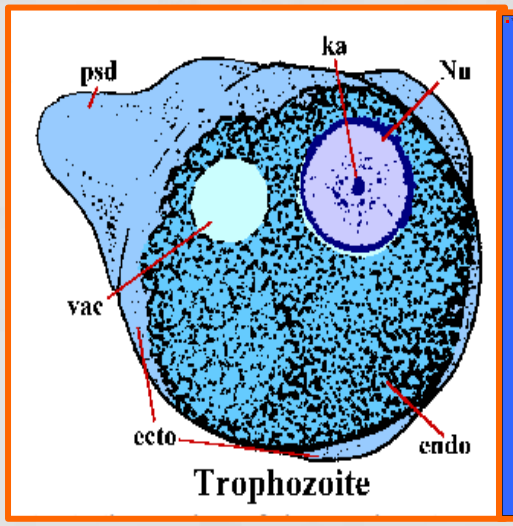
PROTOZOA (CHECK CHAPTER 5)

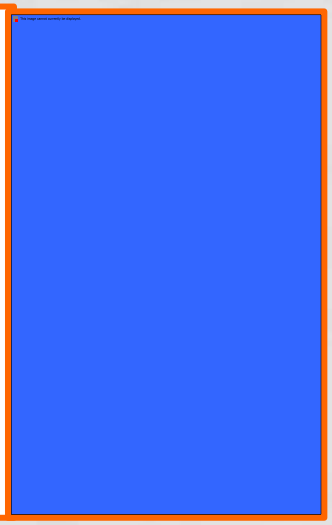
- **Protozoa life cycle consist of two stage :**

Cyst	Trophozoite









PROTOZOA ARE CLASSIFIED

(ACCORDING TO THEIR METHOD OF LOCOMOTION)

- **(Check chapter 5 , table 5-3)**

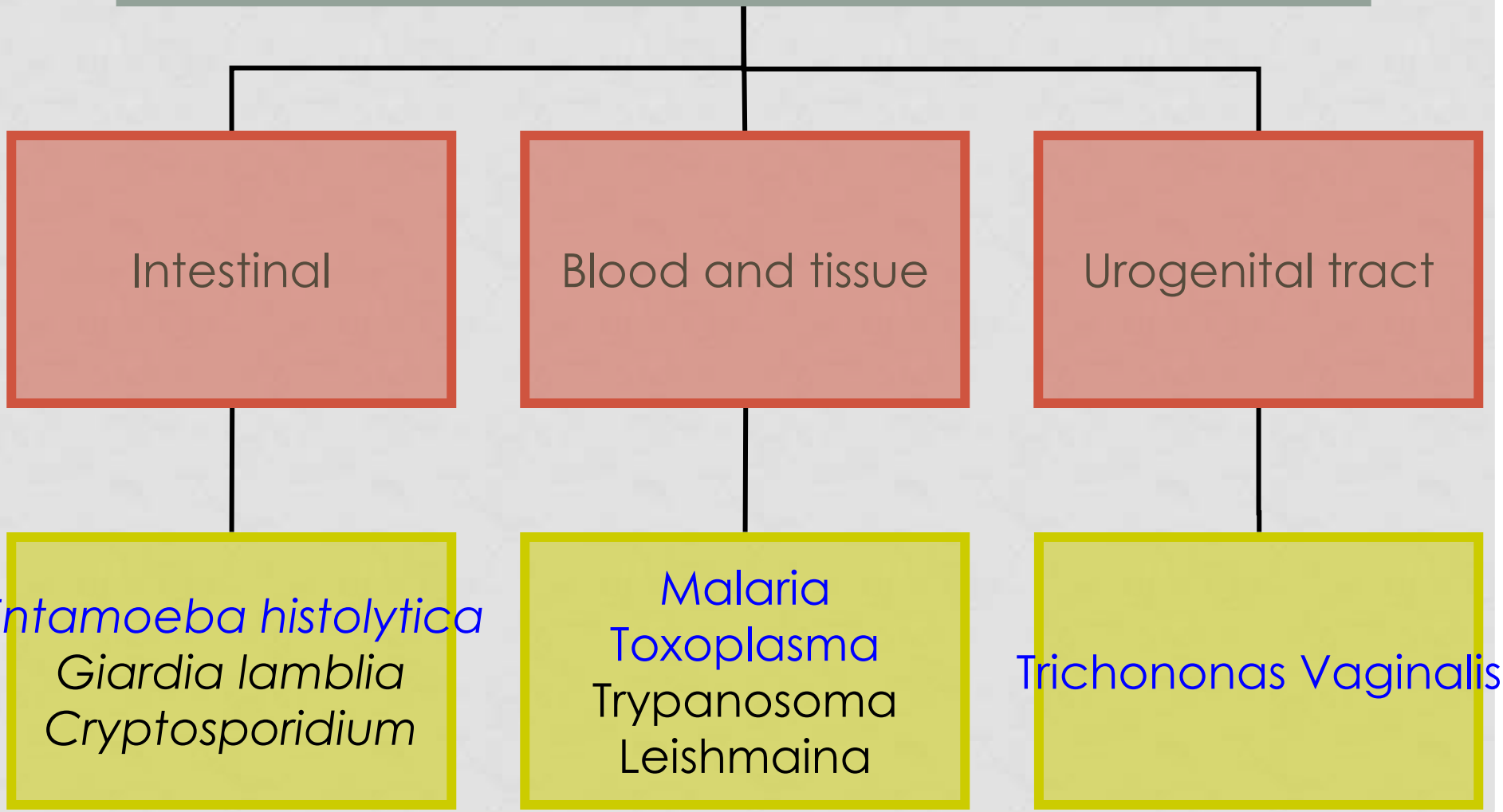
1. **Flagellates** (e.g. *Giardia lamblia*).

1. **Amoeboids** (e.g. *Entamoeba histolytica*).

2. **Sporozoans** (e.g. *Plasmodium*).

3. **Ciliates** (e.g. *Balantidium coli*).

Protozoa infection



INTESTINE

ENTAMOEBA HISTOLYTICA

(CHECK CHAPTER 21 , TABLE 21-3)

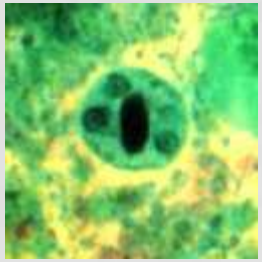
Dysentery
Stool with blood and mucus.

- **Name of Disease:**
  - Amoebiasis (Amebic dysentery)
- **Parasite:**
  - It possess both trophozoite and cyst forms.
- **Habitat:**
  - The lumen of the large intestine.

ENTAMOEBA HISTOLYTICA

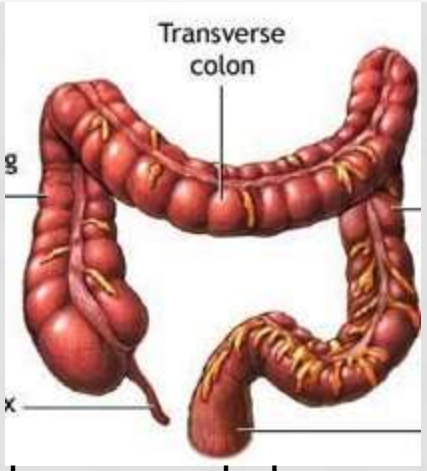
- **Mode of transmission :**

LIFE CYCLE:



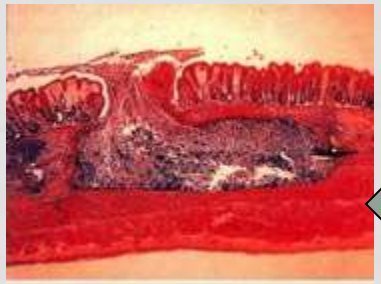
Cyst: infective stage

Inters mouth through contaminated food, drink, fly, or through using human stool as fertilizer



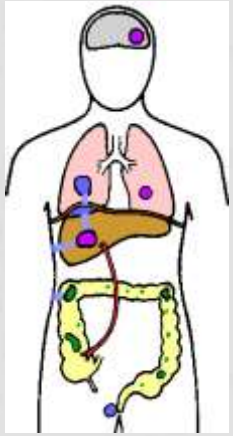
To L.I. lumen and change into trophozoite (pathogenic stage)

Produce lytic enzymes (capable of doing lysis and produce ulcer)



Flask shape ulcer

Can do erosion through B.V. to liver and other organs



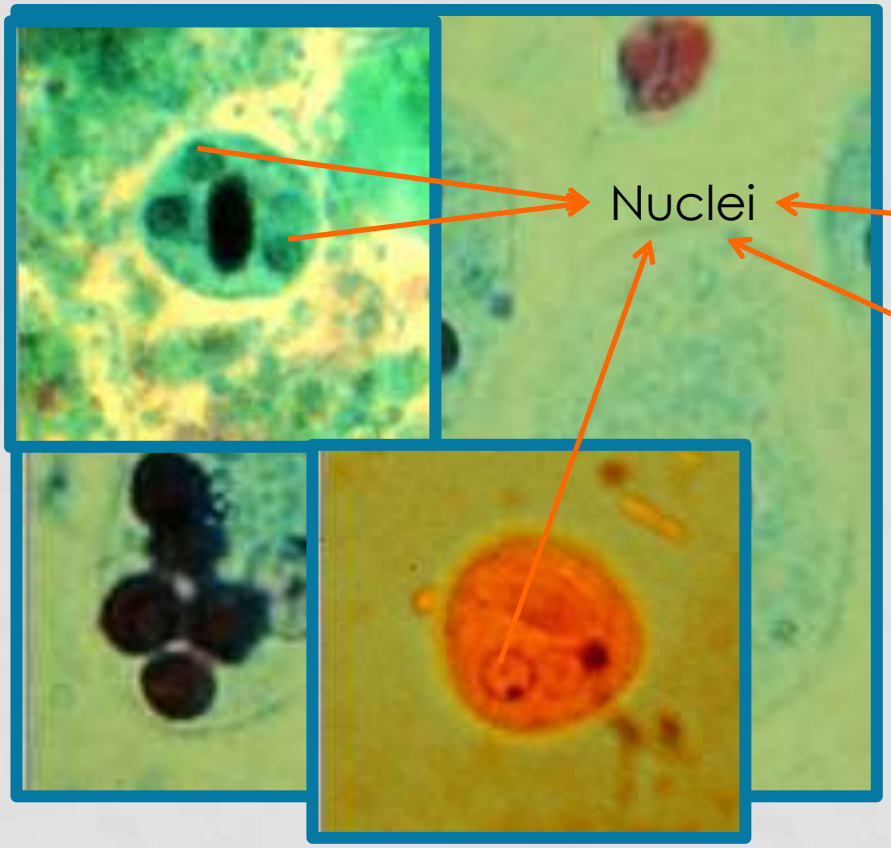
ENTAMOEBA HISTOLYTICA

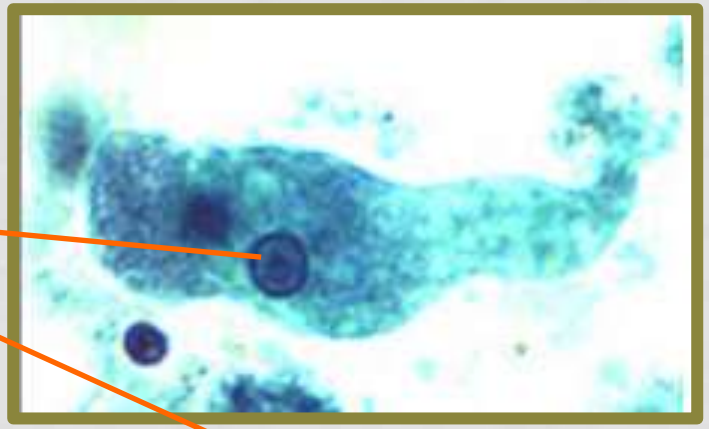
Cyst:

Infective stage

Trophozoite

Pathogenic stag





Entamoeba histolytica

Clinical picture:

- Dysentery: blood+mucous diarrhea (as a result of flask shape ulcer wall invasion)
- Sever abdominal pain
- Tenesmus: sense of incomplete evacuation (the patient at this point should be seeking medical advice)

Complication:

A. intestinal: peritonitis, appendicitis, Hemorrhage

B. Extra intestinal:

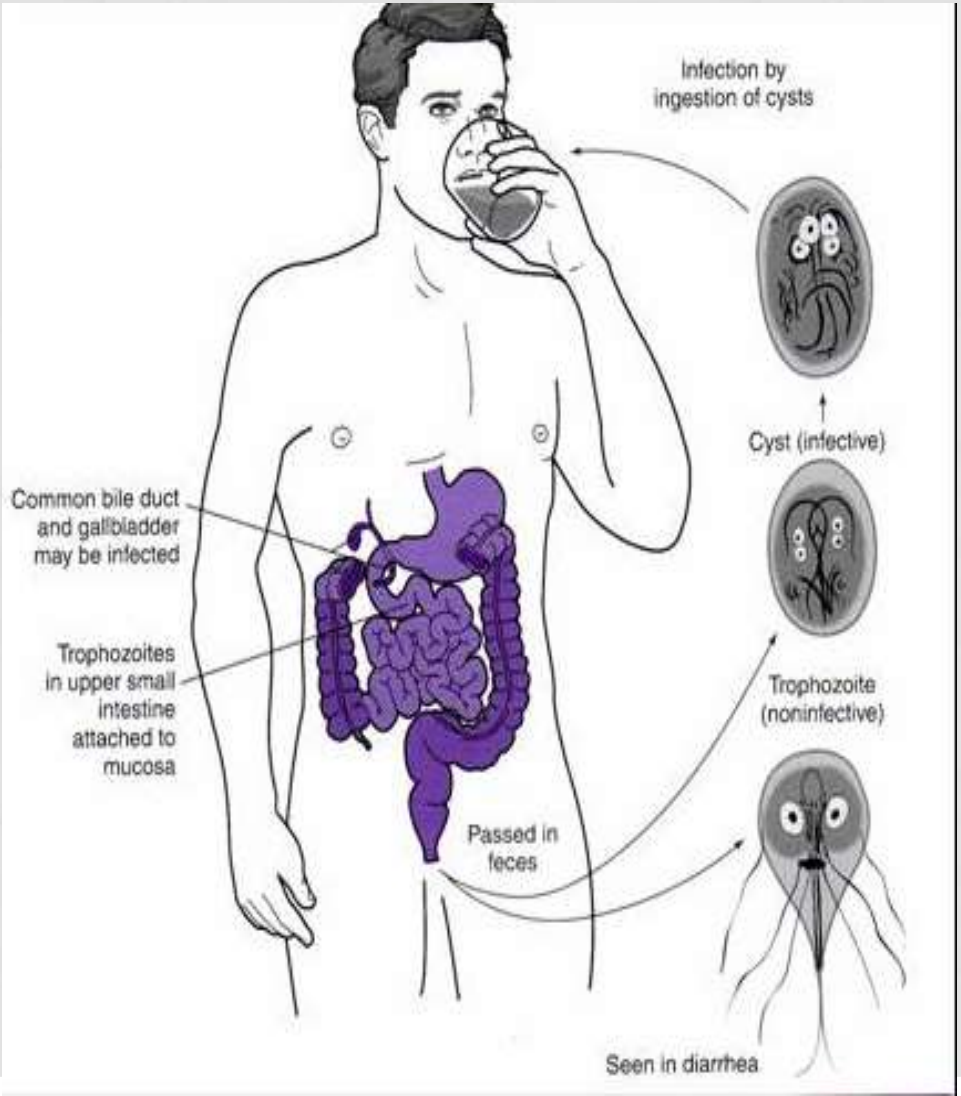
Most commonly: liver . Also in lung, skin, and brain

Laboratory diagnosis :

Gardia lamblia

- **Name of Disease:**
  - Giardiasis
- **Transmission**
- **Laboratory diagnosis**

TRANSMISSION



INTESTINAL PROTOZOAL INFECTIONS DIAGNOSED BY EXAMINING STOOL SPECIMENS

Infection	Observation required for Diagnosis
• Amebiasis	• Trophozites (amebas) and/or cyst
• Balantiadiasis	• Trophozites and/or cyst
• Cyclosporiasis	• Oocycts
• Giardiasis	• Trophozites and/or cyst

GENITOURINARY TRACT

TRICHOMONAS VAGINALIS

(CHECK CHAPTER 21 , P:360)

- **Name of Disease:**

Trichomoniasis

- is the most common protozoal urogenital tract infection of humans.

- **Parasite :**

Trichomonas Vaginalis

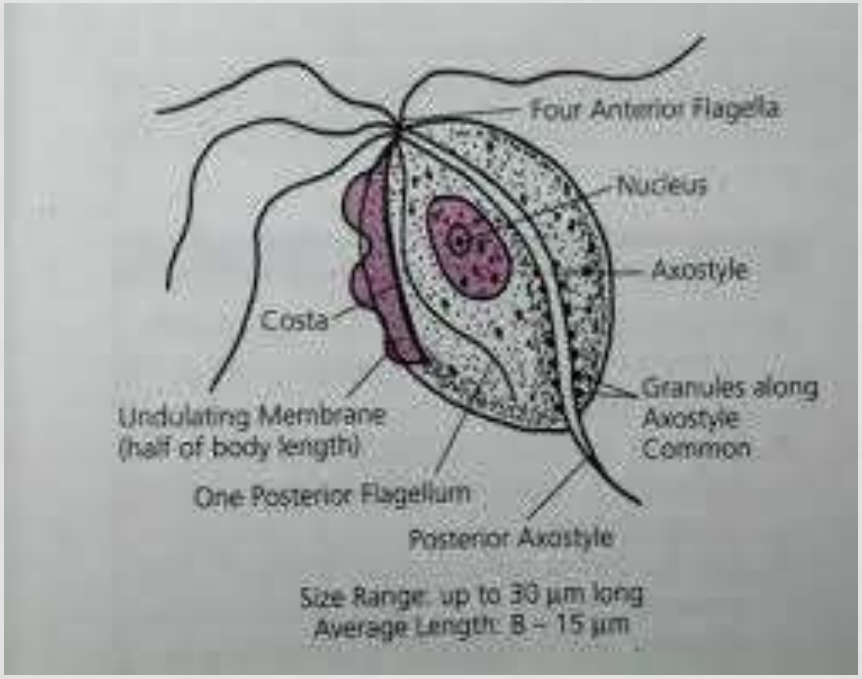
- **Transmission:**

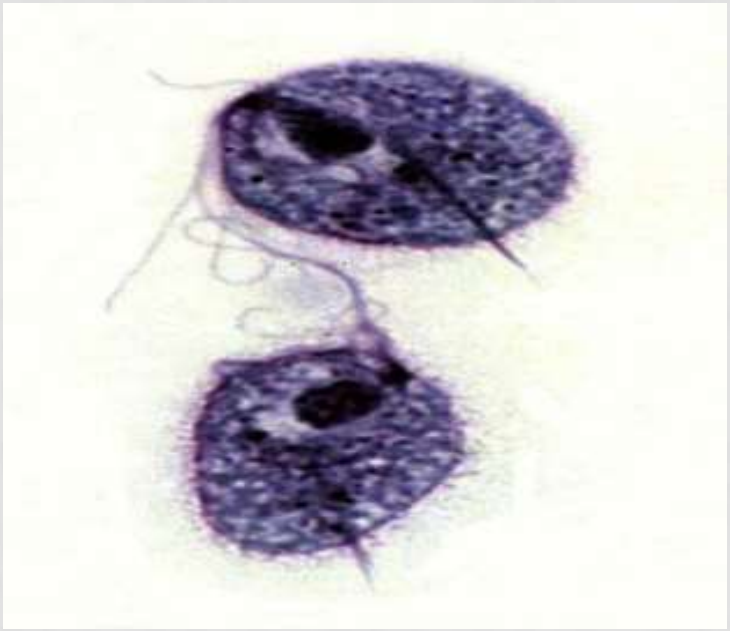
- **Symptoms:**
  - **Male:** usually asymptomatic carriers (if symptomatic white discharge).
  - **Female:** fishy odor yellow or green discharge.

- **Laboratory diagnosis :**
- Saline wet mount examination of vaginal or urethral discharge – motile trophozites

TRICHOMONAS VAGINALIS

- **Trophozoite stage**





BLOOD AND TISSUE

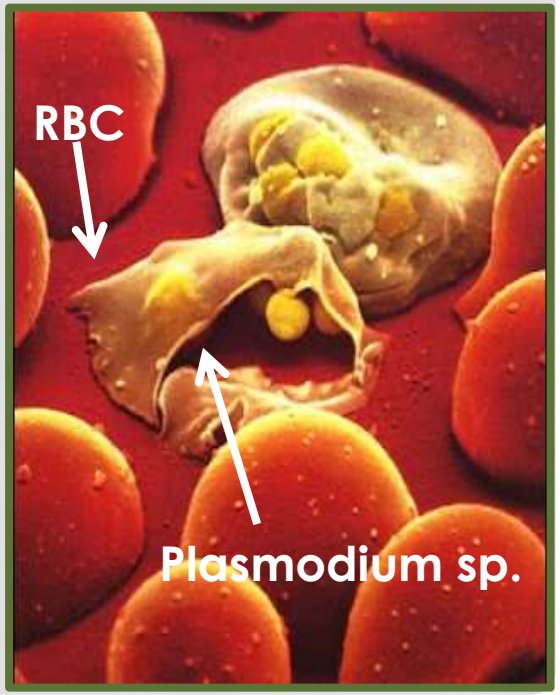
PLASMODIUM SP

- **Name of Disease:**
  - Malaria → .

- **Parasite:**

four species are known to infect human

- ✓*Plasmodium falciparum*
  - (the most deadly and dangerous ,)
- ✓*Plasmodium vivax*.
  - (the most common species,)
- ✓*Plasmodium ovale*.
- ✓*Plasmodium malaria*.



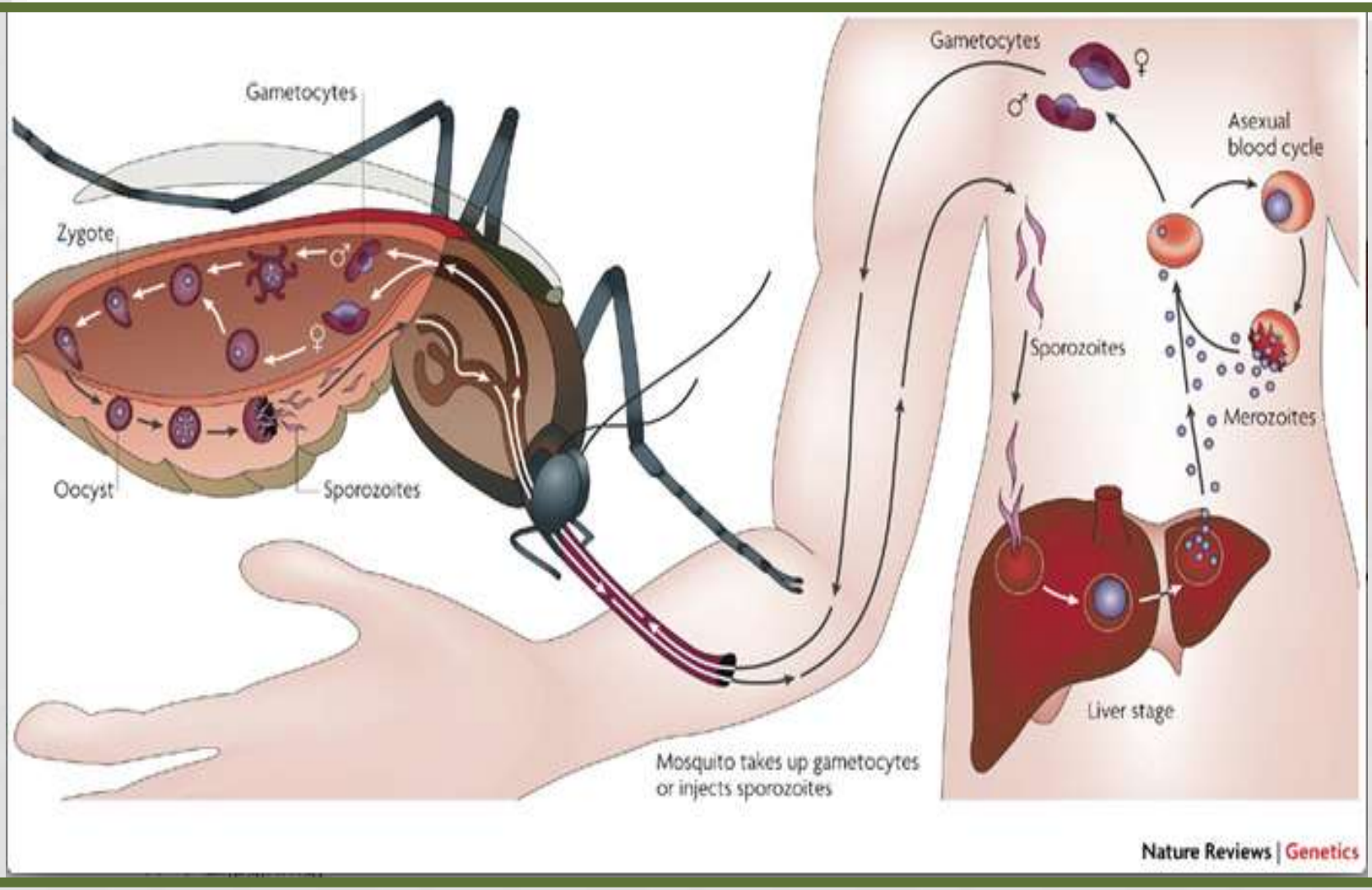
PLASMODIUM SP.

- **Mode of transmission :**

(Check chapter 21 , table 21-4)

LIFE CYCLE: *PLASMODIUM SP.(*

CHAPTER 21, FIGURE 21-7)



PLASMODIUM SP

Pathology and clinical significance:

- When merozoits invade the blood cells, using hemoglobin as a nutrient, eventually, the infected red cells rupture, releasing merozoits that can invade other erythrocytes.

- ***Plasmodium falciparum*** is the most dangerous species**.** ***P. malriae, P. vivax,*** **and** ***P. ovale*** cause milder form of the disease, probably because they invade either young or old red cells, but not both. This is in contrast to *P. falciparum*, which invades cells of all ages.

TOXOPLAMA GONDII

◆Name of the disease:

- Toxoplasmosis.

◆Reproduction:

✓Sexually reproduction (Definitive host) →

- In Cats, where Oocysts are released in feces of cat.

✓Asexual reproduction (intermediate host)→

- In worm blooded animals (cats, mice, humans, and birds).

◆ Laboratory diagnosis

TOXOPLAMA GONDII

- **Mod of Transmission :**

(Check chapter 21 , table 21-2)

Helminthes (worms)

HELMINTHES (WORMS)

(CHAPTER 21, P : 367)

- Ranging from barely visible roundworms (0.3 mm) to huge tapeworms 25 meters long .

- **helminthes grouped them into three categories:**

1. Nematodes (roundworms),
2. Trematodes (flukes)
3. Cestodes (tape- worms)

HELMINTHES

- The stages of life cycle : egg, larva and the adult .
- Sources for human infection are contaminated food, soil, and water or infected animals,
- routes of infection are by oral intake or penetration of unbroken skin

Helminthes

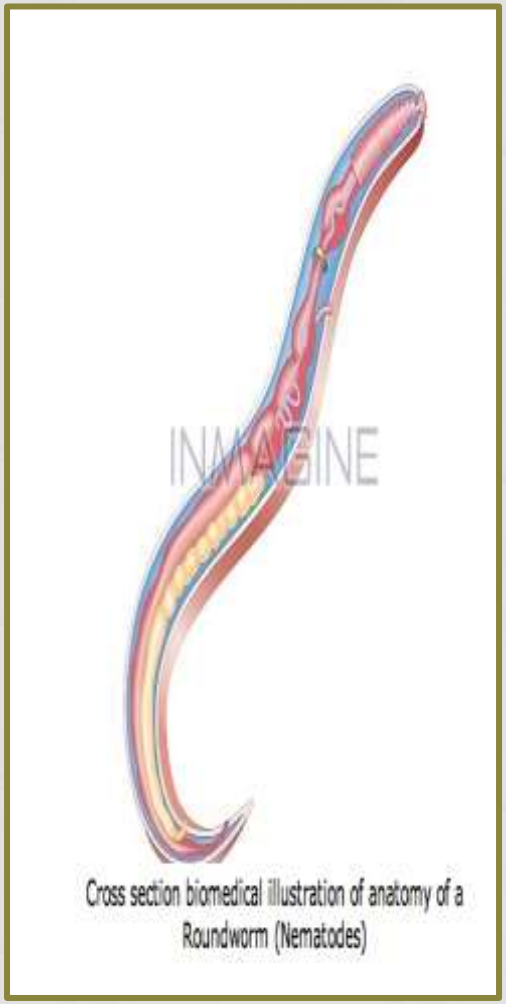
- Nematodes (round worms)
  - ***Ascaris lumbricoides* (Roundworm)**

- **Cystods (flat worms)**
  - ***Taenia saginata***

- **Trematodes (fluks)**
  - **Bilharzia (Schistosomiasis)**

NEMATODES (ROUNDWORMS)

- elongate, cylindrical shape.
- Nonsegmented and tapered at both ends .
- Sexes are separate.
- the vast majority are free- living soil and freshwater worms



- **Nematodes divided into:**

1. intestinal nematodes (e,g, **Ascaris lumbricoides**
2. Tissue nematodes

ASCARIS LUMBRICOIDES (ROUNDWORM)

- *Ascaris lumbricoides* is the largest nematode (roundworm) parasitizing the human intestine

- Morphology:

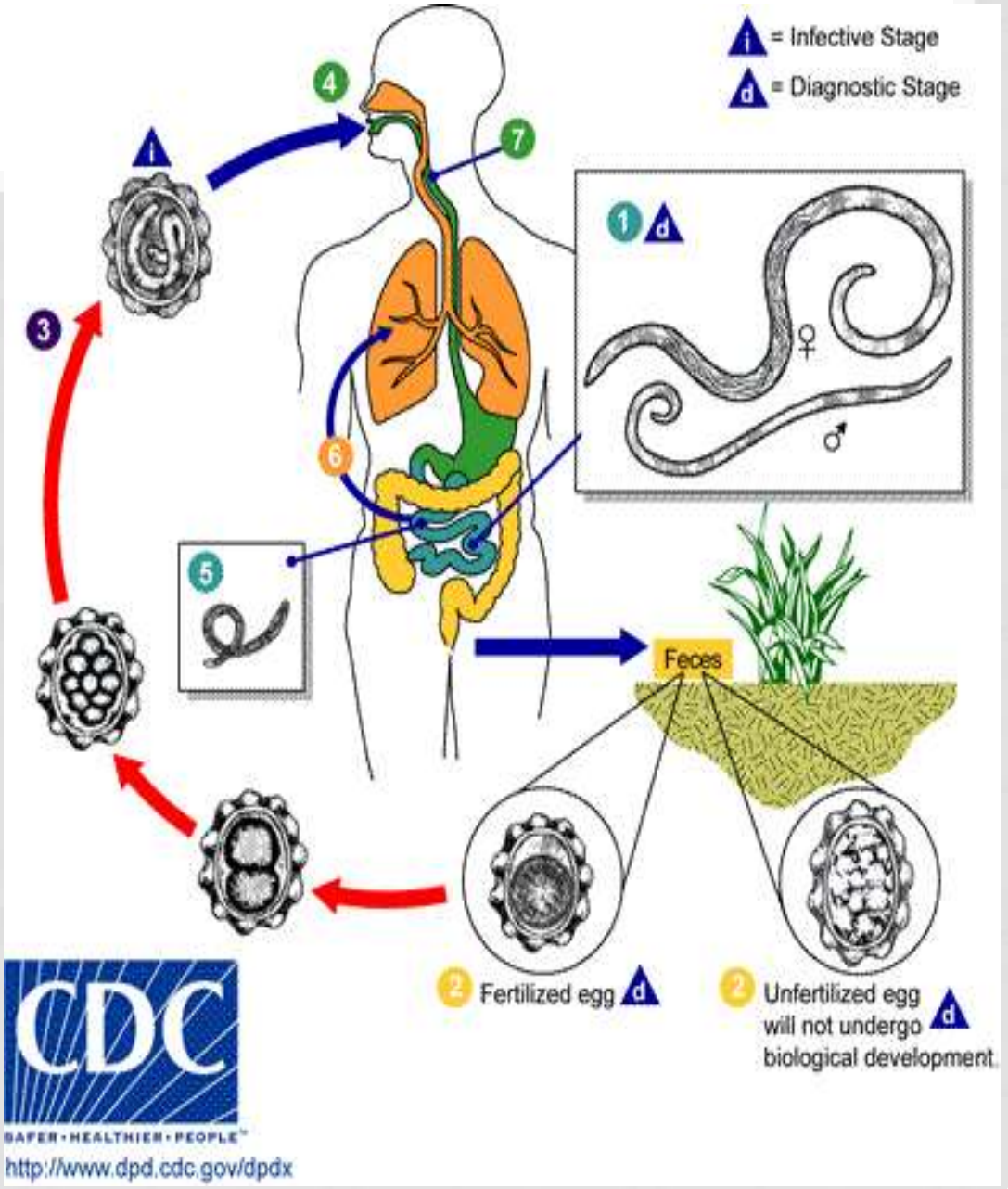
Adult: in small intestine

adult

egg: infective stage

LIFE CYCLE:

- 2 phases: lung and intestinal
- Egg ingested, hatches in duodenum; larvae penetrate intestine wall, enter blood vessels and embolize through liver to lungs.
- They then migrate into airspaces, up trachea and are swallowed, taking up permanent adult residence in the small intestine; ~ 2 months from egg to mature adult



TREMATODES (FLUKE)

- Small (about 1 cm) flat , leaf-like worms.
- Infest various organs of the human host (e.g. intestinal veins, urinary bladder, liver, or lung)
- All parasitic trematodes use freshwater snails as an **intermediate host.**

SCHISTOSOMA SPP.

- Name of the disease:

✓Schistosomiasis (Bilharzia)– it is a disease of the venous system.

•Transmission:

✓ By direct skin penetration, when people come in contact with contaminated water.

Schistosoma is **NOT acquired by ingestion of contaminated food**, it directly penetrates the skin of swimmers in contaminated rivers and lakes.

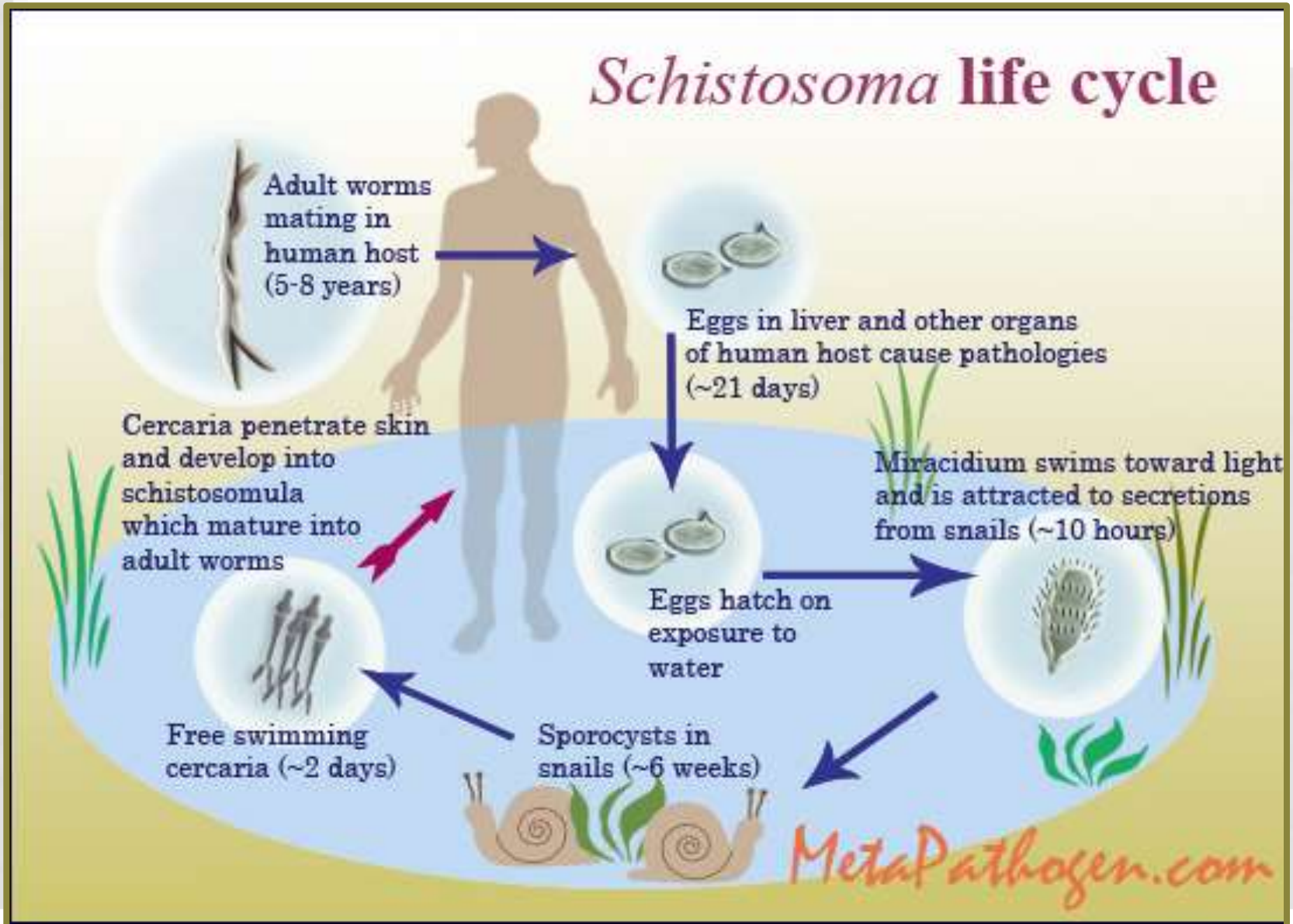
BILHARZIA (SCHISTOSOMIASIS)

- Adult Schistosomes take up residence in various abdominal veins, depending on the species; they are, therefore called **(Blood Flukes)**

Types of Schistosomiasis:

- intestinal Schistosomiasis
- Urinary tract Schistosomiasis

SCHISTOSOMA SPP. LIFE CYCLE



LABORATORY METHODS FOR PARASITES DIAGNOSIS

- Collection of faecal specimens:
  ✓ The container should be free from antiseptics and disinfectants

- ✓ Add some form of preservative

- Microscopic Examination of Wet Mount

- The basic types of wet mount that should be used for each faecal examination are saline, iodine, and buffered methylene blue