


## Medically Important Protozoa ~


Protozoa are a group of unicellular organisms . Many have evolved structural features (organelles) . Reproduction by mitotic binary fission , Although is some protozoal species , sexual (meiotic) reproduction .

Few of protozoan species are pathogenic for humans . Those are Listed as follow .

Pathogenic protozoa :

A- Intestinal :  Entamoeba histolytica (Amoeba)  
Giardia Lamblia (Flagellate )  
Cryptosporidium parvum (sporozoan)  
Balantidium coli (ciliate)

B- Urogenital Trichomonas vaginalis (flagellate)

C- Blood & Tissues  Plasmodium species (sporozoan)  
Toxoplasma gondii (sporozoan )  
Trypanosoma species (Flagellate)  
Leishmania species (Flagellate)

There are important common features that are clinically relevant . e.g. , many protozoa have both :

- A dormant , immotile cyst stage .
- A motile , actively feeding and reproducing , trophozoite stage .

## Intestinal protozoal infections

- 1) Amebic dysentery ( Entamoeba histolytica) ingested cysts from contaminated food or water form trophozoites in small intestine . These pass to the colon , where they feed on intestinal bacteria's and may invade the epithelium , inducing ulceration . Further spread to the liver & cause abscesses .

In the colon , trophozoites form cysts that pass in the feces .

Diagnosis is made by :

- a- Direct examination of fecal samples for motile trophozoites or cysts (contain 1-4 nuclei ) .
- b- Serologic test kits are useful .
- c- Liver abscesses should be biopsied from the abscess edge where the active amebas accumulate .

Infections are treated with metronidazole , iodoquinol .

- 2) Giardiasis ( Giardia lamblia ) .

( Giardia lamblia ) has two life – cycles ;

- a- Binucleate – trophozoite has four flagella .
- b- Drug – resistant , four – nucleate cyst .
- Infection usually results from drinking contaminated water with infective stage (cyst) .
- Infects duodenum , with incubation time of about 10 days .
- Diagnosis by presence of cyst or trophozoites in stool .

Therapy : Metronidazole .

### **Urogenital Tract Infection (Trichomoniasis)**

Trichomoniasis is caused by Trichomonas vaginalis . It is pear – shaped flagellates , with undulating membranes . there is no cyst in the life cycle .

- Infect vagina , vulva , and cervix in females causes inflammation of the mucosal tissue with yellowish , malodorous discharge .
- Less commonly , if infects urethra , prostate , & seminal vesicles in males production white discharge .
- Therapy : Metronidazole .

### **Blood and Tissue protozoal infections**

A- Malaria ( Plasmodium falciparum & other spp.) .

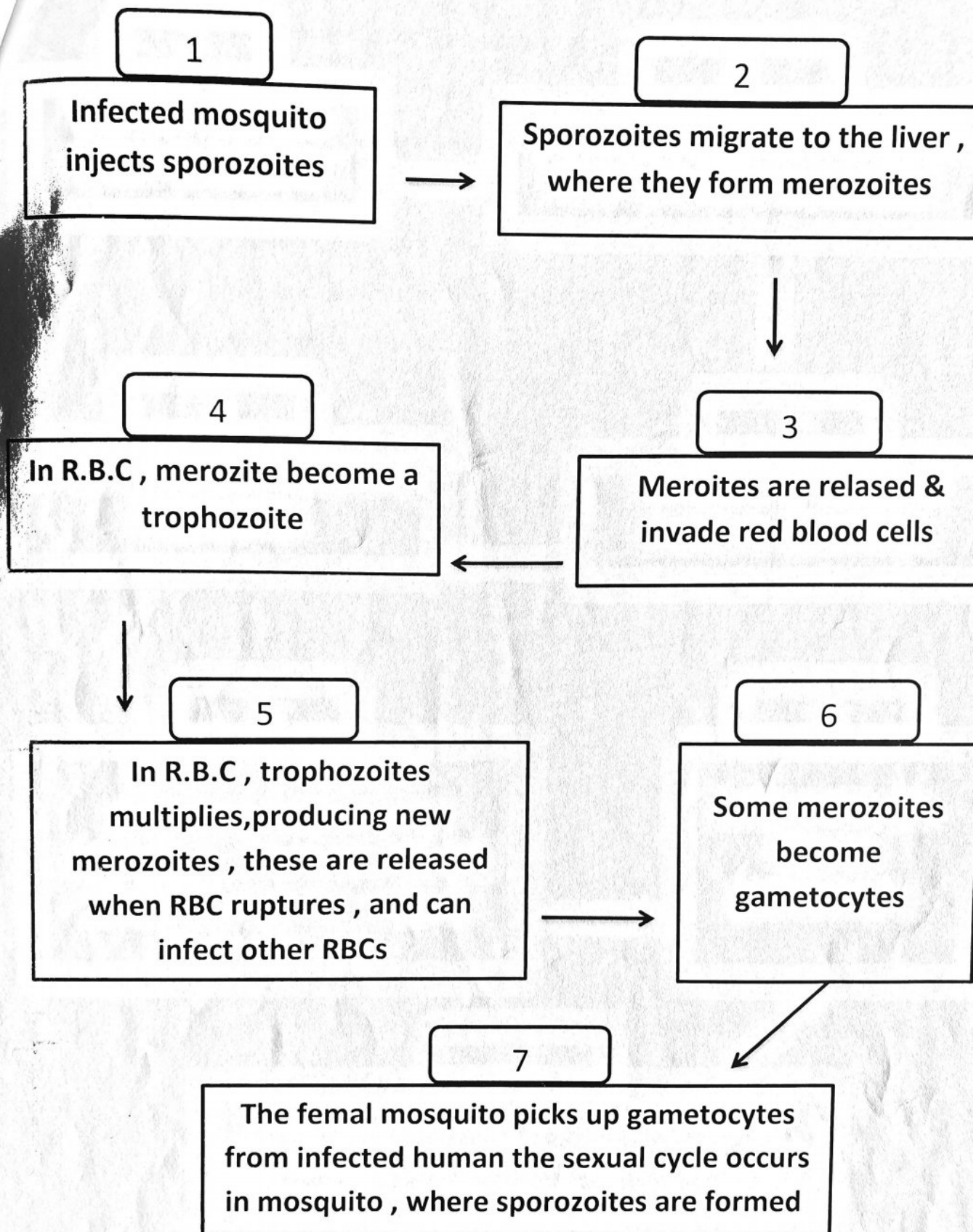
The plasmodial parasite is transmitted to humans through :

- 1- The bite of a female Anopheles mosquito .
- 2- By infected , blood contaminated , needle .
- 3- Blood transfusion .

Sporozoans reproduce asexually in human cells by a process called Schizogony , in which multiple nuclear divisions are followed by envelopment of the nuclei by cell – walls producing merozoites . These inturn , become trophozoites .

Sexual reproduction occurs in the mosquito , where new spores ( sporozoites ) are formed .





Life cycle of malarial parasite, *P. falciparum*

- Large number of RBCs rupture at the same time , a paroxysm (sudden onset ) of fever can resulted from the massive release of toxic substance . RBCs lysis leads to anemia .

- Dix & TRT : Detection of parasite inside RBCs .

- Thick blood smears stained with Giemsa stain .

Thin blood smears stained to determine the species •Treatment with quinine , artemisin , or doxycycline .

#### B- Trypanosomiasis :

Refers to two chronic , fatal diseases (African sleeping sickness & American trypanosomiasis )

- African sleeping sickness is caused by T. gambiense or T. rhodesiense .

- Transmitted by the bite of the tsetse fly . It produce a primary lesion or chancre , then spreads to lymphoid tissue & reproduce extracelluly in the blood . Later , invades CNS causing inflammation of brain & spinal cord . This inflammation produce continuous sleep & death . TRT (suramin ) .

- American trypanosoiasis (chagas disease) caused by T. cruzi . Infection transmitted by insect feces contaminating the conjunctiva or break in the skin .

Acute infection is common in children , chronic infection cause cardiomyopathy .

TRT with nifurtimox .

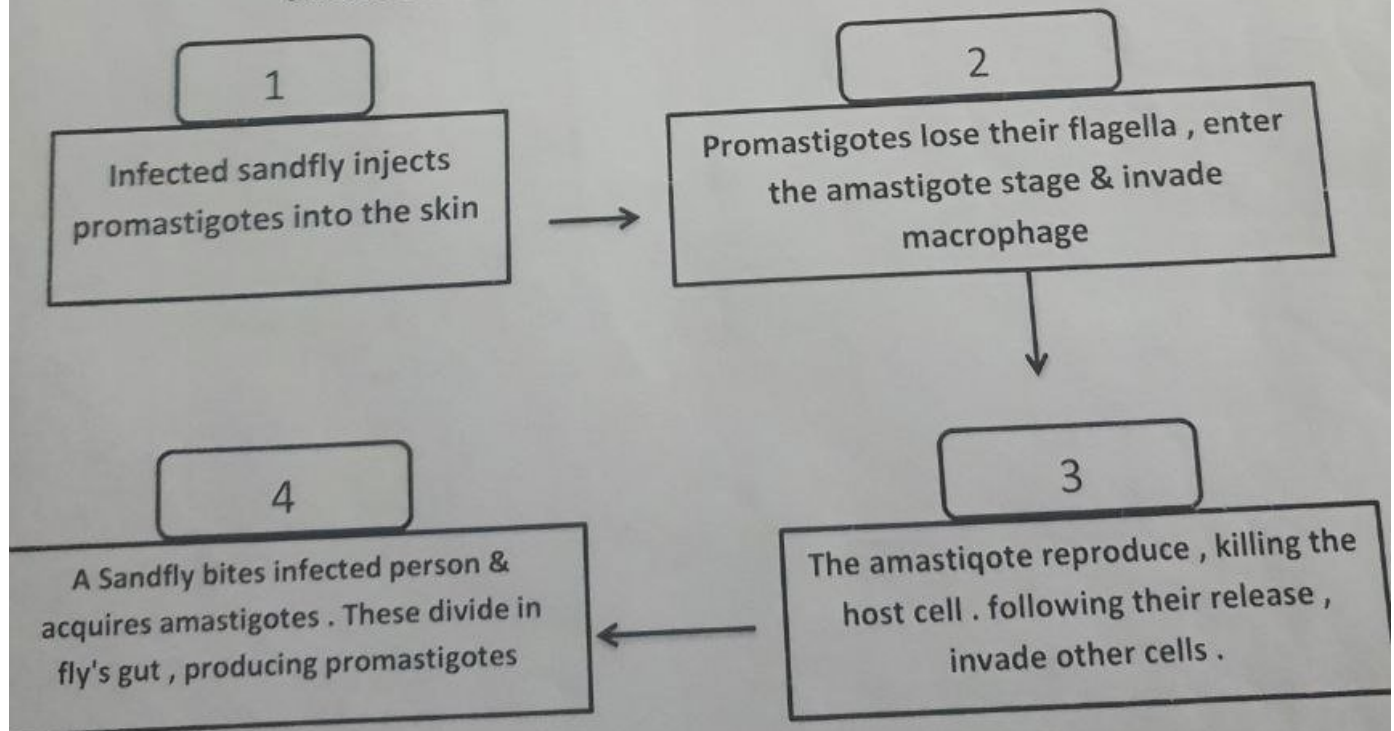
Dix of African trypanosomiasis by detection of motile trypanosomes in Giemsa – stained smears of blood , CSF , and lymph node aspirates .

C- Leishmaniasis : there are three clinical type of leishmaniasis :

1- Cutaneous leishmaniasis ( local name " oriental sore " ) the disease is characterized by ulcerating single or multiple skin sores . most cases heal , but ulcers leave scars .

2- Mucocutaneous leishmaniasis ( local name , espundia ) : In this form of the disease , the parasite attacks tissue at the mucosal – dermal junctions of the nose & mouth , producing multiple lesions .

3- Visceral leishmaniasis ( local name , kala – azar ) : In this type , the parasite initially infects macrophages , which in turn , migrate to the spleen , liver & bone marrow , where the parasite rapidly multiplies . Symptoms include fever & weight loss . Liver & Spleen enlarge , & Jaundice may develop . If the disease untreated , mortality is 100% within 2 years .



**Life cycle of Leishmaniasis**