

MEDICAL PARASITOLOGY

Definitions and Concepts

Medical parasitology

2023-2024

LAB(5)

Protozoa

Phylum: Sporozoa

Class: Haemosporida

Genus: *Plasmodium*

The malarial parasites infecting man, after passing through a develop mental phase in the parenchyma cells of the liver, reside inside the red blood cells and are carried by the circulating blood to all the organs.



Anopheles mosquito

There are four species of *plasmodium* which infect human are well known :-

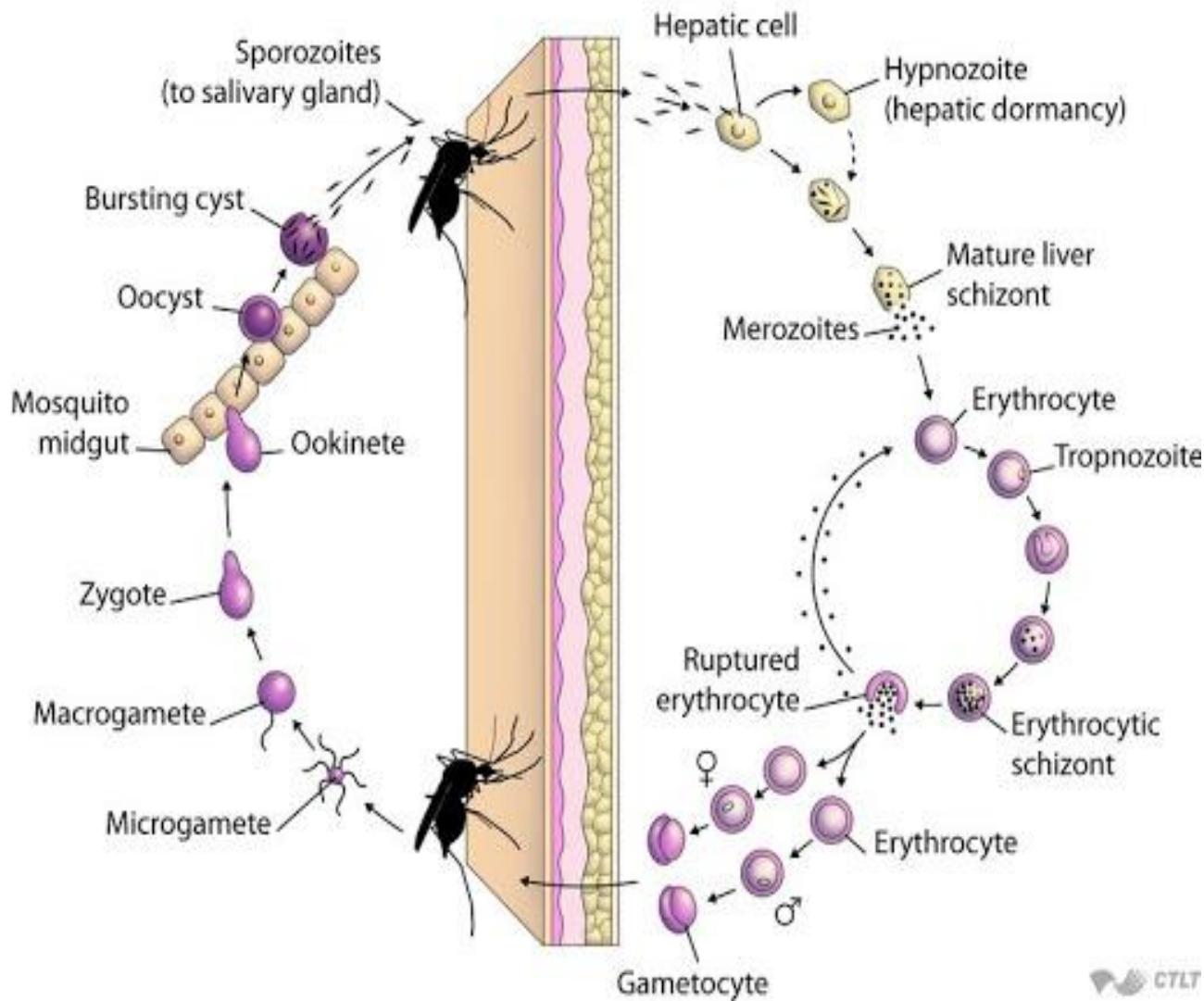
1. *Plasmodium vivax*, which causes benign tertian malaria, fever happen each 48 hour.
2. *Plasmodium ovale*, which causes low benign tertian malaria.
3. *Plasmodium malariae*, which causes quartan malaria, fever happen each 72 hour.
4. *Plasmodium falciparum*, which causes malignant sub - tertian malaria, fever happen in continuously irregular period.


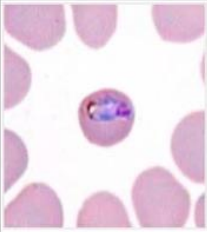
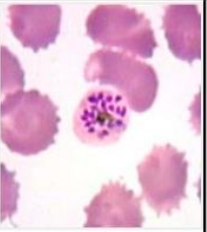
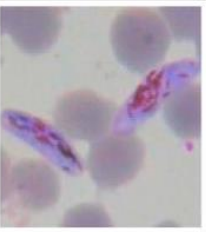
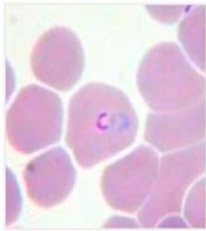
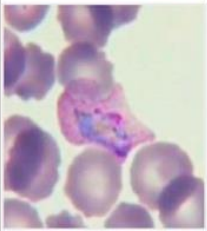
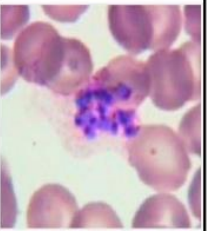
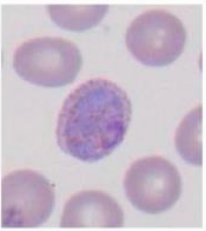
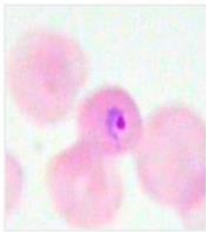
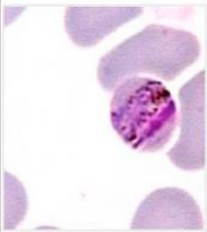
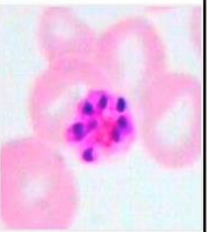
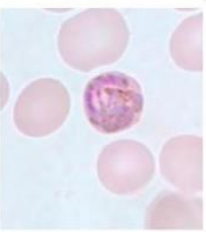

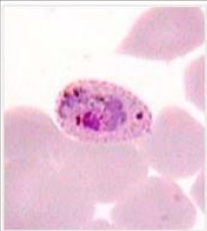
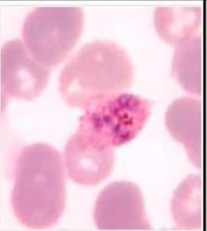
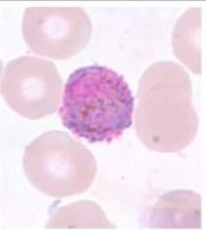
- **Life cycle :-**

Malaria parasites exhibit a complex life cycle involving alternating cycles of asexual division (schizogony) occurring in man (intermediate host) and sexual development (sporogony) occurring in female anopheles mosquito (final host).

Cycle in Mosquito

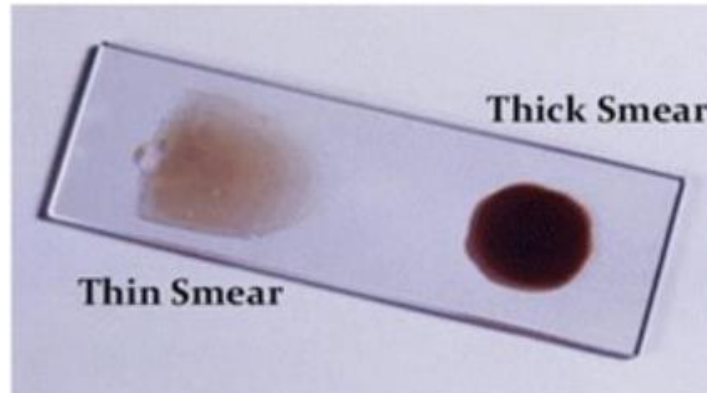
Cycle in Human



Human Malaria					
Stages Species	Ring	Trophozoite	Schizont	Gametocyte	
<i>P. falciparum</i>					<ul style="list-style-type: none"> Parasitised red cells (pRBCs) not enlarged. RBCs containing mature trophozoites sequestered in deep vessels. Total parasite biomass = circulating parasites + sequestered parasites.
<i>P. vivax</i>					<ul style="list-style-type: none"> Parasites prefer young red cells pRBCs enlarged. Trophozoites are amoeboid in shape. All stages present in peripheral blood.
<i>P. malariae</i>					<ul style="list-style-type: none"> Parasites prefer old red cells. pRBCs not enlarged. Trophozoites tend to have a band shape. All stages present in peripheral blood
<i>P. ovale</i>					<ul style="list-style-type: none"> pRBCs slightly enlarged and have an oval shape, with tufted ends. All stages present in peripheral blood.

- **Diagnosis :-**

Diagnosis of malaria can be established by demonstration of malaria parasites in the blood, thick and thin smears of the blood are prepared on the same or different slides. Blood is taken before starting treatment with antimalarials. As well as general test procedure such as test strip and immunologic reaction.



Phylum: Sporozoa

Class: Coccidia

Genus: *Toxoplasma gondii*

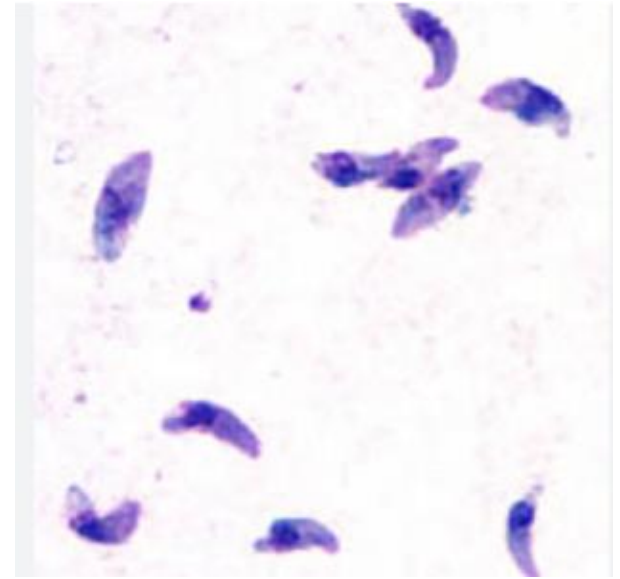
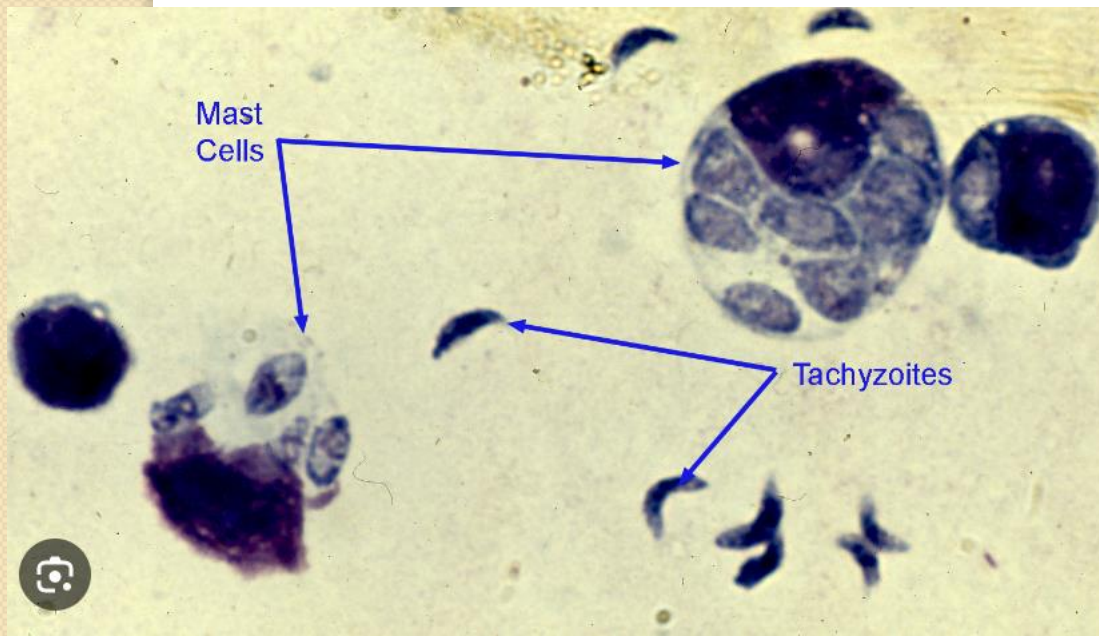
Toxoplasma gondii is an obligate intracellular parasite, that cause disease called toxoplasmosis. This parasite is capable of infecting all warm – blooded animals and humans inside the reticuloendothelial cells many other nucleated cells.

- **Stages of Parasite :-**

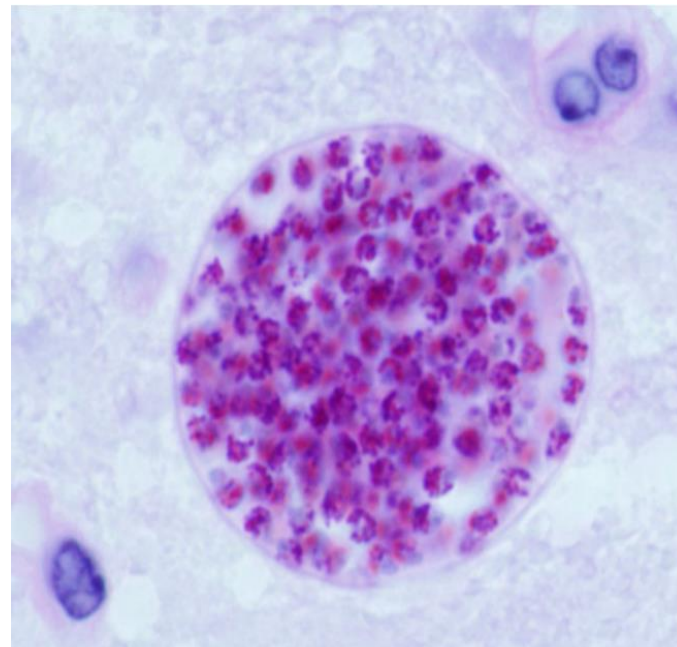
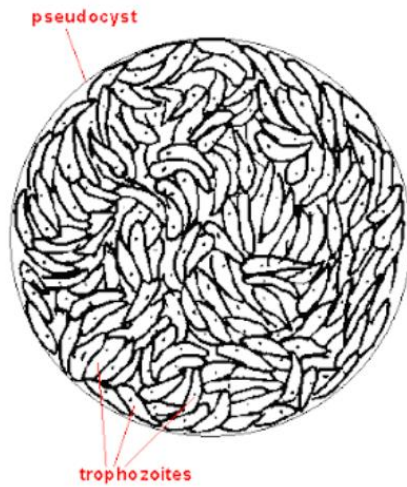
There are three stages for this parasites (all these stages are infectious to man):-

- 1. Tachyzoite**

It is crescent – shaped with a pointed anterior and a rounded posterior end, the nucleus is spherical or rounded and is usually situated towards the central area of the cell. Tachyzoite is the active multiplying form seen during the acute stage of infection. Groups of proliferating tachyzoites within a host cell are known as Pseudocyst.

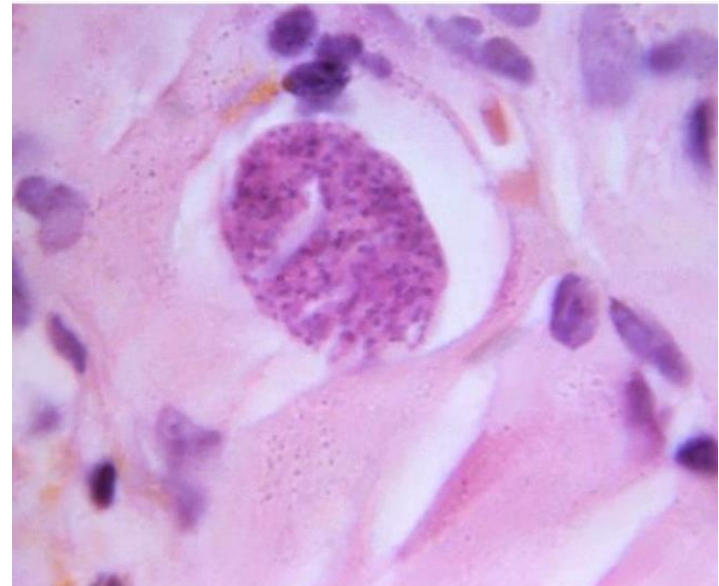
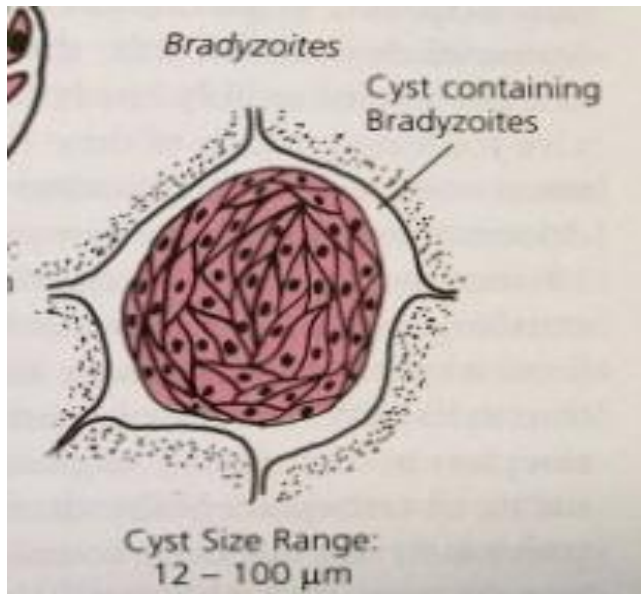


Pseudocyst of *Toxoplasma gondii*



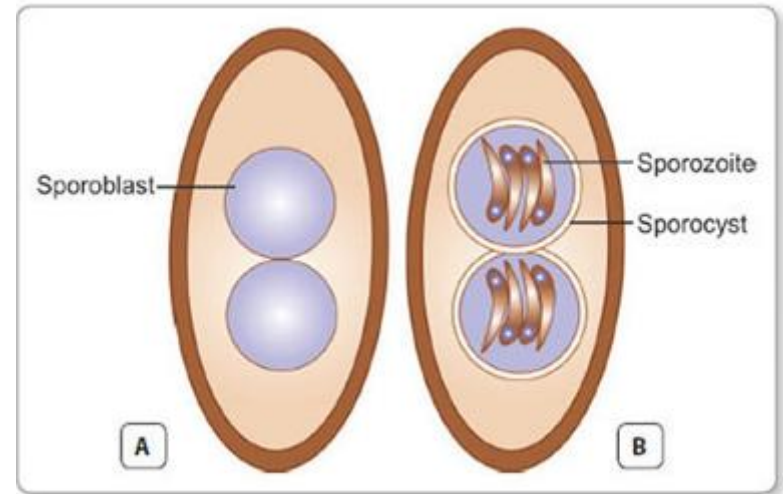
2. Tissue cyst

Tissue cysts occur in chronic infection, these are formed when the parasites multiply and produce a wall within a host cell. The organisms within the cyst are known as bradyzoites, they are crescent-shaped, slender and have a nucleus situated towards the posterior end. Bradyzoites are the slowly multiplying forms of the trophozoites contained in tissue cyst.



3. Oocyst

This stage is present in cat and other felines and not in humans. It is oval or spherical and contains a sporoblast. The oocyst wall contains two colourless layers.



Oocyst

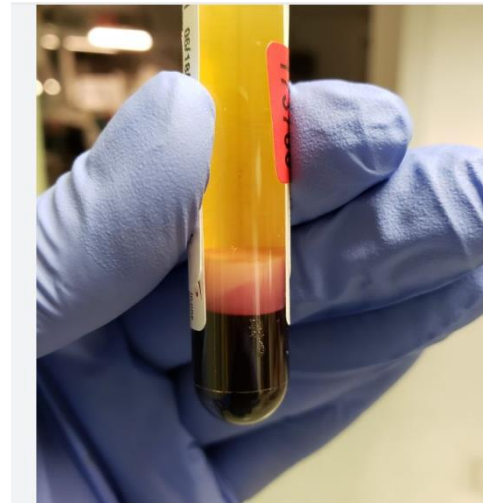
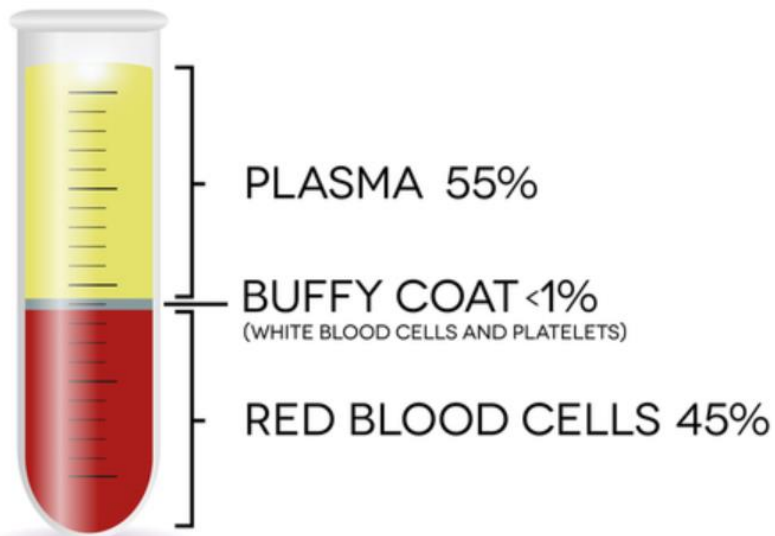
Life Cycle :

Tachyzoites and tissue cysts represent stages of asexual reproduction (schizogony) , while the oocyst is formed by sexual reproduction (gametogony). All three forms occur in domestic cat and other felines which are the definitive hosts and which support both schizogony and gametogony . Only the asexual forms (tachyzoites and tissue cysts are present in other mammals including man and birds, which are the intermediate hosts.

- **Infection in human and other warm- blooded animals can occur :-**
 1. By consuming raw or undercooked meat containing T. gondii tissue cysts.
 2. By ingesting water, soil vegetables, or anything contaminated with oocysts shed in the feces of an infected cat.
 3. Through transmission from mother to fetus, particularly when T. gondii is contracted during pregnancy.

- **Diagnosis :-**

Blood (buffy) coat of hyperinized sample, sputum, bone marrow, cerebrospinal fluid and biopsy material from lymph node, spleen and brain then microscopic examination occur by smears stained with giemsa stain.





THANK
YOU