



## **Phylum: Protozoa:**

### **Class: Sporozoa.**

- Protozoan parasites characterized by the production of spore-like oocysts containing sporozoites were known as **Sporozoa**.
- They live intracellularly, at least during part of their life cycle.
- At some stage in their life cycle, they possess a structure called the apical complex, using which they attach to and penetrate host cells.
- These protozoa are therefore grouped under the Phylum Apicomplexa.

### **Causative Agents of Human Malaria**

- *Plasmodium vivax*: Benign Tertian Malaria
- *Plasmodium falciparum*: Malignant Tertian Malaria
- *Plasmodium malariae*: Benign Quartan Malaria
- *Plasmodium ovale*: Benign Tertian Malaria.

### **Malaria parasite**

#### **Classification**

Malaria parasite belongs to

**Phylum:** *Apicomplexa*

**Class:** *Sporozoa*

**Order:** *Haemosporida*

**Genus:** *Plasmodium*.

#### **Life Cycle**

The malaria parasite passes its life cycle in **2 hosts**.

**Definitive host:** Female *Anopheles* mosquito.

**Intermediate host:** Man.

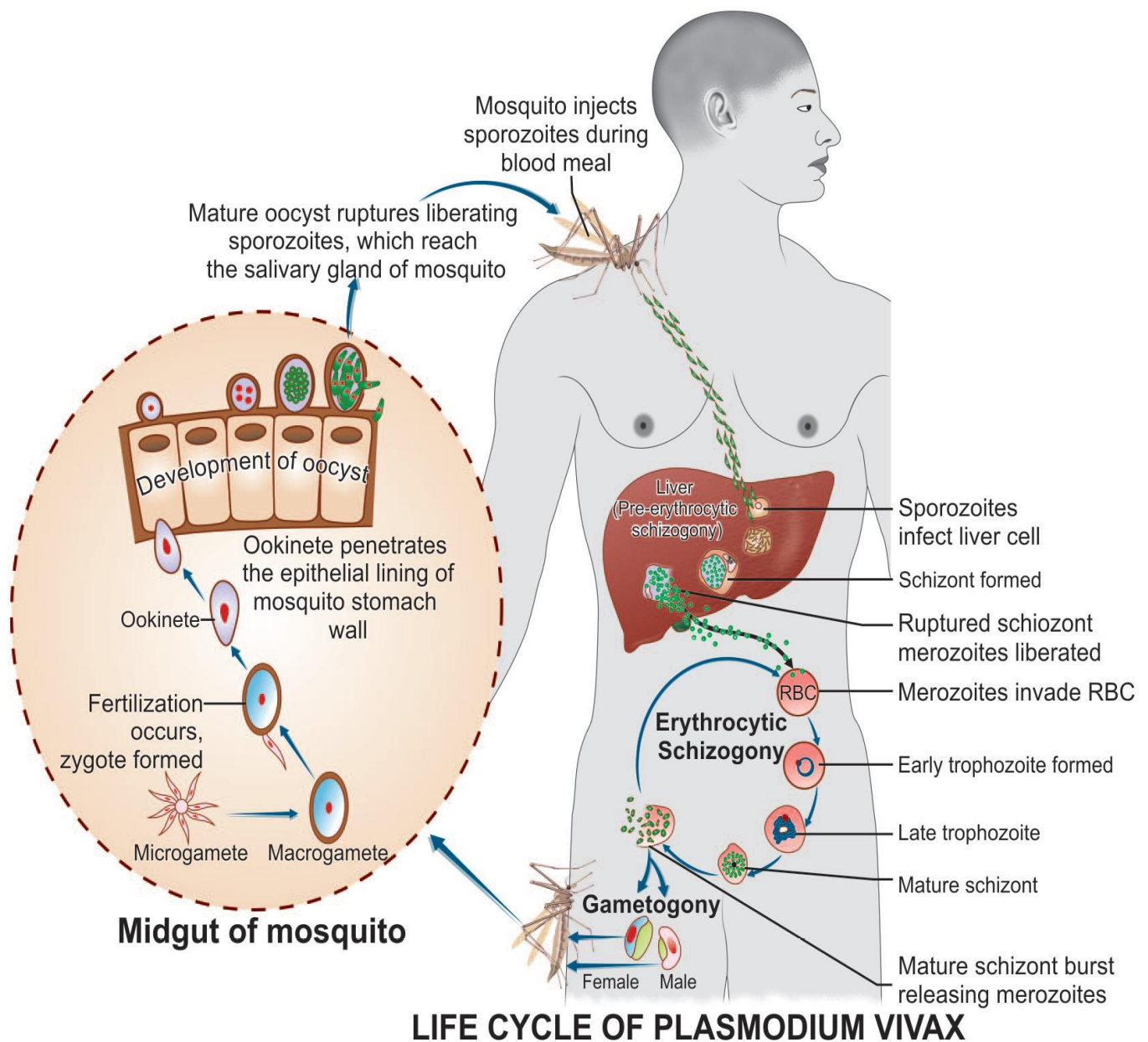
- The life cycle of a malarial parasite comprises 2 stages asexual phase occurring in humans, which act as the intermediate host, and a sexual

Lab 8

phase occurring in the mosquito, which serves as a definitive host for the Habitat

**Asexual phase:** In humans, schizogony occurs in 2 locations—in the red blood cell (**erythrocytic schizogony**) and the liver (**exoerythrocytic schizogony** or the tissue phase).

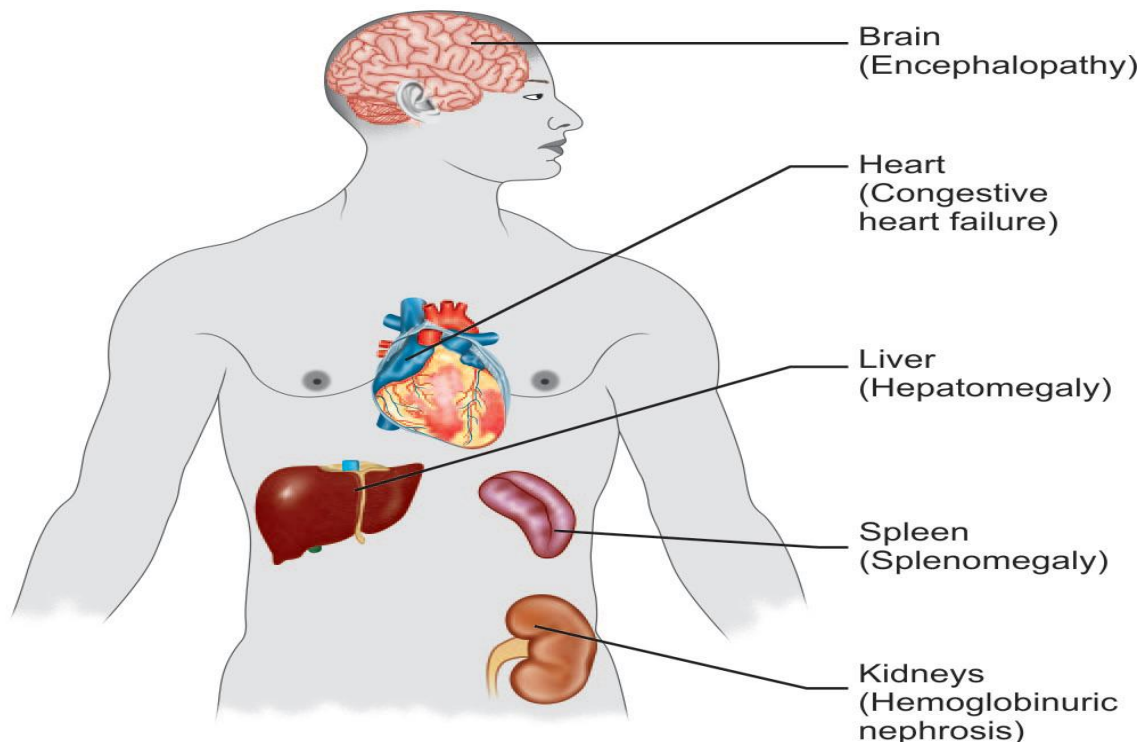
**Sexual phase:** The sexual phase takes place in the female *Anopheles* mosquito, even though the sexual forms of the parasite (**gametocytes**) originate in human red blood cells.





## Pathogenesis

All clinical manifestations in malaria are due to the products of erythrocytic schizogony and the host's reaction to them. The disease process in malaria occurs due to the local or systemic response of the host to parasite antigens and tissue hypoxia caused by reduced oxygen delivery because of obstruction of blood flow by the parasitized erythrocytes.

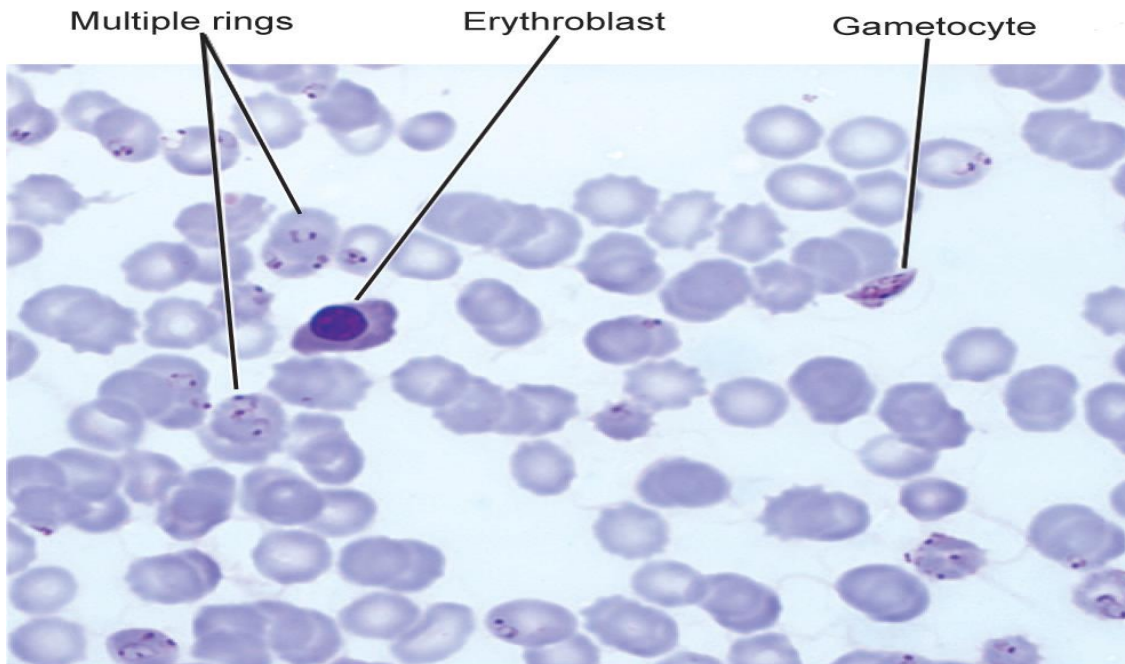


## Laboratory Diagnosis

Diagnosis of malaria can be made by demonstration of malarial parasites in the blood. Two types of smears are prepared from the peripheral blood. One is called a **thin smear** and the other is called a **thick smear**.

- **Thin smears:** They are prepared from the capillary blood of the fingertip and spread over a good quality slide by a second slide held at an angle of  $30^{\circ}$ – $45^{\circ}$  from the horizontal such that a tail is formed.
- **Thick smears:** They can be made on the same slide of thin smears or separately. In a thick film, usually, 3 drops of blood are spread over a small area (about 10 mm).

Lab 8



**Serodiagnosis:**




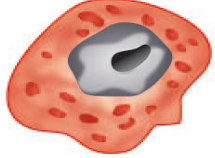
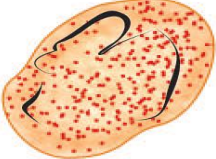


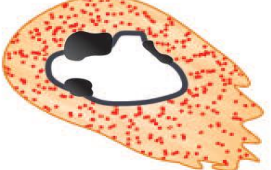
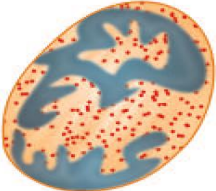


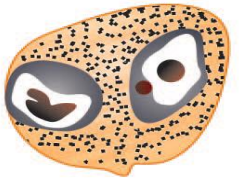
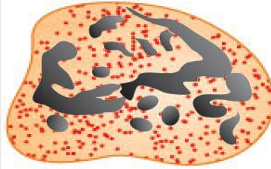
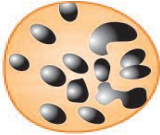


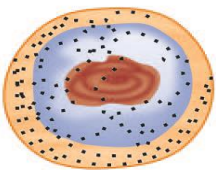


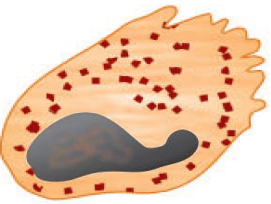
Various serological methods have been developed to detect these antibodies and are as follows:

- **Indirect hemagglutination (IHA)**
- **Indirect immunofluorescence (IIF)**
- **Enzyme-linked immunosorbent assay (ELISA)**





Lab 8

		<i>P. vivax</i>	<i>P. falciparum</i>	<i>P. malariae</i>	<i>P. ovale</i>
Trophozoites	Early				
	Late				
Schizonts	Early				
	Mature				
Gametocytes	Male				
	Female	