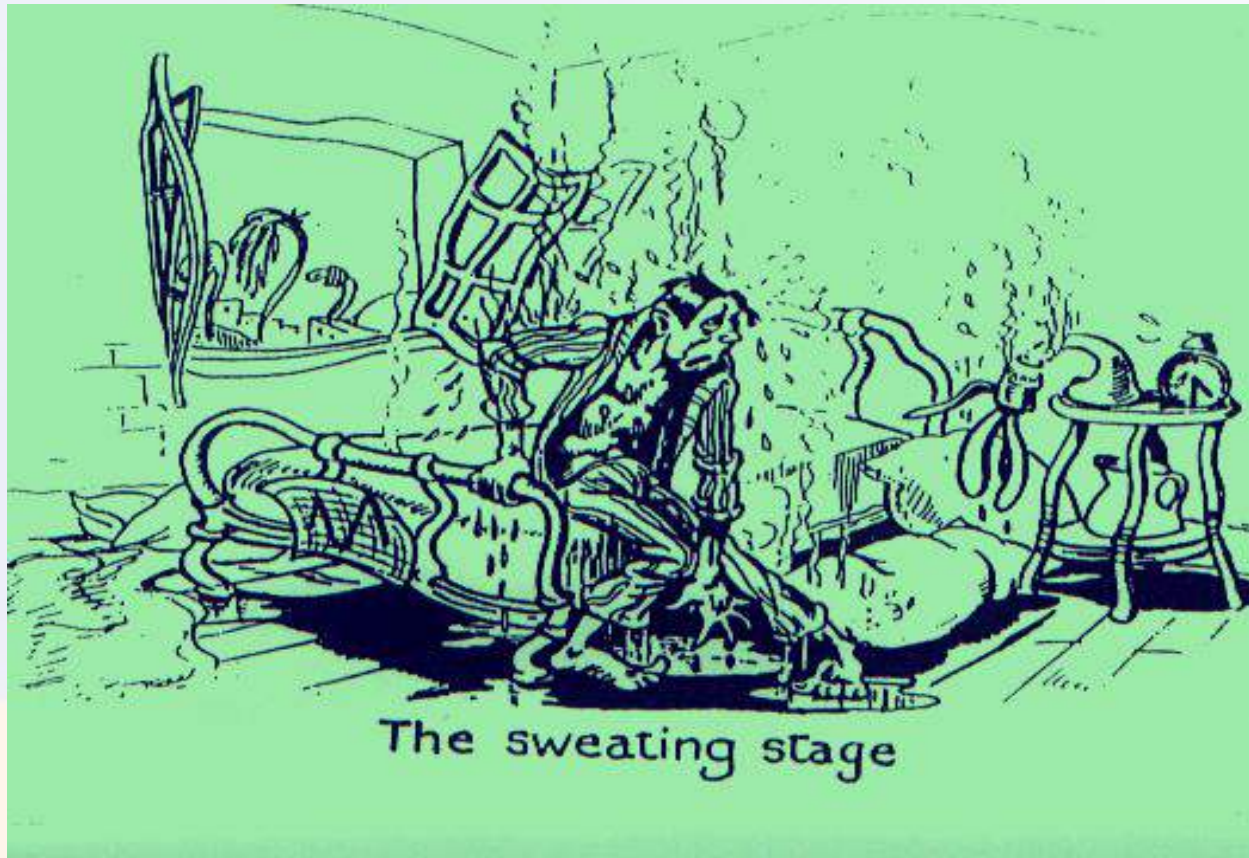


# Malaria



**Sweating stage**, fever ends by a crisis of profuse sweating.

# Malaria



The **periodicity** of the attack varies with the species of the infecting parasite.

- 1) In *P. vivax* is 48 hrs (**benign tertian**)
- 2) In *P. ovale* is 48 hrs (**ovale tertian**)
- 3) In *P. malariae* 72 hrs (**quatrain**).
- 4) In *P. falciparum* typical tertian is not usual in it, so it is called **malignant tertian**.

# Malaria

**Anaemia** after few paroxysms, anemia of **microcytic or normocytic hypochromic** type develops as a result of:

1. Mechanical destruction of parasitized RBCs.
2. Reduced erythropoiesis in the bone marrow.
3. Lysis and phagocytosis of uninfected RBCs.
4. In a small number of patients with malignant tertian malaria there is autoimmune destruction of RBCs.
5. Consumption of more than 70% of haemoglobin in RBCs by the parasite.
6. Failure of the liver to convert liberated iron.

# Malaria



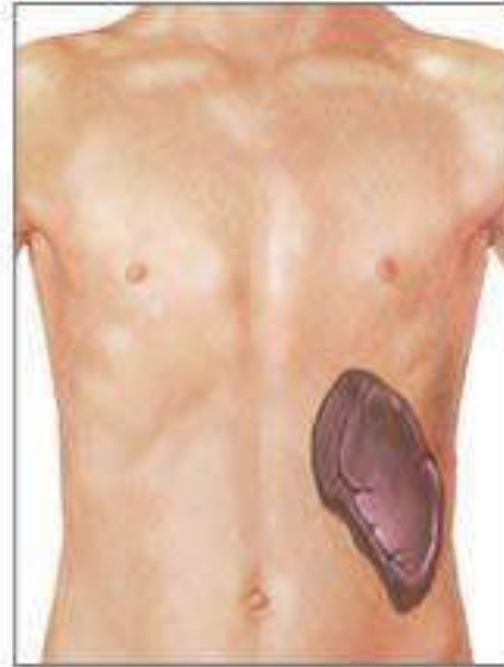
**Splenomegaly:** After few paroxysms, spleen gets enlarged and becomes palpable. Splenomegaly is due to massive proliferation of macrophages which phagocytize both parasitized and non-parasitized RBCs.

**Jaundice** can also occur due to rupture of RBCs.

# Malaria



Normal spleen



Splenomegaly



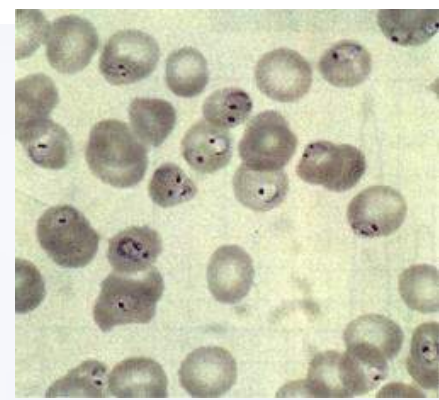
# Malignant malaria



Sever malaria (malignant ) is caused by *P. falciparum* may be fatal , hence it is called pernicious malaria :

1. Cerebral Malaria :
2. Blackwater fever:
3. Anemia :
4. Hypotension \ shock : also called Algid Malaria
5. Hypoglycemia :
5. Pulmonary edema :
6. Bleeding from gum, nose and gastrointestinal tract .
7. Renal failure :
8. Pregnant women have an increased risk of abortion, stillbirth, premature delivery and of low birth weight of their infants.

# Malaria



## . Diagnosis:

1. **Clinical picture** is highly suggestive, esp. the characteristic paroxysm.
2. **Microscopic identification** of parasite (stages) in blood film is the method most frequently used to demonstrate an active infection.
3. **Ab detection** can detect past (not active) infections.
4. **Rapid Diagnostic tests (RDTs)** are based on detection of Ag derived from lysed blood cells using immunochromatographic methods.
5. **Molecular diagnostic techniques** can complement other tests, esp. in species identification like PCR

## LABORATORY DIAGNOSIS

---laboratory diagnosis of malaria is confirmed by the demonstration of malarial parasites in

**the blood film** under microscopic examination.

- Thin film
- Thick film







## SEROLOGY IN MALARIA

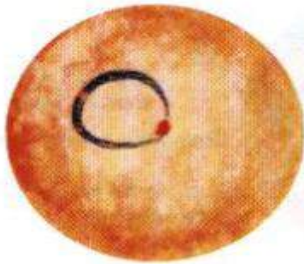


- Serology detects antibodies against malaria parasites, using either indirect immunofluorescence (IFA) or enzyme-linked immunosorbent assay (ELISA). Serology does not detect current infection but rather measures past exposure.

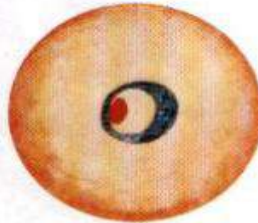
# Stages in thin films

## Ring forms (early trophozoites)

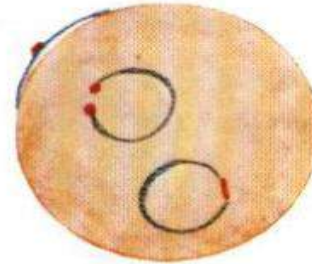
*P. vivax*



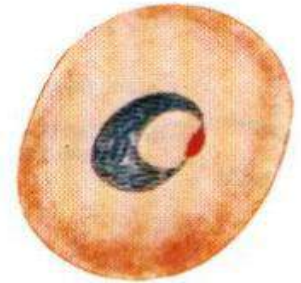
*P. malariae*



*P. falciparum*



*P. ovale*



## Developing trophozoites

*P. vivax*



*P. malariae*



*P. falciparum*

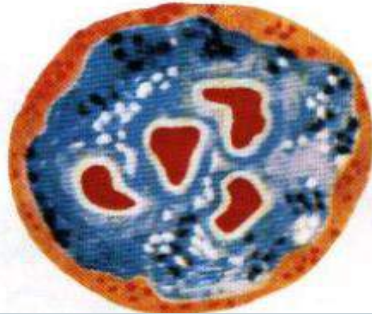


*P. ovale*



## Immature schizonts

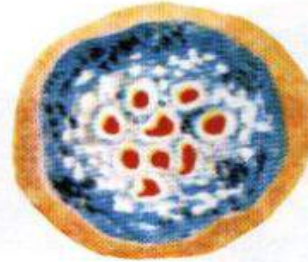
*P. vivax*



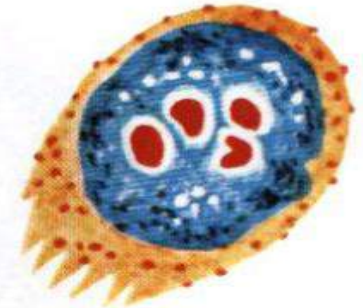
*P. malariae*



*P. falciparum*

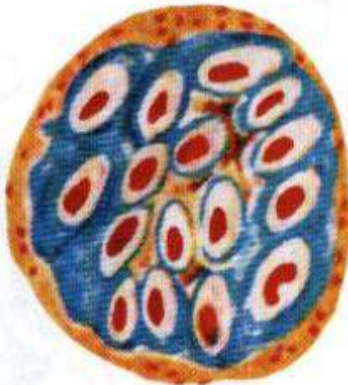


*P. ovale*



## Mature schizonts

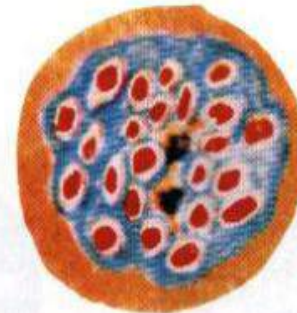
*P. vivax*



*P. malariae*



*P. falciparum*



*P. ovale*



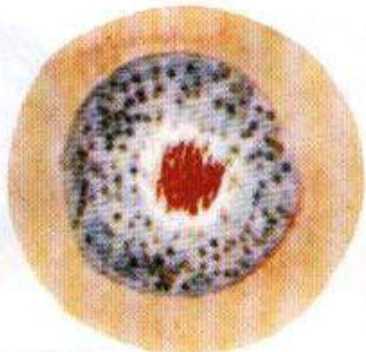


**Microgametocytes (male)**

*P. vivax*



*P. malariae*



*P. falciparum*

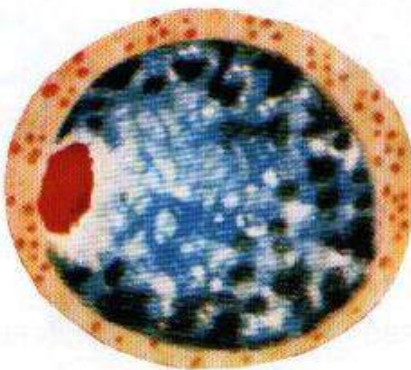


*P. ovale*



**Macrogametocytes (female)**

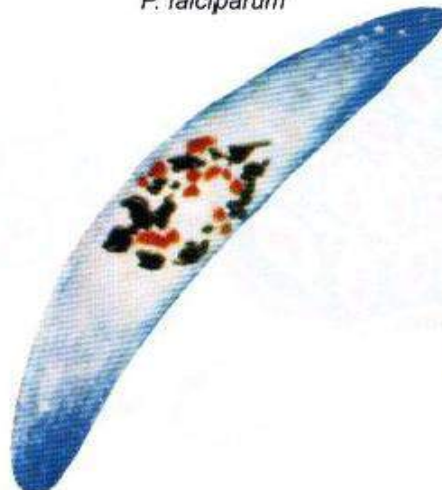
*P. vivax*



*P. malariae*



*P. falciparum*



*P. ovale*





1. Ring forms, small fine rings often broken
2. Trophozoites, markedly irregular cytoplasm
3. Schizonts, many (average 16) small merozoites
4. Gametocytes, compact parasites with features of ♂ and ♀ as described
5. White blood cell



*P. malariae* and *P. ovale*

Almost identical but James' dots may be visible in the latter



1. Ring forms, compact rings
2. Trophozoites, solid regular cytoplasm
3. Schizonts, few (average 8) large merozoites
4. Gametocytes, very difficult to distinguish from *P. vivax*
5. White blood cell

*P. falciparum*



1. Ring forms, very small, fine rings usually unbroken trophozoites (with vacuolated cytoplasm) and schizonts are rarely seen in peripheral blood
2. Gametocytes, characteristic crescentic ♂ and ♀ forms
3. White blood cell