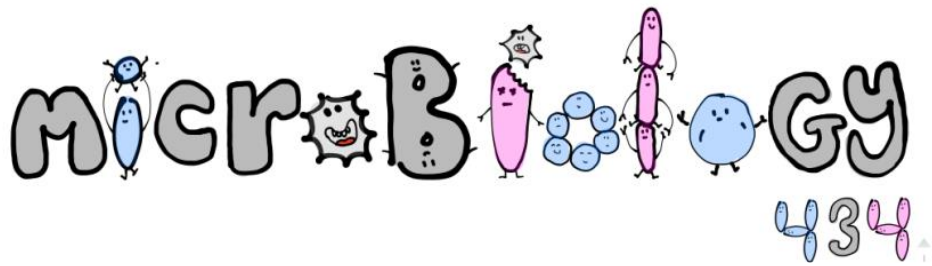


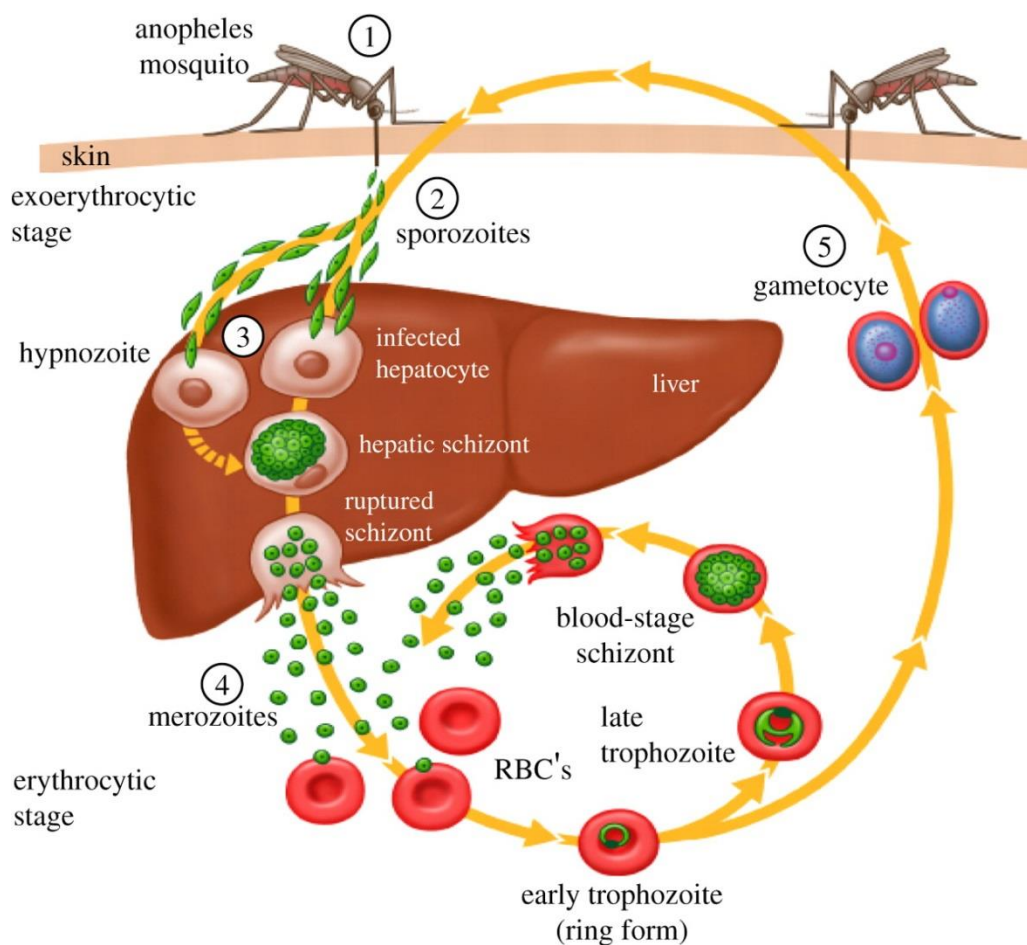
MALARIA



Life cycle:

1. Mosquito on the skin vomit **sporozoites** and takes blood
2. Sporozoites Enter the blood stream and Travel into hepatocytes & proliferate to form **schizont**. (inside hepatocytes)
3. Rapture of the schizont and releasing of the **merozoites**
4. Merozoits penetrate RBCs & become **trophozoites**
5. Proliferate inside the RBC to form **schizont**. (inside the RBC)
6. Rupturing of scizont leads to onset of the symptoms (parasitemia)

- The first cell get injured liver cells
- The main pathology cause **RBCs lysis**
- Infective stages to human **sporozoites**
- Infective stages to Mosquito **Gametocytes [male + female]** after the mosquito is infected it transforms the gametocytes into sporozoites by its salivary glands and the cycle begins
- Mosquito is **definitive host** [it has the sexual stage]



The 5 types of malaria :

[each one has different fever pattern specific for it] [the disease is malaria but the organism is called plasmodium]

1) **plasmodium falciparum** → very **sever**

[huge amounts of merozoite proliferation → can stick to capillaries and cause stasis and capillary constriction → ischemia]

2) **plasmodium vivax** → **relapce** * merozoites hide in the liver for long periods of time*

3) **plasmodium oval** → **relapce** *merozoites hide in the liver for long periods of time *

4) **plasmodium malaria** → not very severe

5) **plasmodium knowlesi** *zoonotic from **monkeys***

[common in **south KSA**]

Uncomplicated malaria	Refractory
<p>Usually human be infected with malarial parasite other than P.falciparum.</p> <p>Symptomatic infection with malaria parasitemia without signs of severity and/or evidence of vital organ dysfunction</p>	<p>can occur when human is infected with P.vivax or P.ovale due to presence of hypnozoites as latent parasite in the liver cells.</p>

Clinical signs & symptoms of malaria

1. Chills
2. Fever
3. Sweating

Malarial Paroxysm		
cold stage	Hot stage	Sweating stage
feeling of intense cold vigorous shivering lasts 15-60 minutes	intense heat dry burning skin throbbing headache lasts 2-6 hours	profuse sweating declining temperature exhausted and weak → sleep lasts 2-4 hours

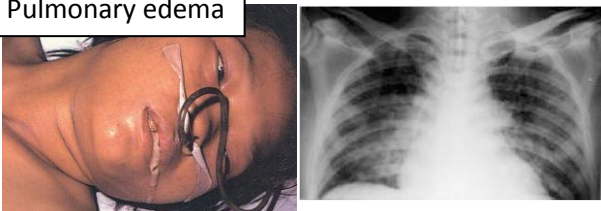
Clinical picture :

- a) **Acute disease Non-severe**
 1. Acute Febrile disease [other plasmodium]
 2. Severe malaria e.g.Cerebral Malaria **plasmodium falciparum** cause death
- b) **Chronic Disease** [progressive]
 1. **Chronic Asymptomatic Infection** lead to Anemia → development disorder – transfusion and death
 2. **Infection During Pregnancy** lead to Placental Malaria → low baby body weight → ↑ mortality rate

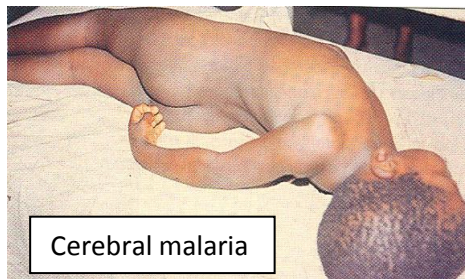
Severe malaria is defined as symptomatic malaria in a patient with P. falciparum with one or more of the following complications:

- **Cerebral malaria** (*unrousable coma not attributable to other causes*).
- Generalized convulsions
- **Severe normocytic anaemia**
- Hypoglycemia
- Metabolic acidosis with respiratory distress
- Fluid and electrolyte disturbances
- Acute renal failure
- Acute **pulmonary edema** and adult respiratory distress syndrome
- Abnormal bleeding
- **Jaundice**
- **Haemoglobinuria [blackwater fever]**
- Circulatory collapse, shock, septicaemia
- Hyperparasitaemia

Pulmonary edema



Cerebral malaria

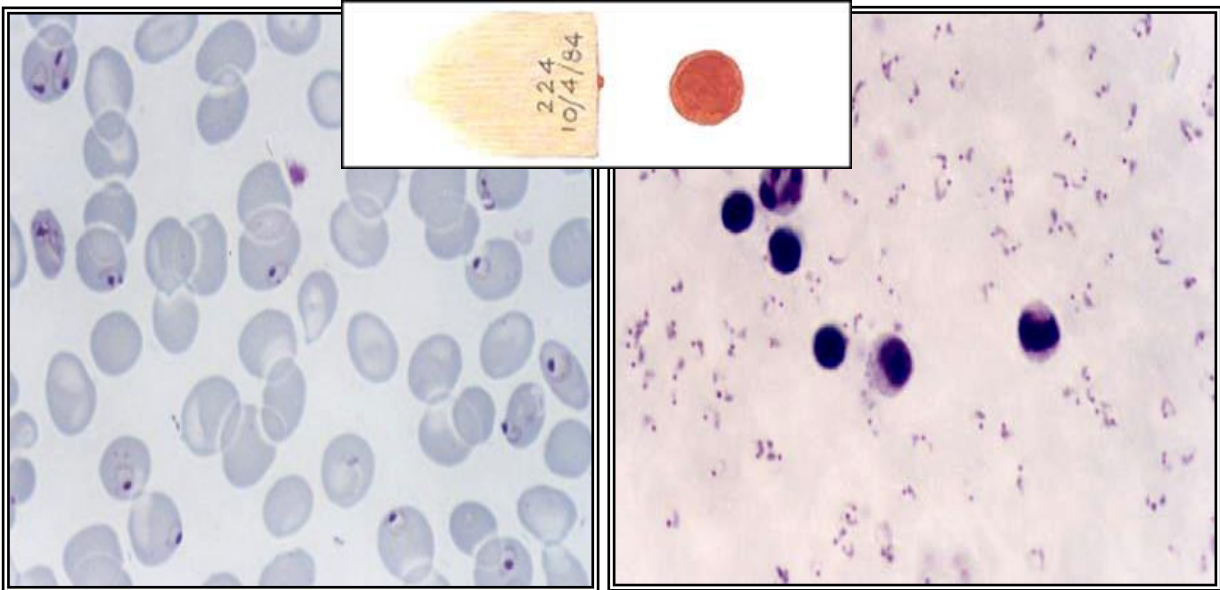


Severe anemia



Diagnosis:

- 1- the gold standard is light **microscopy** [Parasite density - Species diagnosis - Monitoring response to treatment]
- 2- Rapid diagnostic tests [RTDs] → plastic cassette – card - Dipstick – hybrid [cassette \ dipstick]

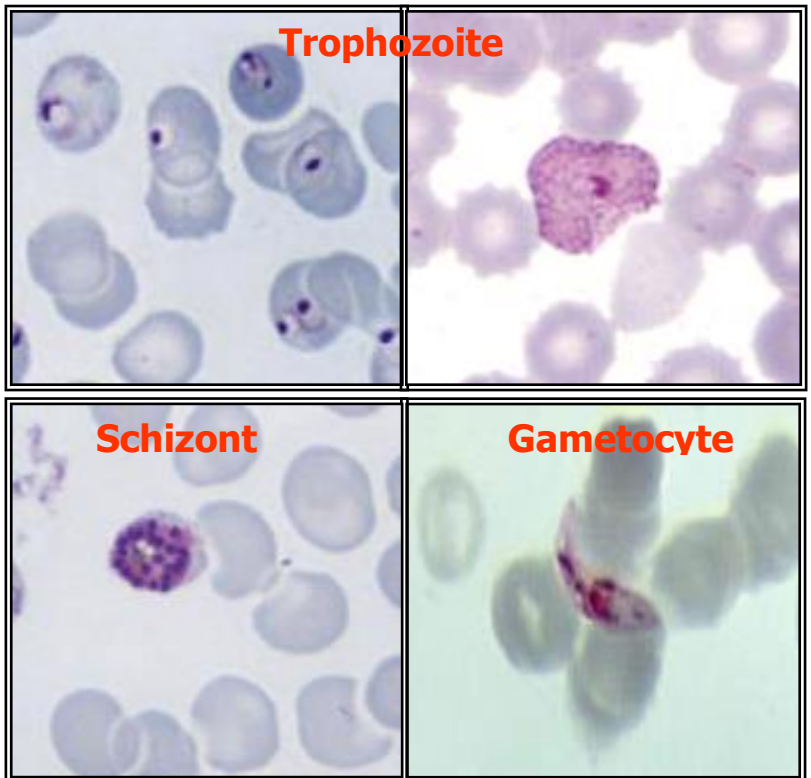


Plasmodium falciparum
(trophozoite stage in thin smear)
For diagnosis and knowing the type of malaria

Plasmodium falciparum
(trophozoite stage in thick smear)
For screening

Three developmental stages seen in blood films:

- 1- Trophozoites
- 2- Schizont
- 3- Gametocyte



Treatment:

- primaquine – chloroquine

MCQs:

- 1- **Which one of the following plasmodium species form Hyponozoit in its lifecycle.**
 - a- Plasmodium falciparum
 - b- Plasmodium malariae
 - c- Plasmodium vivax
 - d- Plasmodium knowlesi

- 2- **Which one of the following is NOT true regarding malaria:**
 - a- Mosquitos are intermediate host in the lifecycle.
 - b- Malaria is a disease caused by a parasitic infection.
 - c- The primary pathology of malaria is RCBs
 - d- Plasmodium falciparum causes sever malaria.

- 3- **Which of the following is an infectious stage to the human body:**
 - A- Gametocytes
 - B- Blood-stage schizont
 - C- Soprozoites
 - D- Trophozoites

- 4- **Which one of the following cells is the first to be infected:**
 - A- Brain cells
 - B- Hepatocytes
 - C- RBCs
 - D- Skin cells

- 5- **Which of the following is the best diagnostic test for malaria:**
 - A- Blood culture
 - B- Electron microscope
 - C- Rapid diagnostic test (RDTs)
 - D- Light microscope

- 6- **Which one of the following is a complication of sever malaria:**
 - A- Cerebral malaria
 - B- Acute pulmonary edema
 - C- Death
 - D- All

- 7- **Which of the following is the infectious stage to the female mosquito:**
 - A- Gametocytes
 - B- Blood-stage schizont
 - C- Soprozoites
 - D- Trophozoites

- 8- **Which of the following is not a diagnostic stage of malaria (can NOT be seen under light microscope):**
 - a- Hynozoite
 - b- Trophozoite
 - c- Schizont
 - d- Gametocytes

Answers: C – A – C – B – D – D – A – A