Department of biology

((Parasites))

2 stage

Lab 6

Plasmodium (Malaria)

By

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Malaria

Malaria is caused by a single-celled parasite of the genus plasmodium. The parasite is transmitted to humans most commonly through mosquito bites

Malaria is caused by a parasite that spreads to humans through the bites of infected female Anopheles mosquitoes. The Plasmodium parasites that infect people with malaria cannot survive outside of their hosts: humans and Anopheles mosquitoes

There are more than 150 blood parasites of the genus Plasmodium. However, only five species of malaria parasites cause significant disease in humans:

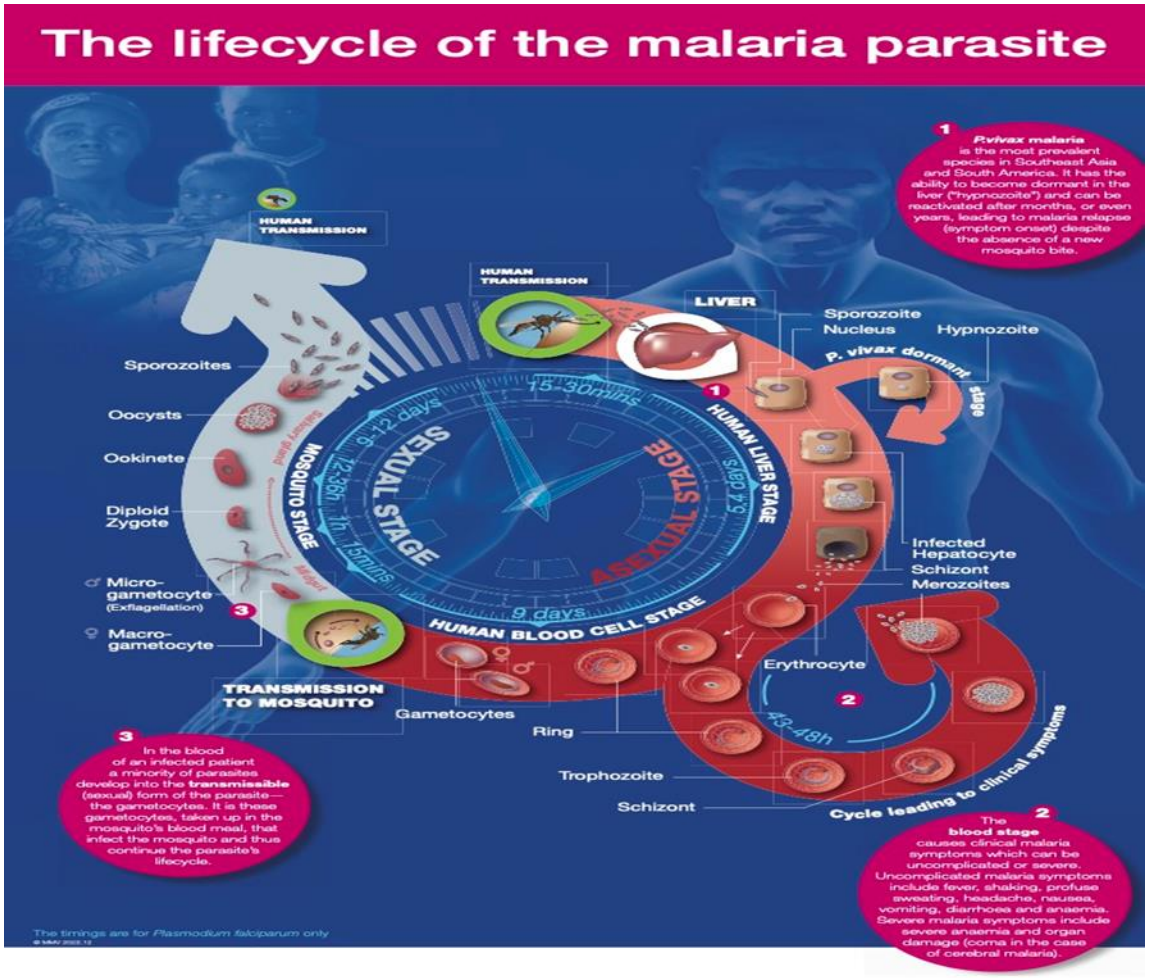
- Plasmodium falciparum – the most prevalent, causes the majority of severe malaria cases and deaths.
- Plasmodium vivax – the main cause of relapsing malaria, with a blood and a liver infection causing acute and ongoing symptoms.
- Less prevalent : Plasmodium , Oval Plasmodium , and Plasmodium Knowlesi

What are the lifecycle stages of the malaria parasite in the Anopheles mosquito?

- Lifecycle stages in the mosquito begin when an insect feeds on the blood of a person infected with malaria, in whom the parasites exist as mature male and female pre-reproductive cells called

gametocytes. These gametocytes are taken into the mosquito gut when it feeds, where they develop further into male and female gametes.

- A male gamete fertilizes the female one to form a zygote. The zygote then enlarges to form an ookinete that migrates to the outer wall of the mosquito gut, where parasites named oocysts at this stage multiply several times. Eventually, the new parasites are released and migrate to the mosquito's salivary glands, ready for transmission to another human.
- When the mosquito bites another human, the parasites, now called sporozoites leave the mosquito salivary gland and enter the human skin making their way, ultimately, to the human liver.


The lifecycle of the malaria parasite
HUMAN TRANSMISSION
HUMAN TRANSMISSION
LIVER
Sporozoite
Nucleus
Hypnozoite
P. vivax dormant stage
Sporozoites
Oocysts
Ookinete
Diploid Zygote
Micro-gametocyte (Exflagellation)
Macro-gametocyte
MOSQUITO STAGE
SEXUAL STAGE
ASEXUAL STAGE
15-30mins
9-12 days
12-36h
1h
15mins
HUMAN LIVER STAGE
5-9 days
9 days
HUMAN BLOOD CELL STAGE
Infected Hepatocyte
Schizont
Merozoites
Erythrocyte
48-48h
TRANSMISSION TO MOSQUITO
Gametocytes
Ring
Trophozoite
Schizont
Cycle leading to clinical symptoms
1 P.vivax malaria is the most prevalent species in Southeast Asia and South America. It has the ability to become dormant in the liver ("hypnozoite") and can be reactivated after months, or even years, leading to malaria relapse (symptom onset) despite the absence of a new mosquito bite.
2 The blood stage causes clinical malaria symptoms which can be uncomplicated or severe. Uncomplicated malaria symptoms include fever, shaking, profuse sweating, headache, nausea, vomiting, diarrhoea and anaemia. Severe malaria symptoms include severe anaemia and organ damage (coma in the case of cerebral malaria).
3 In the blood of an infected patient a minority of parasites develop into the transmissible (sexual) form of the parasite—the gametocytes. It is these gametocytes, taken up in the mosquito's blood meal, that infect the mosquito and thus continue the parasite's lifecycle.
The timings are for Plasmodium falciparum only
Defeating Malaria Together
MMV
Medicines for Malaria Venture
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