

Plasmodium – Life cycle

(Part -3)



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Plasmodium –Lifecycle



Four Stages of Plasmodium Lifecycle

- *Pre-erythrocytic cycle*
- *Exo-erythrocytic cycle*
- *Erythrocytic cycle*
- *Sexual cycle*

Plasmodium –Lifecycle



Erythrocytic Cycle

- Merozoites infect red blood cells
- Inside the red blood corpuscles, the merozoites develop into trophozoites
- As trophozoite grows in size, a central vacuole develops in its body and nucleus is pushed to one side .
- This stage is called signet ring stage
- The signet ring trophozoite grows and becomes amoeboid

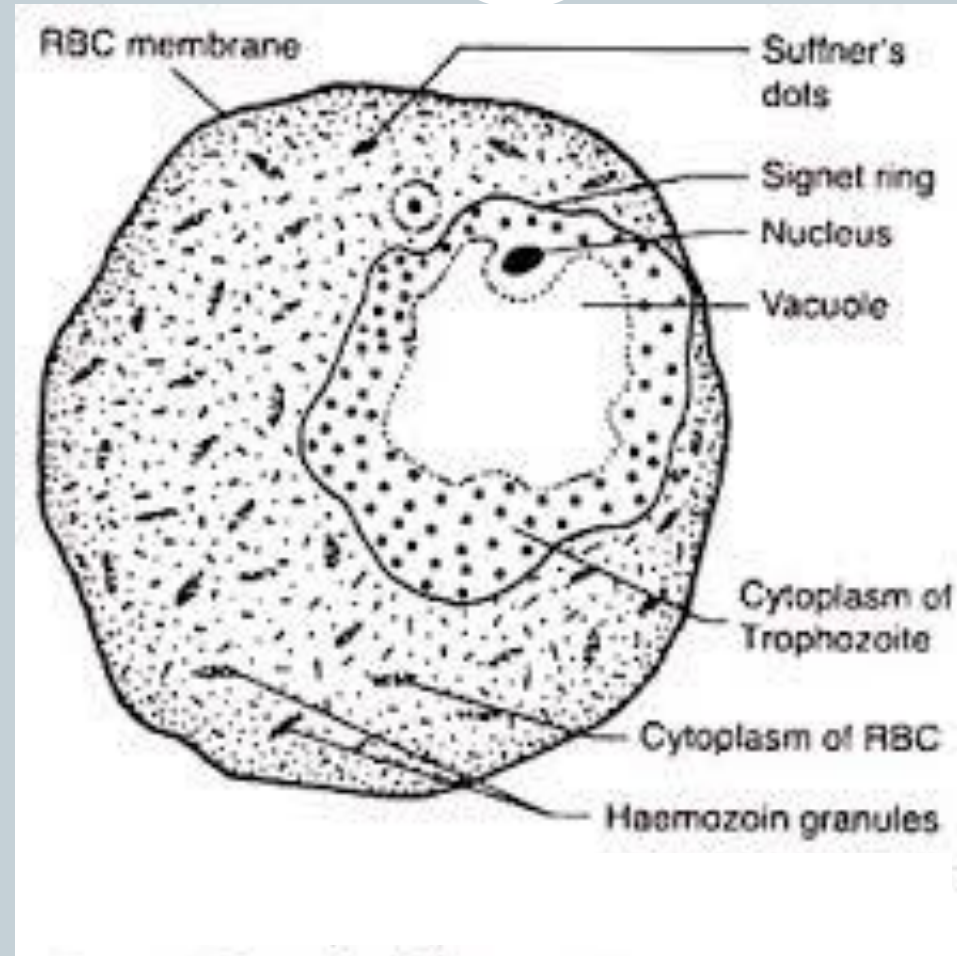
Plasmodium –Lifecycle



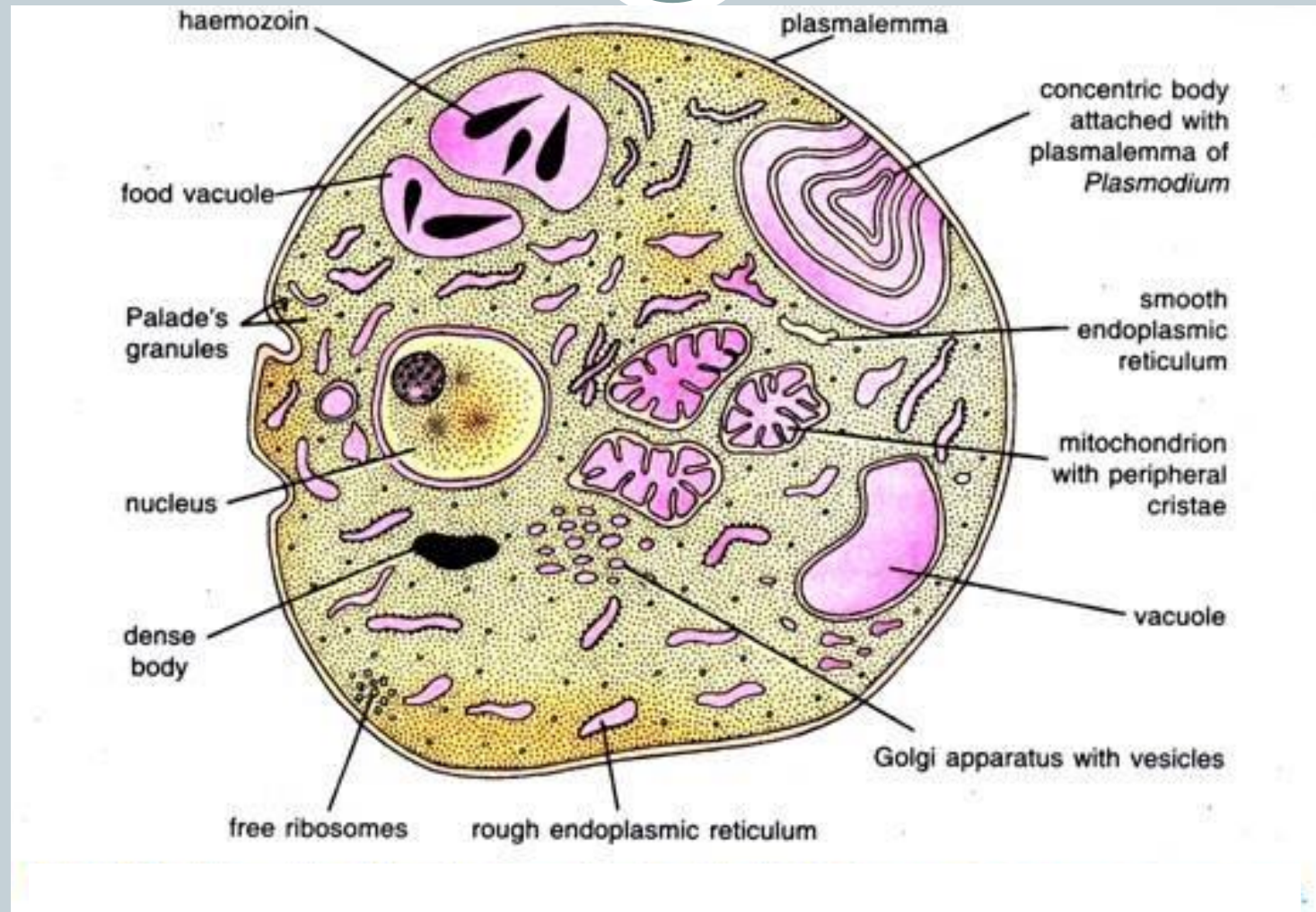
Erythrocytic Cycle contd..

- The amoeboid trophozoite grows in size and becomes rounded and develops into schizonts
- Thus trophozoites finally mature into schizonts
- In about 48 hours, a trophozoite become fully grown and it multiplies by schizogony (erythrocytic schizogony)
- When the schizonts burst, a number of erythrocytic merozoites are set free

Structure of Signet Ring stage



Ultrastructure of Trophozoite



Plasmodium –Lifecycle



Erythrocytic Cycle .. Contd..

- After many generation of schizogony in the blood , some merozoites differentiate into gametocytes
- The gametocytes are of two types
 - Microgametocyte- male
 - Macrogametocyte – female
- The gametocytes are infective to the mosquito and are incapable of any further change in human blood

Plasmodium –Lifecycle



Sexual Cycle

- When a female anopheles mosquito bites an infected person containing gametocytes in RBCs, the ingested blood fills its stomach.

Plasmodium –Lifecycle



Sexual Cycle ... contd..

- In the stomach, macro gametocytes are transformed into the macro gamete and micro gametocytes into micro gamete.
- While, in the mosquito's stomach the micro gametes penetrate the macro gamete and fertilization takes place resulting the formation of zygotes.

Plasmodium –Lifecycle



Sexual Cycle ... contd..

- The zygotes become motile, elongated known as ookinetes. It invades the gut wall of the mosquito, where they develop into oocysts.

Plasmodium –Lifecycle



Sexual Cycle ... contd..

- The oocysts first divide by meiosis then by mitosis several times and result in the formation of sporozoites.
- The oocysts burst and sporozoites are released into the body cavity of mosquito.

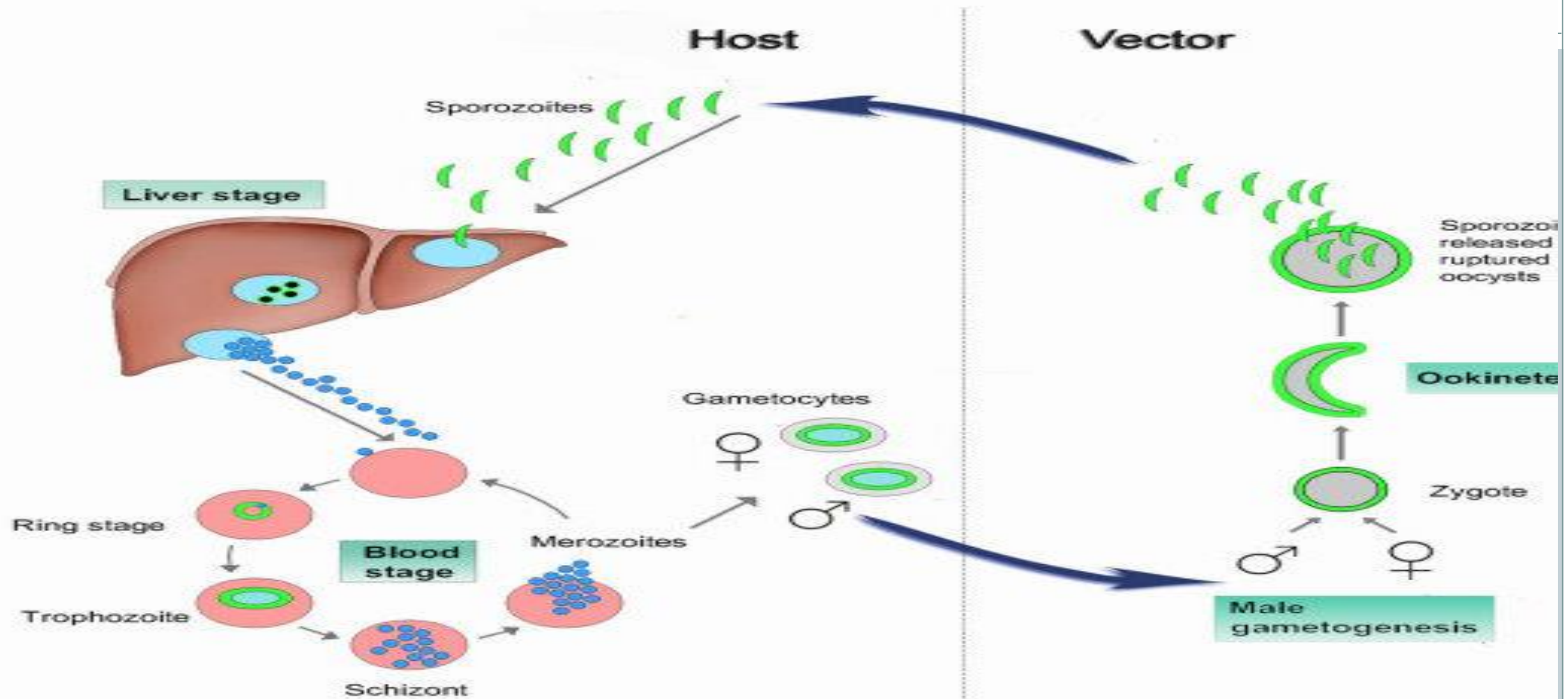
Plasmodium –Lifecycle



Sexual Cycle ... contd..

- Sporozoites make their way into the mosquito's salivary gland.
- Inoculation of the sporozoites into a new human host perpetuates the malarial life cycle.

Plasmodium – Lifecycle



Plasmodium Life Cycle Flow Chart

When the mosquito bites a person it injects sporozoites into them. These travel to the liver where they reproduce asexually producing merozoites (the form of the parasite that invades red blood cells). Merozoites replicate repeatedly in red blood cells, then burst out and invade fresh red blood cells, which can lead to billions of infected cells in the bloodstream and cause the effects of the disease.

Some merozoites in infected blood cells develop into gametocytes – sperm and egg pre-cursor cells that are carried around in the blood.

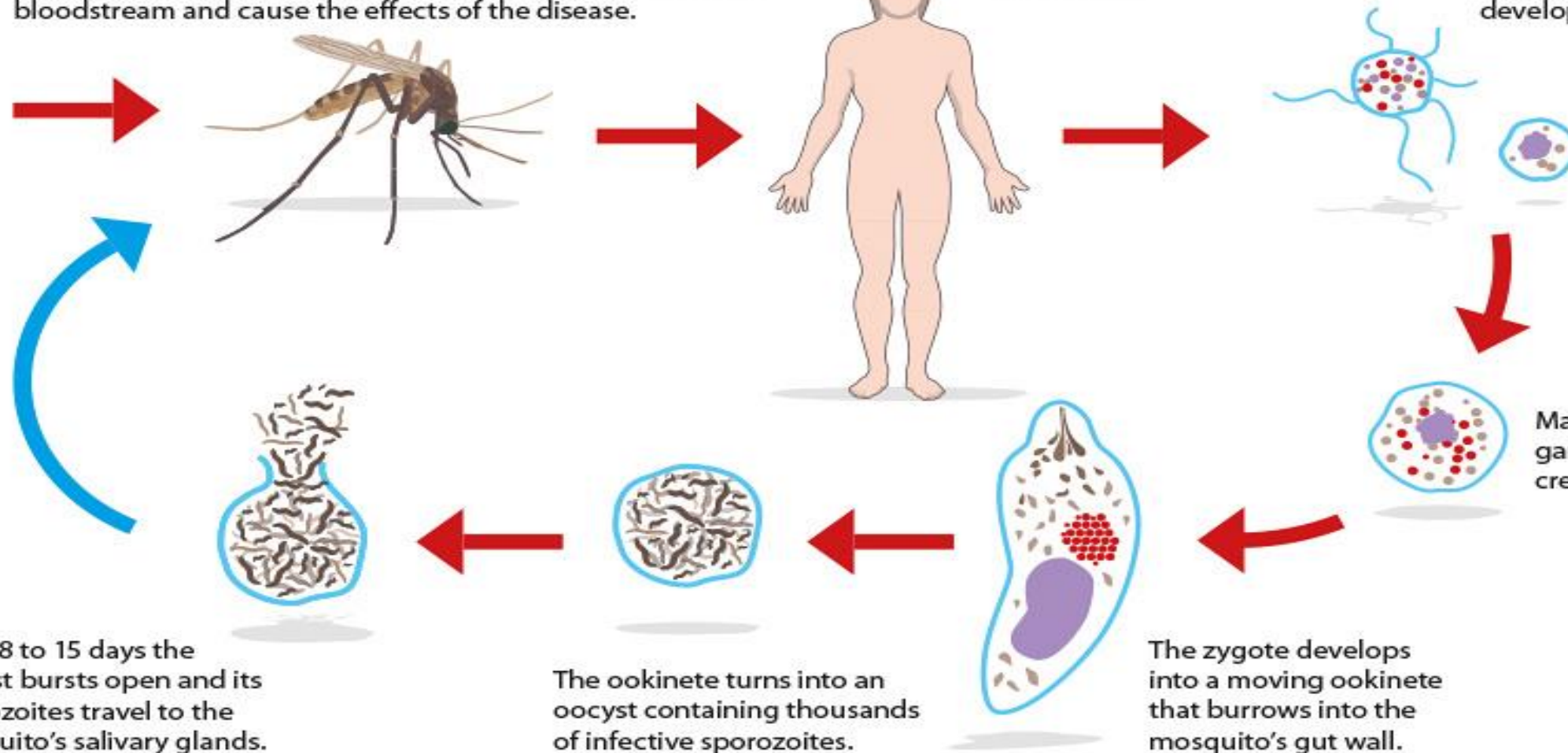
A mosquito bites and ingests infected red blood cells which burst open in the insect's gut. There the gametocytes develop into gametes.

Male and female gametes fuse to create a zygote.

The zygote develops into a moving ookinete that burrows into the mosquito's gut wall.

The ookinete turns into an oocyst containing thousands of infective sporozoites.

After 8 to 15 days the oocyst bursts open and its sporozoites travel to the mosquito's salivary glands.



Thank You

