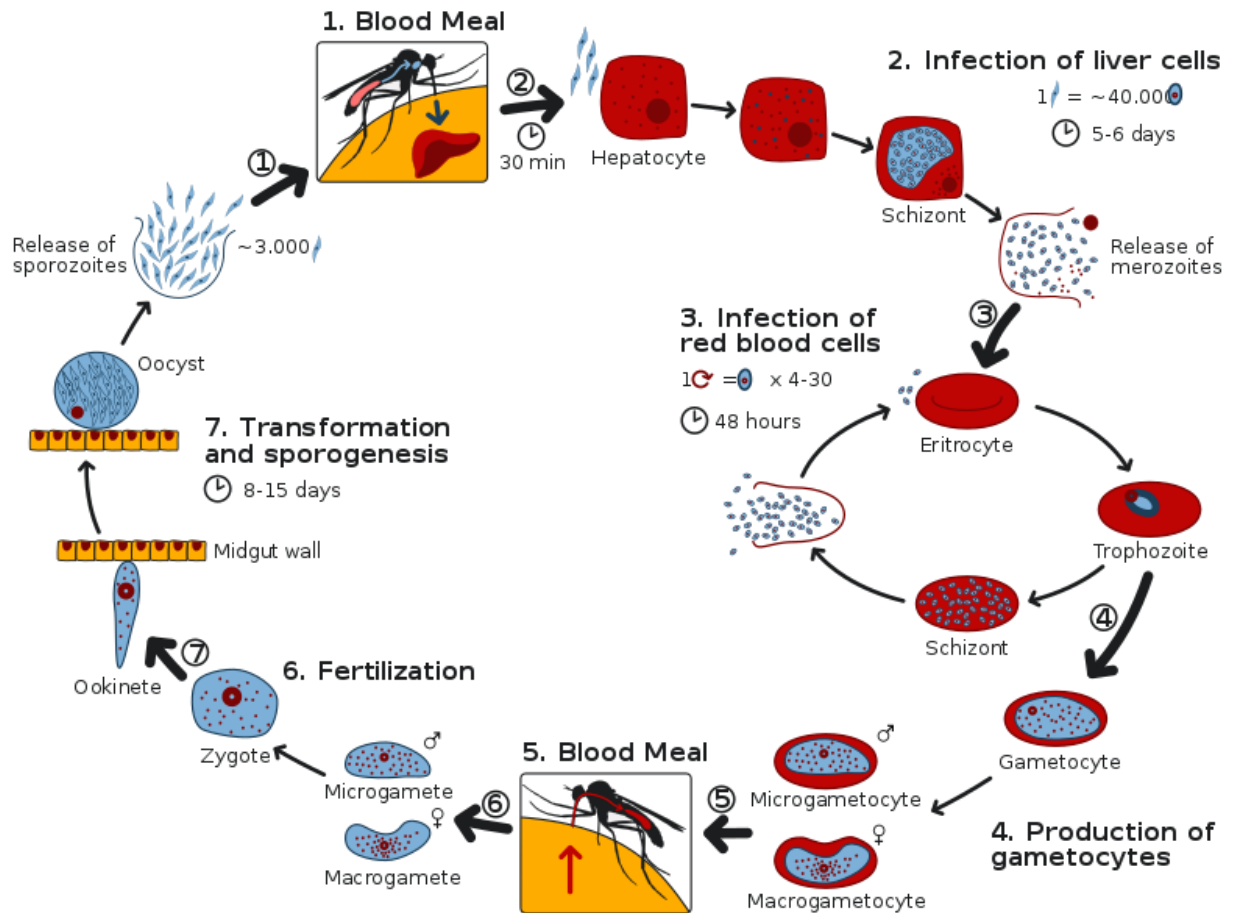


MALARIA : A Journey of Plasmodium From Mosquito To Man

By

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Malaria a word which is very much familiar to all of us today however, the term malaria basically means bad air or mal air. The name was very early given by human populations in Peru, residing near open ditches, ponds, open water channels. These human populations were mostly suffers from high fever and they thought that the fever is due to the bad air around them and which they are inhaling continuously. Without knowing the cause of fever people at that time cure it by using the bark of Cinchona, a native tree of Peru, in South America. It was Laveron who first postulated that malaria occurs due to Plasmodium and after few years it was Sir Ronald Ross who was working on malaria in India in Secunderabad, found stages of malaria parasite in the gut of female **Anopheles** mosquito parasite and finally disclosed that malaria occurs by the bite of female anopheles mosquito.

Plasmodium, a protozoan blood parasite belonging to class sporozoa is the intra-cellular blood of man and other worm blooded vertebrates requires two host to complete its life cycle. Primary host is man in which plasmodium completes its asexual phase of cycle and the secondary or intermediate host is an invertebrate which is Female Anopheles mosquito in which sexual phase takes place. Four species belongs to class sporozoa of plasmodium causing human malaria are **P.vivax, P.falciparum, P.malariae and P.ovale**, of these four species the most common one is vivax and falciparum. One of the most lethal form of malaria is that caused **by P.falciparum** which causes cerebral or malignant malaria creating immense suffering from disease, loss of man power and loss of economy in treatment and above all a very high mortality rate about two to three million people die annually across the world.

Man gets infected by the bite of female anopheles mosquito carrying the infection in its salivary glands. During blood meal mosquito transfer several sporozoites into the blood stream of man sporozoites soon make their way to the liver where they start dividing into merozoites and gametocytes this is called pre-erythrocytic schizogony or tissue stage schizogony. Merozoites released from pre-erythrocytic schizogony, some of them infects again fresh liver cells or hepatocytes and some merozoites infects erythrocytes or RBCs to initiate erythrocytic schizogony. Inside the erythrocyte malaria parasite goes through several stages such as ring stage, trophozoite stage, schizont stage etc. Inside the RBC the parasite consumes the globin part of haemoglobin and haem is left. Haem itself is highly toxic to parasite therefore, haem is converted into more inert and less toxic haemozoin, this is done by an enzyme haem polymerase found in the parasite itself. Erythrocytic schizogony completes with the rupture of rbc releasing haemozoin and several erythrocytic merozoites in the blood stream of the host.

Haemozoin is highly toxic for the host and as soon it is released by the rupture of an erythrocyte in the blood circulation of the host who witnesses febrile stage (shivering) followed by immense sweating. On the completion of erythrocytic cycle several rbc rupture simultaneously (erythrocytic schizogony) at a time leading to a huge loss of red cells which results in anemia which further complicates the malarial infection. Erythrocytic merozoites released after the rbc burst few of them enters into fresh rbc and starts another erythrocytic cycle while few erythrocytic merozoites changes themselves into male (micro) and female (macro) gametocytes and the process is called gamogony. After the formation of gametes no further development occurs in man and gametes waits for a female anopheles mosquito to suck the gametes during blood meal.

During blood meal mosquito sucks blood of malaria infected person and gametes reaches into the body of the secondary host the female anopheles. In the body of mosquito the required temperature 20-25 degree centigrade for

fertilization is achieved and therefore fertilization occurs in the gut of the mosquito. After fusion several moving zygotes are formed which are called ookinete. Ookinetes are spindle shape which helps them to penetrate the gut wall and reach the haemocoel of the mosquito. Only that Ookinetes which are able to penetrate the gut wall and reach haemocoel remains alive and restookinetes dies in the gut and passes out of the body of mosquito with the faeces. Ookinete changes into oocyst containing sporozoites and reaches to the salivary gland of the mosquito for fresh infection. Malaria can be controlled by the treatment of malaria by conventional antimalarals belonging to 4-aminoquinoline groups such as chloroquine, amodiaquine, quinine etc, chloroquine now adays is also used for chemoprophylaxis of malaria in an endemic area.