Plasmodium General

Plasmodium is a parasitic protozoa that causes the disease malaria. Malaria is a mosquito-borne illness that is widespread in tropical and subtropical regions across Sub-Saharan Africa and Asia and is a major cause of morbidity and mortality in these regions. The plasmodium parasite always has two hosts in its life cycle, including a mosquito vector and a vertebrate host. All the Plasmodium species that cause malaria in humans are transmitted by the Anopheles mosquito. Malaria infection develops over two phases involving the liver and red blood cells. Initially, during the mosquito bite, Plasmodium sporozoites in the mosquito's saliva enter the bloodstream and migrate to the liver and infect hepatocytes. After a dormant period, the organisms differentiate into thousands of merozoites which can rupture the host cell and escape into the blood, where it infects red blood cells. Within the red blood cells, the parasites further multiply and can cause lysis of the cells. Simultaneous waves of merozoites escaping and infecting red blood cells lead to the classic symptom of cyclical fever. Other common symptoms include headache, and affected individuals can develop anemia and splenomegaly. Malaria is typically diagnosed by visualization of parasites with red blood cells on a blood smear. Chloroquine is a medicine that prevents the development of parasites in red blood cells and is commonly used for both the prevention and treatment of malaria. However, there is increasing resistance to chloroquine in certain geographical areas, and individuals that travel to these areas should use mefloquine for malaria chemoprophylaxis instead.



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Characteristics

Protozoa
Propeller-protozoa
Plasmodium is a genus of protozoa, which are unicellular eukaryotic organisms.

Malaria
Malaria-mullet Mosquito
Malaria is a mosquito-borne illness that typically causes symptoms of fever, headache, and anemia. Malaria is widespread in tropical and subtropical regions across Sub-Saharan Africa and Asia and is a major cause of morbidity and mortality in these regions.

Anopheles Mosquito
Antennae-fist Mosquito
The Plasmodium parasite always has two hosts in its life cycle, including a vector, usually a mosquito, and a vertebrate host. All the Plasmodium species that cause malaria in humans are transmitted by the Anopheles mosquito.

Signs and Symptoms

Cyclic Fever
Fever-beaver on Cyclic Wheel
Malaria is characterized by cycles of fever and chills caused by simultaneous waves of Plasmodium merozoites escaping and infecting red blood cells.

Headache
Headache-lump
Severe headache is a common symptom of malaria.

Anemia
Anemone
Plasmodium parasites infect red blood cells during the erythrocytic stage and multiply within, causing lysis of red blood cells which can lead to anemia.

Splenomegaly
Spleen-balloon
Circulating infected red blood cells are identified and destroyed in the spleen and can lead to enlargement of the spleen, also known as splenomegaly.

Diagnosis

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Blood Smear

Blood Smear on Glass

Blood smears are the most reliable tests for malaria and allow for the visualization of parasites within red blood cells if infected.

Treatment

Chloroquine

Chlorine-queen

Chloroquine is a medicine that prevents the development of plasmodium parasites in red blood cells and is used for the prevention and treatment of malaria. However, this form does not destroy Plasmodium vivax or ovale parasites that remain dormant in the liver. Also, there is increasing resistance to chloroquine in certain geographical regions.

Mefloquine for Resistant Types

Meat-loaf-queen wearing Resistance-bandana

For travel to areas where chloroquine resistance is relatively high, atovaquone-proguanil or mefloquine are recommended for malaria chemoprophylaxis instead.

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