

# General Science

## Malaria

The causative agent of malaria was discovered in 1880 by Charles Alphonse Louis Laveran. Malaria is the world's largest parasitic disease, killing more people than any other communicable disease except Tuberculosis. Each year, 241 million people contract the disease according to the World Health Organization, and about 3 million die, most of which are children under five years old. Malaria is spread by the bite of an infected female *Anopheles mosquito*. Human malaria is caused by intracellular protozoan parasites of the genus *Plasmodium* that are transmitted by *Anopheles mosquitoes*.

### Mosquito Phase (sexual Reproduction)

Inside the mid-gut of the mosquito, fertilization occurs, producing zygotes, which develop into ookinetes. The ookinetes form oocysts, which then grow, divide



and rupture to give rise to Sporozoites,  
which migrate to the Salivary glands.  
Then the infectious cycle of malaria  
can repeat itself.

Male + Female gamete ..... Zygote ..... ookinetes .....  
Oocysts ..... Sporozoites.

## Causes of Malaria

Malaria is spread by the bite  
of an infected female *Anopheles mosquito*.  
Malaria may also be spread by transfusion  
of blood from infected people or by the  
use of contaminated (dirty) needles or  
syringes. There are more different causes  
of malaria:

- Uninfected mosquito. A mosquito becomes infected by feeding on a person who has malaria.
- Transmission of Parasite.
- In the liver.
- Into the bloodstream.
- On to the next person.



## Symptoms:

Intense fever, occurring in 24-72 hours intervals, is accompanied by nausea, headaches, and muscular pain. fatigue, vomiting, and in severe cases it can cause yellow skin, seizures coma or death. Furthermore, General feeling of discomfort, liver failure, renal failure and cerebral disease etc

## Treatment:

Malaria is treated with antimalarial medication; artemisinin drugs the best treatment for Plasmodium falciparum malaria. Normally Quinine is used to treat malaria but for severe malaria, artesunate is superior to quinine in both children and adults. it also includes monitoring for poor breathing effort, low blood sugar and low blood potassium on the other side Atovaquone, chloroquin, Doxycycline, mefloquine and primaquine are also treat malaria.



# Dengue Fever

Dengue fever is a painful debilitating mosquito-borne disease caused by any one of five closely related dengue viruses. The earliest descriptions of an outbreak date from 1779. Its viral cause and spread were understood by the early 20th century in 1906 and 1907. In 1943, Ren Kimura and Susumu Hotta isolated the dengue virus. These two scientists were studying blood samples of patient taken during the dengue epidemic in Nagasaki, Japan.

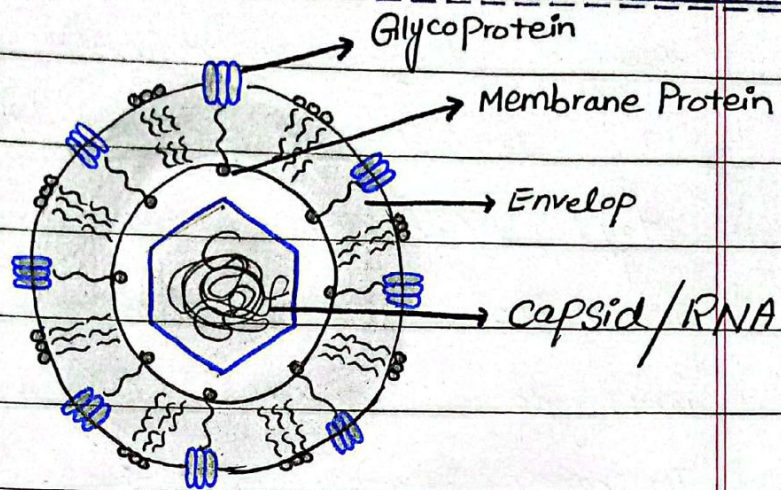
## Cycle of virus in Human.

When mosquito bites once inside the skin, dengue virus binds to langerhans cells (that indentifies pathogens). The virus enters the cells through binding between viral proteins and membrane proteins on the langerhans cell.



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The cell move to the nearest lymph node. Meanwhile, the virus genome is translated in membrane-bound vesicles on the cell's endoplasmic reticulum, where the cell's protein synthesis apparatus produces new viral protein that replicate the viral RNA and begin to form viral particles. They are then able to enter other white blood cells (monocytes and macrophages).

### Causes:-

When mosquito bites human, it sucks the blood along with virus. So, *Aedes aegypti* mosquito becomes a dengue vector. Once the virus enters the mosquito's system in blood meal, the virus spread



through the mosquito's body over a period of eight to twelve days. After this period, the infected mosquito can transmit the dengue virus to another person while feeding. In rare events, dengue can be transmitted during organ transplantations or blood transfusions from infected donors. Despite, these rare events, the majority of dengue infections are transmitted by mosquito bites.

### Symptoms of Dengue Fever:

Symptoms, which usually begin four to six days after infection and last for up to 10 days, may include

- Sudden high fever
- Severe headaches
- Pain behind eyes
- Fatigue
- Severe joint and muscle pain
- Nausea
- Vomiting
- Skin rashes



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## Treatment For Dengue Fever :-

There is no specific medicine to treat dengue infection but there are some methods may treat dengue fever :-

- Take rest
- Eat plenty foods
- Drink plenty of fluids
- Drink boiled water
- Acetaminophen (Paracetamol) is used to control pain.

## Prevention :-

- Stay away from heavily populated residential areas
- Use mosquito repellents, even indoors.
- wear long sleeved shirts and long pants tucked into socks.
- Use air conditioning.
- Make sure window and door screen are secure and free of holes.
- Use mosquito net.
- Avoid dirty water to remain in house.