

2-19-2015

## Dengue Fever

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### Repository Citation

Hernandez, Ashley and Harkness, Chris, "Dengue Fever" (2015). *Infectious Diseases Project 2015*. 4. [https://scholarworks.sfasu.edu/stem\\_center\\_student\\_posters\\_infectious\\_diseases\\_project\\_2015/4](https://scholarworks.sfasu.edu/stem_center_student_posters_infectious_diseases_project_2015/4)

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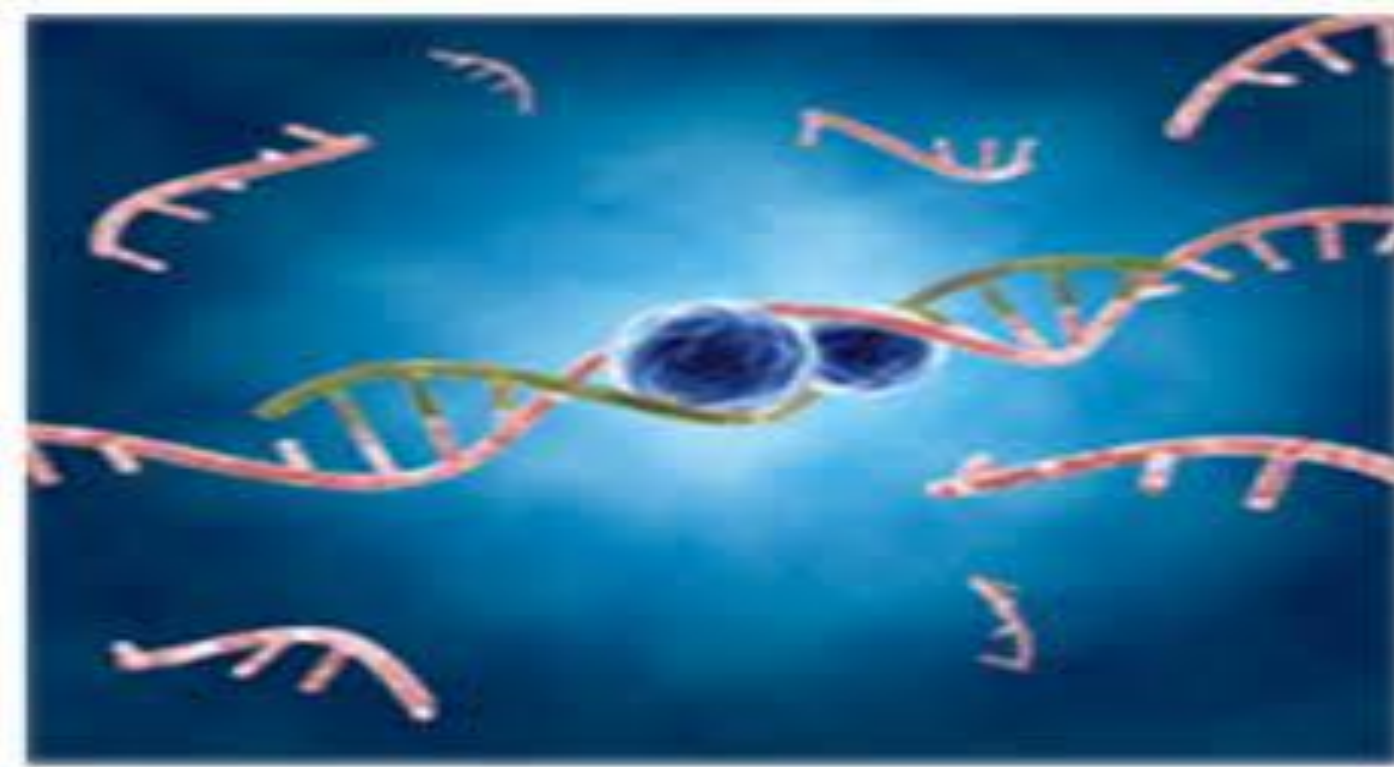




## Background

**Importance:** In recent years, the transmission of dengue fever has increased surprisingly fast and has become a major international public health concern. As of today this disease has mainly affected large countries and has become a leading cause of hospitalization and death among children in the certain areas. The amount of people that have got this infection has dramatically increase in recent decades. Over 40% of the world's population are currently at risk of getting Dengue Fever. There is now an estimate of 50-100 million people that catch this disease every year (World Health Organization, 2002).

Viral DNA replicating.



**Historical:** In the 1970s there were only 9 countries that had dengue fever and now there are about 100 countries in the region of the West Pacific. Not only are the number of cases is increasing, but large outbreaks are also occurring worldwide. Now the threat of possible outbreak of dengue fever is in Europe. As this virus spread to 20 different countries, it managed to hospitalize an estimated 500,000 people each year and approximately 2.5% of these people die ( World Health Organization, 2002).

Areas with high concentrated populations of Dengue Fever.



**Microorganism/information:** Dengue fever is caused by viruses, and there is not a specific type of medicine or antibiotic that could treat it. This virus is able to live only within the living cells of the hosts. During a ten day incubation time period, the virus passes from intestinal tract to the salivary glands. This is how the person gets infected and the mosquito that is carrying the dengue fever virus can live for about a month infecting thousands more people ( World Health Organization, 2002).

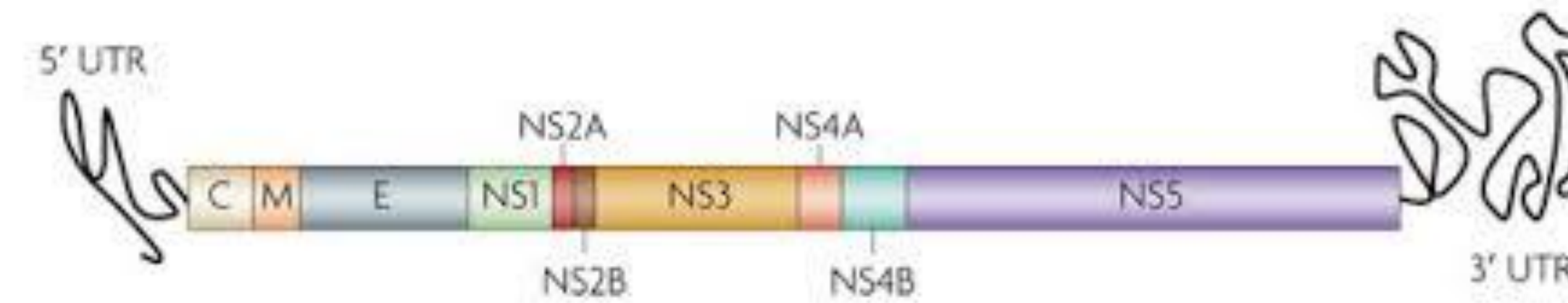
# Dengue Fever

By: Ashley Hernandez and Chris Harkness

## Infection/Disease

**Immune Response:** Dengue fever is a RNA Virus. Its outer bilayer contains capsid shell containing the RNA genome. The cognate receptor is involved in normal infection and the Fc receptor is involve with a phenomenon called and antibody dependent enhancement. The protein combines to the cognate receptor and triggers a cellular process called cytolysis. The virus responds by changing the form of the outer shape from protein to spikes. The capsid breaks and the viral RNA travels to the rough endoplasmic reticulum. The RNA attaches to the replication complex to start the first round of synthesis. Using the virus's positive sense RNA as the template a negative copy is made, the pair of RNA strands forms a double helix. The RNA then become a circle again (Clark, 1955).

Dengue virus genome.



**Progression:** Mosquitoes carry this virus and then transmit it inside humans. Unlike common colds dengue fever can only be passed down by an infection. Once the virus has been transmitted into the body, it travels inside the blood stream and can cause changes to the blood vessels. A process called disseminated intravascular coagulation (DIC) occurs, where chemicals responsible for clotting are used up which leads to severe bleeding (Gubler, 2003).

**Prognosis:** For the large majority of people that have been infected with dengue fever, the prognosis is excellent. During the illness, the patients are likely to feel extreme pain. Patients with underlying illness or immune depression have a fair to good prognosis because they are more likely to get complications. Patients who develop Dengue Hemorrhagic Fever or Dengue Shock Syndrome have a range of outcomes from good to poor, depending on how quickly supportive measures are given. Overall, the rate worldwide is about 1% of all dengue fever which means that around 500,000 to 1 million people die each year from dengue fever (Whitethorn, 2012).



## Treatment

**Options:** There has not been a single vaccine made to cure dengue fever. The only treatment doctors advocate is reducing the extreme pain the person is consumed with. Doctors give their patients precaution to not use NSAIDS (non-steroidal-anti-inflammatory-drugs) such as pain reliever, or any aspirin containing drugs because it can increase the risk of internal bleeding. Most patients are advised to use Tylenol. As with the dengue virus, DHF (Dengue Hemimorphic Fever) also causes extreme pain. If a client is diagnosed at an early stage with DHF, the symptoms can be treated effectively by using fluid replacement therapy (Clark 1955).

**Mechanism:** The white blood cells respond by producing signaling proteins; such as cytokines and interferon, which are responsible for many symptoms including the flu-like symptoms and the severe pain. In severe infections, the virus inside the victim's body has greatly increased and a higher chance exists that many other organs could be affected.. As a result; less blood is able to circulate into the blood vessels, and the blood pressure becomes dangerously low and cannot supply sufficient blood to vital organs. Dysfunction of the bone marrow which is a result of the infection of stromal cells, leads to reduced numbers of platelets, which are necessary for proper blood clotting (Sandler, 1998).

On the right is the *Aedes aygetis* mosquito.



**Emerging::** In dengue fever there is the leaking blood vessel that needs to be understood to be able to conquer this illness. Dengue is a disease of dehydration, so doctors recommend to stay hydrated and drink plenty of fluids for treatment. If a patient does not stay hydrated, the arteries and veins may develop thousands of pinpoint holes due to the body's reaction to the dengue virus. As this occurs, the fluids from inside the blood vessels to leak out (Shimmer, 2005).