Zika Virus

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Zika is a **mosquito-borne virus**, first identified in **Uganda** in 1947 in a **Rhesus macaque** followed by evidence of infection and disease in humans and other African countries in the 1950s. The infection itself (sometimes called Zika fever) is usually mild and goes away on its own. However, the impact of the virus has most significantly been seen in **pregnant women** and their fetuses. Zika virus infection is associated with **microcephaly** in newborns, which means their head is smaller than normal. It can also cause **Guillain-Barré syndrome**, a rare nerve disorder that causes muscle weakness and paralysis.

About the Zika Virus

Zika virus **disease** is caused by a virus from the ***Flavivirus* genus**, Flaviviridae family.Zika is mostly **transmitted through the bite** of an infected **Aedes species mosquito (**Aedes aegypti and Aedes albopictus) which acts as vectors for dengue and yellow fever as well.

- Zika virus infection can cause **microcephaly** in newborns, which means their head is smaller than normal. It can also cause **Guillain-Barré syndrome,** a rare nerve disorder that causes muscle weakness and paralysis.

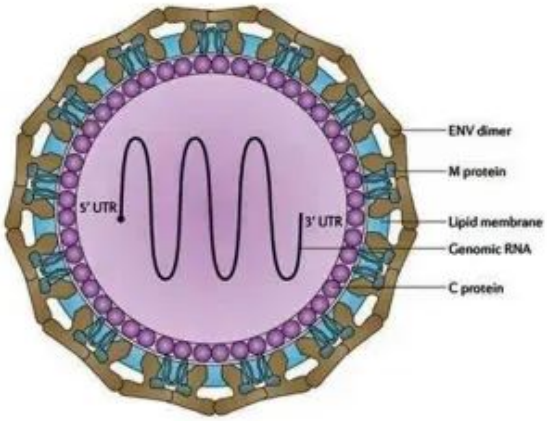
- The Zika virus was named after the Zika Forest in Uganda, where it had been discovered for the first time in 1947 and the **first human** case of Zika was reported in **1952**.
    - The Zika virus caused a significant **epidemic in Brazil in 2015.**
- In 2016 **WHO** declared the Zika virus, various neurological illnesses, and microcephaly as **Public Health Emergency of International Concern (PHEIC)**.
- **Spread in India:** Zika virus cases have been detected in the states of Gujarat, Madhya Pradesh, and Rajasthan in **2018** and Kerala, Maharashtra in **2021**. However, Zika virus-associated microcephaly was not recorded.

Structure

Zika virus is a **single-stranded RNA virus** belonging to the Flaviviridae family. The Asian and African lineages are the two major geographically distinct lineages of the virus.

- The **African lineage** affects **monkeys and apes** as primary hosts and **humans** as secondary hosts, whereas the **Asian lineage** affects **humans** as primary hosts.
- The Zika virus is a single-strand ribonucleic acid (RNA) virus and the RNA is translated into a single polyprotein that encodes **three structural proteins**—capsid (C), membrane (M), and envelope (E)—as well as seven nonstructural proteins.
- The **viral particle** is formed by **structural proteins**, as the name implies.
- **Nonstructural proteins** aid in genome replication and packaging, as well as manipulating host processes in favour of the virus.
- For the first time, **cryo-electron microscopy** was utilised to reveal the near-atomic structure of the Zika virus.

Aedes aegypti



Structure of Zika Virus

Transmission Modes

Zika virus is primarily transmitted to humans by the bite of an infected *Aedes aegypti* mosquito. Other ways of viral propagation include:

- Through **sexual contact** with the sick person
- **Transfusions of blood and organ transplantation**
- **Congenital infection** from mother to foetus because the virus is capable of crossing the placental barrier.
- **Testing:** Zika virus disease diagnostics is primarily based on the detection of viral RNA from clinical specimens (blood, saliva, urine, cerebrospinal fluid, amniotic fluid, semen, and breast milk).

Symptoms

The **incubation period** is usually between **three to twelve days** after being bitten by an infected mosquito. Approximately 80% of the infections are asymptomatic.

- The **most common symptoms** are a maculopapular rash (+/-itchy), arthralgia, fatigue, non-purulent conjunctivitis/conjunctival hyperaemia, myalgia, and headache.
- The maculopapular rash frequently begins on the face and spreads across the body. Retro-orbital pain and gastrointestinal symptoms are less common.

Treatment

There is **no vaccination or preventative treatment** available.

- The treatment is symptomatic and mostly focuses on hydration, pain alleviation, and antihistamines for pruritic rash.
- The key to controlling the spread of the Zika virus is to have a comprehensive approach that includes regular **vector surveillance and integrated vector management** of Aedes mosquitos.
- **Environmental modification**/manipulation, **personal protection** through protective clothing and repellents, **biological control** using larvivorous fish and bacillus thuringiensis, and **chemical control** using larvicides(temephos) and adulticides (pyrethrum, malathion), are all part of integrated vector management.

Challenges

The challenges in India’s Zika virus management are listed below:

- **Limited knowledge:** concerning the virus's epidemiological properties and its interactions with other arboviruses, such as dengue.
- **Limited lab capacity** and cross-reactivity of diagnostic flavivirus antibody assays.
- **Absence of Herd immunity:** In freshly affected countries. High population mobility and cross-border movement of infected travellers also act as significant challenges.
- **No vaccinations or antiviral treatments are available:** for microcephaly and other birth defects in babies, as well as cases of Guillain-Barre syndrome and other neurological diseases.
- **Other factors:** Favourable breeding conditions for Aedes mosquitos. Inadequate vector surveillance system. Underfunding and inadequate facilities in India's healthcare system result in ineffective epidemic control response.