

*Review Article*

**Zika Virus: Discussion at a Glance**

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*Received 15 March 2017; received in revised form 20 June 2017; accepted 21 June 2017*

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**ABSTRACT**

The Zika virus (*Aedes aegypti* and *Aedes albopictus*), is a mosquito borne flavivirus. This virus transmitted by the same type of mosquito that carries dengue fever, yellow fever, and chikungunya virus. A mosquito bites an infected person and then passes those viruses to other people it bites. Historically, Zika virus infection was considered a sporadic, relatively mild disease characterized by fever, maculopapular rash, conjunctivitis and often arthralgia. In this review we are focusing on the epidemiology, diagnosis, treatment & control for zika virus.

**KEYWORDS**

Zika virus, microcephaly, protective measures.

## 1. INTRODUCTION

In May 2015, the Pan American Health Organization (PAHO) issued an alert about possible autochthonous transmission of Zika virus (ZIKV) in Brazil, South America. Since then, the virus has spread widely in Middle and South America, and the Caribbean, affecting 29 countries and resulting in ten-thousands of probable and confirmed cases as of 22 February 2016.<sup>1,2</sup> The introduction of any emerging infection and its rapid spread to other parts of the world draws global attention. The changing climate also results in a boom in vector population and their accelerated dispersal. The *Aedes* vector species borne infections like Zika are a potential threat, especially in urban settings where *Ae. aegyptiis* abundant.<sup>3,4</sup> ZiV is transmitted by arthropod vectors thus called arbovirus. This virus belongs to the family *Flaviviridae*. It is placed under the genus *Flavivirus* and is closely related to yellow fever, Japanese encephalitis, dengue, and West Nile viruses.<sup>5</sup> There are also some reports of sexual transmission of ZiV. The non-infected partner showed symptoms of ZiV infection and laboratory tests found ZiV antibodies in both the partners' blood.<sup>6,7</sup> Detection of ZiV RNA in the amniotic fluid of foetuses and a possible link between ZiV fever and microcephaly in newborn babies indicate that it can cross the placenta and cause vertical transmission.

### 1.1. Pathophysiology

While the pathophysiology of Zika-induced microcephaly is not yet fully known, it is reported to involve infection of the primary neural stem cells of the fetal brain, known as neural progenitor cells.<sup>8,9</sup> The main roles of brain stem cells are to proliferate until the correct number is achieved, and then to produce neurons through the process of neurogenesis. Zika proteins NS4A and NS4B have also been shown to directly suppress neurogenesis. Infection of brain stem cells can cause cell death, which reduces the production of future neurons and leads to a smaller brain<sup>8</sup>. Zika also appears to have an equal tropism for cells of the developing eye, leading to high rates of eye abnormalities as well.<sup>9</sup>

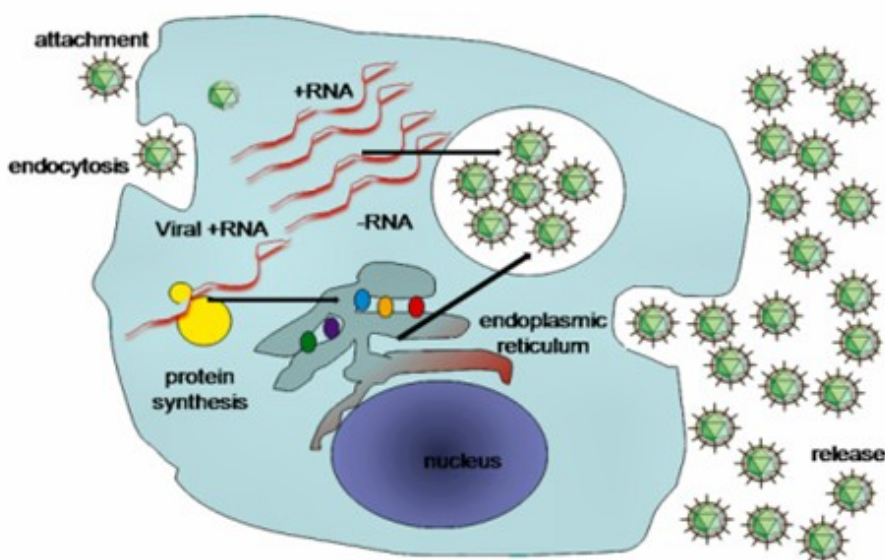
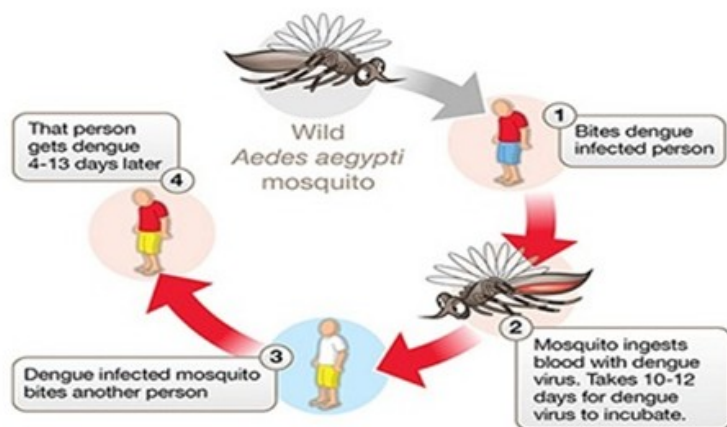


Fig- 1: Replication of zika virus.



**Fig-2:** Transmission of zika virus.

### 1.2. Transmission

Transmission is via the bite of mosquitoes from the *Aedes* genus, primarily *Aedes aegypti* in tropical regions. It has also been isolated from *Ae. africanus*, *Ae. apicoargenteus*, *Ae. luteocephalus*<sup>10</sup> *Ae. Albopictus*<sup>11, 12</sup> *Ae. vittatus* and *Ae. furcifer*.<sup>13</sup> During the 2007 outbreak on Yap Island in the South Pacific, *Aedes hensilli* was the vector, while *Aedes polynesiensis* spread the virus in French Polynesia in 2013.<sup>14</sup>

It is unclear why levels in semen can be higher than other body fluids, and it is also unclear how long infectious virus can remain in semen. There have also been cases of men with no symptoms of Zika virus infection transmitting the disease. The CDC has recommended that all men who have travelled to affected areas should wait at least 6 months before trying to attempt conception, regardless of if they were ill.<sup>15,16</sup> To date there have been no reported sexual transmissions from women to their sexual partners. Oral, anal or vaginal sex can spread the disease.<sup>17,18</sup> There have been no reported cases that disease transmit through the breastfeeding but virus has been found in breast milk.

### 1.3. Zika virus can also spread

1. During sex with a person who has Zika to his or her sex partners.
2. From a pregnant woman to her fetus during pregnancy or around the time of birth.
3. Through blood transfusion (likely but not confirmed).

### 1.4. Symptoms

Many people infected with Zika won't have symptoms or will only have mild symptoms. The most common symptoms are fever, rash, joint pain, or red eyes. Other common symptoms include muscle pain and headache. Symptoms can last for several days to a week. People usually

don't get sick enough to go to the hospital, and they very rarely die of Zika. Once a person has been infected with Zika, they are likely to be protected from future infections.

Hospitalization and deaths from Zika are unusual, but a nerve disorder, Guillain-Barré Syndrome, can rarely follow an infection. The biggest concern is related to birth defects that have been seen when pregnant women become infected.



**Fig-3:** Symptoms of zika virus.

### 1.5. Zika Virus Diagnostics

There is relatively limited literature describing the performance characteristics of diagnostic tests for ZIKV. This section describes the methods that have been used to identify ZIKV infections in human specimens.

**Viral culture.** Culture-based methods for ZIKV detection are used in public health and research laboratories but are not generally available for clinical purposes. The reference method for the isolation of ZIKV and other arboviruses is intracerebral mouse inoculation.<sup>19</sup> ZIKV is also culturable in several cell lines, including African green monkey (Vero) and rhesus monkey kidney (LLC-MK2), as well as *Aedes pseudoscutellaris* (MOS61 or AP-61) and *Aedes albopictus* (C6/36)<sup>19,20</sup>

To diagnose Zika, a doctor or other healthcare provider will ask about any recent travel and any signs and symptoms. A blood or urine test can confirm a Zika infection.<sup>21</sup> Pregnant women who live in or have recently traveled to an area with Zika should talk to a doctor or other healthcare provider about their risk of Zika virus infection even if they don't feel sick. Pregnant women should also talk to their doctor or other healthcare provider if they have a sex partner who lives in or recently traveled to an area with Zika. Pregnant women should see a doctor or other healthcare provider if they develop a fever, rash, joint pain, or conjunctivitis (red eyes). They should tell the doctor or other healthcare provider where they live and where they have traveled.<sup>22</sup>

### 1.6. Protective Measures

There is no vaccine to prevent Zika. The best way to prevent diseases spread by mosquitoes is to protect yourself and your family from mosquito bites. Here's how:

- Wear long-sleeved shirts and long pants.
- Stay in places with air conditioning and window and door screens to keep mosquitoes outside.
- Take steps to control mosquitoes inside and outside your home.
- Treat your clothing and gear with permethrin or buy pre-treated items.
- Use Environmental Protection Agency (EPA)-registered insect repellents. Always follow the product label instructions.
- When used as directed, these insect repellents are proven safe and effective even for pregnant and breastfeeding women.
- Do not use insect repellents on babies younger than 2 months old.
- Do not use products containing oil of lemon eucalyptus or para-menthane-diol on children younger than 3 years old.
- Mosquito netting can be used to cover babies younger than 2 months old in carriers, strollers, or cribs to protect them from mosquito bites.
- Sleep under a mosquito bed net if air conditioned or screened rooms are not available or if sleeping outdoors.
- Prevent sexual transmission of Zika by using condoms or not having sex.<sup>21,22</sup>

### *1.7. Treatment*

There is no specific medicine to treat Zika. Treat the symptoms:

- Get plenty of rest.
- Drink fluids to prevent dehydration.
- Take medicine such as acetaminophen to reduce fever and pain.
- Do not take aspirin or other non-steroidal anti-inflammatory drugs.

If you are taking medicine for another medical condition, talk to your healthcare provider before taking additional medication. To help prevent others from getting sick, strictly follow steps to prevent mosquito bites during the first week of illness. Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs), like ibuprofen and naproxen, should be avoided until dengue can be ruled out to reduce the risk of increased bleeding.<sup>23</sup>

## **2. CONCLUSION**

Though the presence of Zika virus has not been detected yet in India and serious mortality and morbidity is also not associated with this virus but the possible association of this virus infection with microcephaly and other neurological symptoms is revealed. Therefore, the preparedness for Zika virus has to be there in our country. This disease has been notified recently internationally and requires very rigorous surveillance programme including detection of Zika virus in vector mosquitoes.

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