INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

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Review Paper

Review Of Overview on Zika Virus

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ARTICLE INFO

Published: 20 May 2026
Keywords:
Zika Virus, mosquito-borne virus, Flaviviridae,
DOI:
10.5281/zenodo.20308521

ABSTRACT

Zika virus (ZIKV) is a mosquito-borne virus belonging to the Flaviviridae family, first identified in 1947 in Uganda. For many decades, it remained largely unnoticed due to its mild symptoms and low number of reported human cases. However, since 2007, ZIKV has emerged as a significant global health concern, causing outbreaks in the Pacific Islands, the Americas, and other regions. The virus is primarily transmitted by Aedes mosquitoes, although other modes such as sexual transmission and blood transfusion have also been reported. Most infections are mild, presenting with symptoms like fever, rash, joint pain, and headache, but serious complications such as Guillain-Barré syndrome and congenital abnormalities in newborns have been associated with the infection. Diagnosis is mainly based on detection of viral RNA using RT-PCR or identification of antibodies. Currently, there is no specific antiviral treatment or approved vaccine for ZIKV, and management is mainly supportive. Prevention strategies focus on mosquito control, personal protection, and safe sexual practices. Ongoing research is essential for the development of effective vaccines and targeted therapies to control future outbreaks

INTRODUCTION

In 1947, the Zika virus (ZIKV) was first found in a rhesus monkey.[1]Human infections with Zika were first reported in Nigeria (Africa) in 1954.[2] For the next 50 years, fewer than 20 human cases were recorded, and most of the information came from studies on the yellow fever virus (YFV).[3]Zika virus, which belongs to a group of viruses called Flaviviridae, was first discovered in 1947 from a monkey in the Zika Forest in Uganda, East Africa. Later studies showed that the virus is found in many places across sub-Saharan Africa and Southeast Asia.[4] The statement highlights how Zika virus infection remained largely unnoticed for decades due to its silent transmission, where the virus spread without causing severe disease or large outbreaks. This allowed it to silently circulate across regions in Africa and Asia for about 60 years, with fewer than

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

20 confirmed human infections during this period. The lack of noticeable illness in the majority of cases contributed to the underreporting and under recognition of the virus until more significant outbreaks occurred in recent years.[5]

Geographical distribution of Zika virus infections

In 2007, the first known Zika virus outbreak happened on the small island of Yap in the western Pacific [6]. Six years later, a bigger outbreak took place in French Polynesia in the South Pacific, and then smaller outbreaks happened on other islands in the Pacific[7]By January 2017, nearly all countries in Latin America and the Caribbean had reported cases of the Zika virus.[5][8] In some places, like the Maldives and Vanuatu, the virus was only found in people who had returned from other areas where Zika was active.[9] figure 1 show geographical distribution and emergence of Zika virus

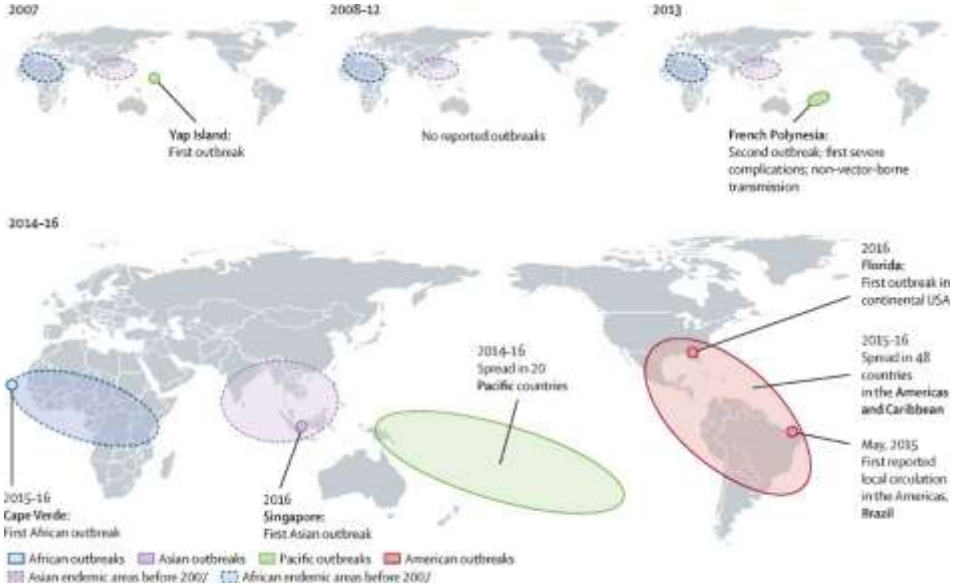

fig1-**Zika virus outbreaks from 2007–16[10]**

Transmission

Zika virus, like other flaviviruses, is transmitted by mosquitoes, primarily of the *Aedes* (*Stegomyia*) genus. Several *Aedes* spp. have been implicated, including *Ae. aegypti*, *Ae. africanus*, *Ae. hensilli*, *and Ae. Albopictus.* [11-13]Zika virus has been found in wild-caught Ae. aegypti mosquitoes, and laboratory experiments have shown that these mosquitoes are capable of spreading the Zika virus.[14][15] Zika virus is a small, round virus that has a protective outer layer called an envelope. It's part of the *Flavivirus* group, which also includes other viruses spread by mosquitoes, like dengue and yellow fever. The virus carries genetic material in the form of RNA, which is about 11,000 bases long. This RNA carries instructions for making the virus's parts: three proteins that help form the virus and seven other proteins that help the virus reproduce inside the body.[16] Zika virus mainly spreads in nature through a cycle where forest mosquitoes pass it between non-human primates (like monkeys). However, antibodies to the Zika virus have also been found in other animals, including mammals and rodents.[17][18][19]. Around the time of the outbreak in Yap State, two US scientists who had been working in Senegal in August 2008 returned to the USA and got sick with symptoms like a rash, headache, tiredness, and joint pain. One of them also had blood in his semen. Blood tests showed that Zika virus was the cause of their illness. Later, the wife of one of the scientists (called patient 3) also became sick with the same symptoms. This suggested that Zika virus could be spread through

sexual contact or saliva.[23] Zika virus originally spread between monkeys and mosquitoes in Africa. Over time, it started spreading between humans and mosquitoes, which is now the main way it's transmitted. Zika can also be passed from men to women through sexual contact or through blood transfusions.[24]

Guillain-Barré Syndrome (GBS) is a condition where the body's immune system attacks its own nerves, often after an infection like Zika. This can cause weakness, numbness, and sometimes even paralysis.[24]

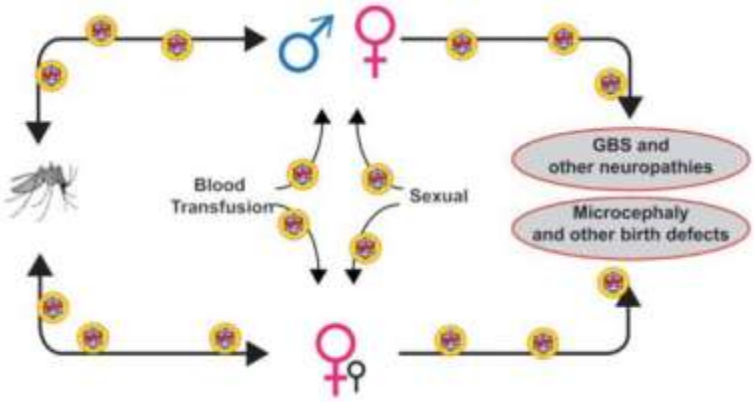

Fig 2 -Modes of transmission of Zika virus are illustrated schematically [24]

Zika virus identification and early epidemiology

Zika virus was first discovered in 1947 when it was taken from a monkey placed on a platform in the Zika Forest near Entebbe, Uganda. The following year, in 1948, the virus was also found in a group of Aedes africanus mosquitoes from the same forest.[20] When the virus was taken from a mouse brain and given to monkeys, it didn't cause any noticeable illness. When the virus was directly injected into the monkeys' brains, only one out of five monkeys showed mild fever. At the same time, a blood test was also done to check for the virus.[21] The first confirmed case of a natural Zika virus infection in humans was reported by Simpson. He described how he got sick with the virus while working to isolate it from Aedes africanus mosquitoes in Uganda between 1962 and 1963.[22] Phylogenetic studies have shown that the Zika virus (ZIKV) that spread to the Pacific islands and South America comes from the Asian lineage.[26][27].

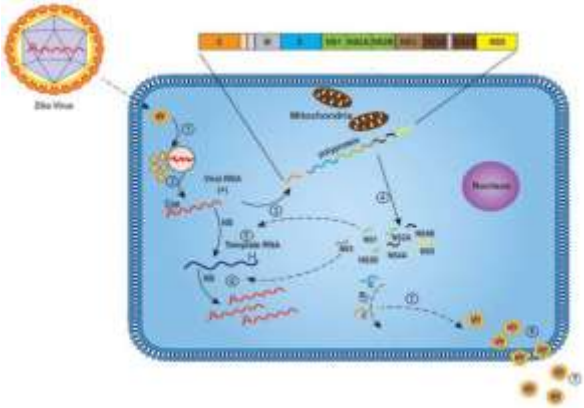

Fig 3 - Life cycle of Zika virus [25]

The virus attaches to the surface of a host cell using proteins on its outer layer that bind to receptors on the cell's surface. After this, the virus enters the cell through a process where the cell pulls the virus in, forming a small pocket called a clathrin-coated pit 1. When the virus is inside the cell, the environment becomes more acidic, which causes the virus to change shape. This change helps the virus's outer layer merge with the cell's membrane, breaking apart the virus and releasing its genetic material into the cell's interior (cytoplasm)2. The virus's RNA is used by the cell to make one long protein chain, called a polyprotein 3. This long protein chain is then cut into smaller pieces, both while it's being made (cotranslationally) and after it's been made (post-translationally), by enzymes from both the cell and the virus 4. The protein chain is cut into 10 smaller proteins: 3 structural proteins (C, prM, and E) that make up the virus's outer shell, and 7 nonstructural proteins (NS1, NS2A, NS2B, NS3, NS4A, NS4B, and NS5) that help the virus function inside the cell. The structural proteins are found at the beginning (N-terminus) of the protein chain, and the nonstructural ones are at the end (C-terminus).For replication, the virus uses parts of the cell's membranes called vesicle packages. These packages help form a "replication complex" where the virus's RNA is copied, along with the help of viral and cell proteins like NS3 and NS5 5 . Replication starts by making a negative-strand RNA copy of the virus's genetic material. This negative strand then acts as a template to create many copies of the original positive-strand RNA, which is the virus's genome 6 . The virus starts to assemble on the surface of the endoplasmic reticulum, which is a structure inside the cell that helps with protein and lipid production 7 . The virus particles form by budding off from the endoplasmic reticulum and then travel through the cell's secretory system, including the trans-Golgi network 8. The virus particles mature in the trans-Golgi network, then are released from the cell through a process called exocytosis 9. [25]

Diagnosis

When a sample is taken in the first few days after symptoms start, a test to detect the virus or its genetic material can be done. Virus detection can be done by isolating the virus from cell cultures (using mosquito or mammal cells), directly from mosquitoes, or by injecting it into the brains of newborn mice.[28],[29] Virus isolation is usually done in specialized labs and is rarely successful. This is likely because the virus is present in very low amounts in the blood, making it hard to isolate.[30] There are two main types of diagnosis for Zika virus (ZIKV). The first type involves detecting the virus itself or its components in the body. This includes tests like RT-PCR, which identifies the viral RNA and is most commonly used because it is highly accurate and reliable, immunoassays that detect viral proteins, and virus isolation, which involves growing the live virus in the laboratory. Although virus isolation is considered the gold standard, it requires special lab facilities and is not usually performed. The second type of diagnosis is based on detecting antibodies produced by the body against the virus, which helps to determine if a person has been infected recently or in the past.[31]

Treatment

There are two main ways to develop treatments for Zika virus (ZIKV). The first way is to use existing medicines that were originally made for other diseases and test if they work against Zika. Some of these drugs have shown good results in laboratory studies.The second way is to create new drugs specifically designed to fight the Zika virus. Scientists can use knowledge from research on dengue virus to help develop these drugs. However, they must be careful because Zika and dengue are different viruses and do not behave

exactly the same. Another possible treatment is using special antibodies to fight the virus. One major challenge in developing Zika treatments is ensuring they are safe, especially for pregnant women, since there is a high risk of side effects.[31]

- Take paracetamol (acetaminophen) to reduce **fever, headache, and body** pain.
- Drink plenty of fluids and take proper rest.
- Do not take aspirin, because it can increase the risk of bleeding, especially if platelet count is low (thrombocytopenia) [32].

Prevention

The main carriers (vectors) of dengue, chikungunya, and Zika are different types of **Aedes mosquitoes**. So, prevention mainly focuses on avoiding mosquito bites. This can be done by removing places where mosquitoes breed, such as stagnant water, and by using insecticides and repellents like DEET or picaridin. Cleanliness and sanitation drives should be carried out on a large scale to eliminate mosquito breeding sites in homes and high-risk areas like construction sites, garbage areas, and dumping grounds. Around crowded places such as schools, hospitals, and transport areas, at least a 400-meter mosquito-free zone should be maintained. Spraying insecticides is also useful in areas where Zika cases are found. People living in or traveling to affected areas should stay indoors as much as possible, use insect repellents when going outside, and wear full-sleeve clothes, long pants, and preferably clothes treated with permethrin to reduce mosquito bites.[33]. Safe sexual practices are important to prevent the spread of Zika virus (ZIKV). Men returning from infected areas should use condoms during sex with their pregnant partners throughout the pregnancy. In some regions, women are advised to avoid becoming pregnant until the outbreak is over. Pregnant women or those planning pregnancy should avoid traveling to areas where Zika is spreading. If travel is necessary, they must take strong precautions to prevent mosquito bites. Other rare ways of transmission, such as contact with infected body fluids or bites from infected animals, should also be avoided by following proper infection control measures. Although vaccines are available for some related viruses, there is currently no vaccine for Zika, so there is an urgent need to develop one. Some possible vaccine approaches being studied include weakened (attenuated) vaccines, killed vaccines, or vaccines developed using human cell lines.[34],[35].

CONCLUSION

Zika virus (ZIKV) is an emerging mosquito-borne infection that has gained global attention due to its rapid spread and potential health risks, especially in pregnant women. Although the disease is usually mild and often goes unnoticed, it can lead to serious complications such as neurological disorders and congenital abnormalities. The virus is mainly transmitted by Aedes mosquitoes, but other routes like sexual transmission and blood transfusion are also possible. Diagnosis is done either by detecting the virus directly or by identifying antibodies, with RT-PCR being the most commonly used method. Currently, there is no specific antiviral treatment or approved vaccine for Zika, so management mainly focuses on relieving symptoms. Therefore, prevention plays a crucial role, including mosquito control, personal protection measures, and safe sexual practices. Continued research is essential to develop effective vaccines and treatments to control future outbreaks.

REFERENCES

1. Dick GW, Kitchen SF, Haddow AJ. 1952. Zika virus. I. Isolations and serological

specificity. *Trans R Soc Trop Med Hyg* 46:509–520

2. Macnamara FN. 1954. Zika virus: a report on three cases of human infection during an epidemic of jaundice in Nigeria. *Trans R Soc Trop Med Hyg* 48:139–145.
3. Faye O, Freire CC, Iamarino A, Faye O, de Oliveira JV, Diallo M, Zanotto PM, Sall AA. 2014. Molecular evolution of Zika virus during its emergence in the 20th century. *PLoS Negl Trop Dis* 8:e2636.
4. Zika virus, which belongs to a group of viruses called Flaviviridae, was first discovered in 1947 from a monkey in the Zika Forest in Uganda, East Africa. Later studies showed that the virus is found in many places across sub-Saharan Africa and Southeast Asia.
5. Musso, D · Gubler, DJ**Zika virus***Clin Microbiol Rev.* 2016; **29**:487-524
6. Duffy, MR · Chen, TH · Hancock, WT · et al.**Zika virus outbreak on Yap Island, Federated States of Micronesia***N Engl J Med.* 2009; **360**:2536-2543.
7. Musso, D · Nilles, EJ · Cao-Lormeau, VM**Rapid spread of emerging Zika virus in the Pacific area***Clin Microbiol Infect.* 2014; **20**:O595-O596
8. WHO**Situation report. Zika virus microcephaly Guillain-Barré syndrome. March 10, 2017. Data as of 9 March 2017**http://reliefweb.int/report/world/zika-virus-microcephaly-and-guillain-barr-syndrome-situation-report-10-march-2017(accessed May 26, 2017).
9. Musso, D · Baud, D · Fredman, DO**Should testing of donors be resticted to active Zika virus areas?***Lancet Infect Dis.* 2016; **16**:1108-1109
10. ttps://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)31450-2/fulltext
11. Dick GW, Kitchen SF, Haddow AJ. Zika virus. I. Isolations and serological specificity. Trans R Soc Trop Med Hyg. 1952;46:509–20. 10.1016/0035-9203(52)90042-4
12. Marchette NJ, Garcia R, Rudnick A. Isolation of Zika virus from *Aedes aegypti* mosquitoes in Malaysia. Am J Trop Med Hyg. 1969;18:411–5.
13. Grard G, Caron M, Mombo IM, Nkoghe D, Mboui Ondo S, Jiolle D, et al. Zika virus in Gabon (Central Africa)—2007: a new threat from *Aedes albopictus?* PLoS Negl Trop Dis. 2014;8:e2681. 10.1371/journal.pntd.0002681
14. Diallo D, Sall AA, Diagne CT, Faye O, Faye O, Ba Y, et al. Zika virus emergence inmosquitoes in southeastern Senegal, 2011. PLoS One. 2014;9:e109442. 10.1371/journal.pone.0109442
15. Boorman JP, Porterfield JS. A simple technique for infection of mosquitoes with viruses; transmission of Zika virus. Trans R Soc Trop Med Hyg. 1956;50:238–10.1016/0035-9203(56)90029-3
16. 16-Kuno, G · Chang, GJ**Full-length sequencing and genomic characterization of Bagaza, Kedougou, and Zika viruses***Arch Virol.* 2007; **152**:687-696
17. Haddow, AD · Schuh, AJ · Yasuda, CY · et al.**Genetic characterization of Zika virus strains: geographic expansion of the Asian lineage***PLoS Negl Trop Dis.* 2012; **6**:e1477
18. Haddow, AJ · Williams, MC · Woodall, JP · et al.**Twelve isolations of Zika virus from *Aedes (Stegomyia) Africanus (Theobald)* taken in and above a Uganda Forest***Bull World Health Organ.* 1964; **31**:57-69
19. Darwish, MA · Hoogstraal, H · Roberts, TJ · et al.**A sero-epidemiological survey for certain arboviruses (*Togaviridae*) in Pakistan***Trans R Soc Trop Med Hyg.* 1983; **77**:442-445

20. Dick, GW · Kitchen, SF · Haddow, AJ**Zika virus. I. Isolations and serological specificity***Trans R Soc Trop Med Hyg.* 1952; **46**:509-520
21. Dick, GW**Zika virus. II. Pathogenicity and physical properties***Trans R Soc Trop Med Hyg.* 1952; **46**:521-534
22. Simpson, DI**Zika virus infection in man***Trans R Soc Trop Med Hyg.* 1964; **58**:335-338
23. Foy, BD · Kobylinski, KC · Chilson Foy, JL · et al.**Probable non-vector-borne transmission of Zika virus, Colorado, USA***Emerg Infect Dis.* 2011; **17**:880-882
24. www.annalsofneurology.org.]
25. www.annalsofneurology.org.
26. M.T. Alera, L. Hermann, I.A. Tac-An, C. Klungthong, W. Rutvisuttinunt, W. M anasatienkij, *et al.* Zika virus infection, PhilippinesEmerg Infect Dis, 2015 (21) (2012), pp. 722-724
27. V.M. CaoLormeau, C. Roche, A. Teissier, E. Robin, A.L. Berry, H.P. Mallet, *et al.*Zika virus, French Polynesia, South Pacific
28. Emerg Infect Dis, 2014 (20) (2013), pp. 1085-86G.W.A. Dick, S.F. Kitchen, A.J. HaddowZ ika virus. I. Isolations and serological specificityTrans R Soc Trop Med Hyg, 46 (1952), pp. 509-520
29. R. Buathong, L. Hermann, B. Thaisomboons uk, W. Rutvisuttinunt, C. Klungthong, P. Chi nnawirotpisan, *et al.*etection of Zika virus infection in Thailand, 2012–2014
30. R.S. Lanciotti, O.L. Kosoy, J.J. Laven, J.O. Velez, A.J. Lambert, A.J. Johnson, *et al.*Genetic and serologic properties of Zika virus associated with an epidemic, Yap state, Micronesia, 2007Emerg Infect Dis, 14 (2008), pp. 1232-1239
31. . Shan, X. Xie, A.D.T. Barrett, M.A. Garcia-Blanco, R.B. Tesh, P.F. da Costa Vasconcelos, *et al.*Zika virus: diagnosis, therapeutics, and vaccine.
32. P. Gautret, F. SimonDengue, chikungunya and Zika and mass gatherings: what happened in Brazil, 2014
33. Staples JE, Dziuban EJ, Fischer M, Cragan JD, Rasmussen SA, Cannon MJ, et al. Interim guidelines for the evaluation and testing of infants with possible congenital Zika virus infection—United States, 2016. MMWR Morb Mortal Wkly Rep. 2016;65:63–7. doi:10.15585/mmwr.mm6503e3.
34. Dyer O. Jamaica advises women to avoid pregnancy as Zika virus approaches. BMJ. 2016;352:i383.
35. Sabchareon A, Wallace D, Sirivichayakul C, Limkittikul K, Chanthavanich P, Suvannadabba S, et al. Protective efficacy of the recombinant, live-attenuated, CYD tetravalent dengue vaccine in Thai schoolchildren: a randomised, controlled phase 2b trial. Lancet. 2012;380:1559–67. doi:10.1016/ S0140-6736(12)61428-7.

HOW TO CITE: Awari Nilam, Vaidya Sayali, Jagtap Sambodhi, Sonali Gavale, Pallavi Phalke, Review Of Overview On Zika Virus, Int. J. of Pharm. Sci., 2026, Vol 4, Issue 5, 55166-5172, https://doi.org/10.5281/zenodo.20308521