

## A GROWING EPIDEMIC-RELATED CATASTROPHE IN KOZHIKODE- NIPAH

**Aswathy K A**

Research Scholar, SJJT university  
aswathyka1994@gmail.com

**Dr. Ankit Singh**

Research Guide, SJJT university

### ABSTRACT

*The Nipah virus (NiV), a paramyxovirus in the genus Henipavirus of the family Paramyxoviridae, is the culprit behind the zoonotic infection known as Nipah (pronounced "nee-pa"). It is a pathogen with a level 4 biosafety rating that is spread by particular species of fruit bats, primarily Pteropus spp., who serve as natural reservoir hosts. In 1998, the Malaysian town of Kampung Sungai Nipah became the first to report the illness. Transmission from person to person also happens. There have also been reports of outbreaks in other South and Southeast Asian nations. Based on the entire N and G gene sequences that are now available, phylogenetic analysis confirmed that there are two primary clades of NiV that are in circulation. In the NiV-MY clade, NiV isolates from Malaysia and Cambodia grouped together, whereas the NiV-BD clade included isolates from Bangladesh and India.*

*Keywords: Nipah virus (NiV), bats, diagnosis, encephalitis, epidemiology, pathology, prevention, control, vaccines, therapeutics, zoonotic.*

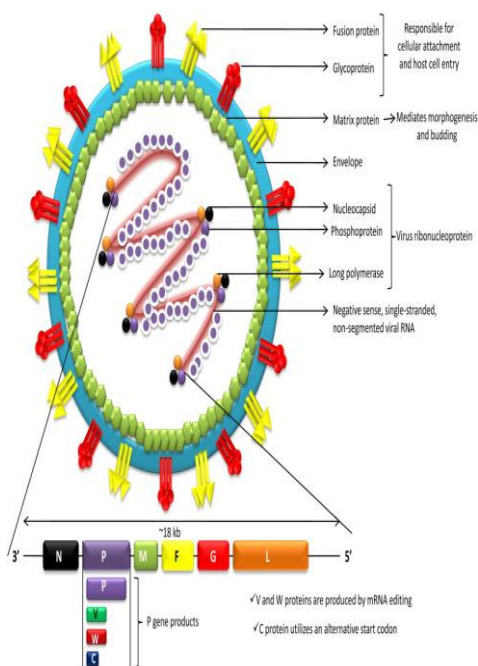
### INTRODUCTION

Infectious diseases are illnesses caused by microscopic organisms such bacteria, viruses, fungi, or parasites which can spread either through contact or transmission from a single individual to another. Infection among humans can also occur from contact with an infected pet that harbors a harmful bacterium that can infect people. In 2020, COVID-19, a recently identified viral disease caused by the SARS-CoV-2 virus, was the biggest contributor of mortality.

The possibility of a worldwide health crisis is greatly increased when infectious viruses including avian/bird flu, swine flu, Middle East respiratory syndrome coronavirus (MERS-CoV), severe acute respiratory syndrome (SARS), Crimean-Congo hemorrhagic fever (CCHF), Lassa fever, Rift Valley fever (RVF), Marburg virus disease, Ebola, Zika, Nipah, and henipaviral diseases spread rapidly. Observing the current social fear has been raised by the virus that causes the Nipah sickness epidemics as well as the emergencies caused by the Zika and Ebola viruses over the past five years.

A paramyxovirus known as the Nipah virus (NiV) can infect humans and causes severe respiratory illnesses and deadly encephalitis (Henipavirus genus, Paramyxovirinae subfamily, Paramyxoviridae family, order Mononegavirales).

Both glycoproteins, G and F, enable NiV to spread through the recipient cells. This fusion (F) protein allows the virus to connect to host receptors located on cell surfaces, although the G glycoprotein promotes virus-host cell membrane fusion for cellular entry. The F protein refolds as a result of conformational alterations made by the G protein by NiV whenever it binds to host ephrin B2/3 receptors.



**Fig 1: Structure of Nipah virus**

**TRANSMISSION OF THE NIPAH VIRUS**

Bats serve as carriers for a number of vulnerable illnesses, including the Nipah, rabies, and Marburg viruses. Studies by Schountz (2014) and O'Shea et al. (2014) have found no connection between these viruses and any notable harmful alterations in the bat species. Understanding the viral cycle among fruit bats, pigs, and humans—as in addition to the mechanisms of NiV propagation across bats to pigs, pigs to humans, and date palm sap to humans—requires extensive investigation.

**EPIDEMIOLOGY AND DISEASE OUTBREAKS**

In Malaysia, NiV disease was initially discovered in 1998 in individuals who interacted with pigs. In March 1999, 11 male abattoir workers (average age: 44) in Singapore who purchased pig meat from Malaysia were found to have

contracted a sudden Nipah virus infection, which resulted in one dead case. The victims also had MRI focal areas with significantly elevated cortical white matter signal extent, higher serum levels of IgM, and some unusual manifestations of pneumonia and encephalitis. 94 people, 37 years old on average, including male and female, who had been identified with serious viral encephalitis during September 1998 and June 1999 and had close interactions with the swine species were examined.

**PUBLIC HEALTH SIGNIFICANCE AND ZONOTIC ASPECTS**

NiV, among the most current zoonotic virus to surface, is incredibly deadly and could cause a worldwide epidemic. Only recently was NiV, a well-known and emerging contagious disease, identified. It has an elevated mortality rate, causes extreme feverish illness, and remains to be an important international health issue. NiV, which was essentially transferred from pig to pig and eventually from pig to man, was acquired by the pigs from bats. Furthermore, the virus has been found to be present in the spit and urine of the flying fox species *Pteropus vampyrus* and *Pteropus hypomelanus* of the Malaysian Islands, indicating that they may act as the virus's natural reservoirs. Consuming fruits, vegetables, or water is an additional means that the disease could spread to people and other animals. Consuming fruits, vegetables, or water tainted with the saliva, urine, or feces of infected bats is a different approach that the disease can spread to people along with different species (Luby et al. 2009). Whenever ingested,

drinks with alcohol made from date palm sap have the potential to spread infection.

Treating animals with illnesses at home, on the farm, or at slaughterhouses may further raise the probability of animal-to-human exchange, according to research from several NiV outbreaks. The potential for a worldwide pandemic brought on by NiV appears to be influenced by a variety of viral strains that have the capacity to spread from person to person, the accessibility of a vulnerable group of people, and the susceptible to mistakes characteristics of RNA virus reproduction. Worldwide epidemics can result from NiV disease epidemics in densely populated regions like South Asia because of the significant global travel and commerce connectivity. Many ecological and biological factors affect NiV influx into humans and the sensitivity of both people and animals to it.

## LABORATORY DIAGNOSIS

NiV illnesses in both people and animals can be confirmed by NiV isolation, immunological evaluation, and techniques that amplify viral nucleic acids. Nucleotide arranging of amplicons is used as a confirmation that reverse transcription polymerase chain reaction (RT-PCR), real-time RT-PCR (qRT-PCR), and duplex nested RT-PCR (nRT-PCR) are effective methods for identifying NiV disease.

## PREVENTION AND CONTROL MEASURES

### NIPAH virus action plan

1. A 24-hour control room
2. Just those who participate in control room operations are permitted access to the control room.
3. Validation of identity is required.
4. Travel in and out is noted in the record book.
5. Personnel of the crew of various ages must work in their designated regions.
6. There will be both day and night review meetings.

### A. Surveillance team

1.. will be overseen by DSOs and epidemiologists, and medical teams will conduct active surveillance.

2.Hospital surveillance and field surveillance.

Suspect Nipah case

## CONCLUSION

The 'One Hospital' approach is also quite important. The ecologists and virus researchers from the healthcare and veterinary medicine fields must collaborate across institutions and globally to completely understand the duration and mechanism of the virus's excretion by bats. At the exact time, people in general needs to be educated about food and personal cleanliness. Every import animal must be inspected both upon arrival before and prior to departure from the site of origination. Appropriate confinement, isolation, and disinfecting techniques, involving infrastructural facilities and trained personnel carrying protective gear, are needed setup as a way to react quickly upon the identification of another case. Persistent investigation in the domains of

human and animal wellness, and reservoir hosts is necessary to determine the frequency and predict the risk of transmission of viruses among human and swine populations. The discovery and development of antibody therapies or antiviral agents and preventative vaccines should be increased in order to treat sick people and successfully stop spreading the disease during a crisis. Collaborations like CEPI and the biotech sector will speed up the research and development of a vaccine or treatment for NiV.

## REFERENCES

1. Arankalle VA, Bandyopadhyay BT, Ramdasi AY, Jadi R, Patil DR, Rahman M, Majumdar M, Banerjee PS, Hati AK, Goswami RP, et al. 2011. Genomic characterization of Nipah virus, West Bengal, India. *Emerging Infect. Dis.* 17(5):907–909. doi: 10.3201/eid1705.100968.
2. Bellini WJ, Harcourt BH, Bowden N, Rota PA. 2005. Nipah virus: an emergent paramyxovirus causing severe encephalitis in humans. *J Neurovirol.* 11(5):481–487. doi: 10.1080/13550280500187435
3. Blum LS, Khan R, Nahar N, Breiman RF. 2009. In-depth assessment of an outbreak of Nipah encephalitis with person-to-person transmission in Bangladesh: implications for prevention and control strategies. *Am J Trop Med Hyg.* 80(1):96–102. doi: 10.4269/ajtmh.2009.80.96
4. Bossart KN, Zhu Z, Middleton D, Klippel J, Crameri G, Bingham J, McEachern JA, Green D, Hancock TJ, Chan YP, et al. 2009. A neutralizing human monoclonal antibody protects against lethal disease in a new ferret model of acute Nipah virus infection. *PLoS Pathog.* 5(10):e1000642. doi: 10.1371/journal.ppat.1000642.
5. Breed AC, Meers J, Sendow I, Bossart KN, Barr JA, Smith I, Wacharapluesadee S, Wang L, Field HE. 2013. The distribution of henipaviruses in Southeast Asia and Australasia: is Wallace's line a barrier to Nipah virus? *PLoS One.* 8(4):e61316. doi: 10.1371/journal.pone.0061316
6. Broder CC, Xu K, Nikolov DB, Zhu Z, Dimitrov DS, Middleton D, Pallister J, Geisbert TW, Bossart KN, Wang L-F. 2013. A treatment for and vaccine against the deadly Hendra and Nipah viruses. *Antiviral Res.* 100(1):8–13. doi: 10.1016/j.antiviral.2013.06.012
7. Chadha MS, Comer JA, Lowe L, Rota PA, Rollin PE, Bellini WJ, Ksiazek TG, Mishra AC. 2006. Nipah-virus associated encephalitis outbreak, Siliguri, India. *Emerg Infect Dis.* 12(2):235–240. doi: 10.3201/eid1202.051247
8. Chanchal DK, Alok S, Sabharwal M, Bijauliya RK, Rashi S. 2018. Nipah: silently rising infection. *Int J Pharm Sci Res.* 9(8):3128–3135. doi: 10.13040/IJPSR.0975-8232.9(8).3128-35
9. Chattopadhyay A, Rose JK. 2011. Complementing defective viruses that express separate paramyxovirus glycoproteins provide a new vaccine vector approach. *J Virol.* 85(5):2004–2011. doi: 10.1128/JVI.01852-10
10. Chattu VK, Kumar R, Kumary S, Kajal F, David JK. 2018. Nipah virus epidemic in southern India and emphasizing "One Health" approach to ensure global health security. *J Family Med Prim Care.* 7(2):275–283. doi: 10.4103/jfmprc.jfmprc\_137\_18