

# Nipah Virus Infection

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## Nature of the disease

Nipah virus is an emerging zoonotic disease, first described in 1999 and is caused by a virus of the Paramyxoviridae family. The disease, which is similar to another emerging zoonoses (Hendra virus), can spread from its wildlife reservoir to pigs and humans where it causes an often fatal disease.

## Classification

List D of SPC list disease, notifiable disease in most countries, highest biological security level (BSL 4).

## Susceptible species

The host range and susceptible species for Nipah virus are not yet entirely known, however recently conducted research has shown that the natural hosts are fruitbats of the Pteropus genus. To date four species of fruit bats, including two flying fox species, and one specie of insectivorous bat have been found to carry Nipah virus.

Humans are susceptible and among domestic animals, pigs are the most susceptible, whereas dogs, cats, goats and horses have shown evidence of infection without concurrent disease. Rodents and birds don't seem to be susceptible.

## Distribution

The first ever identified outbreak of Nipah virus occurred in Malaysia in 1999 which subsequently spread as far as Singapoure . In 2001, the OIE officially declared Malaysia free from Nipah virus infection in its pig population. However the disease may be still present in the bat populations. Considering the distribution of fruit bats and their ability to fly over long distances, the disease could be expected to be present among bats in neighboring areas.

## Clinical signs

There are no clinical manifestations of the disease in bats.

Clinical disease in pigs can be very subtle and a large proportion of pigs in a farm may not exhibit any clinical signs. The incubation period is estimated to be 7 to 14 days. Clinical observations in pigs were described during the 1999 outbreak in Malaysia and may vary according to the physiological stage and the age of the animals:

In suckling pigs, mortality was high and infected piglets showed symptoms of open mouth breathing, leg weakness with muscle tremors and neurological twitches.

In weaners and porkers, clinical signs included acute febrile illness with respiratory signs ranging from rapid and laboured breathing to harsh non-productive coughing. Blood-tinged mucous discharge from the nostrils appeared in severe cases. Neurological signs included trembling, twitching, muscular spasms, rear leg weakness and varying degrees of lameness or spastic paresis.

In sows and boars, clinical signs included sudden death, or acute febrile illness with laboured breathing (panting), increased salivation and serous, mucopurulent or blood-tinged nasal discharge. Neurological signs observed included agitation and head pressing, tetanus-like spasms and seizures, nystagmus, champing of mouth, and apparent pharyngeal muscle paralysis. Abortions were reported in affected sows.

## Post-mortem findings

Necropsies should be conducted on recently dead and euthanased acutely diseased pigs and should always be conducted with integral protective suits being worn (cf BSL-4). The post-mortem findings caused by Nipah virus infection in pigs are relatively non-specific. The lungs present mild to severe lesions with varying degrees of consolidation, emphysema and petechial-to-ecchymotic haemorrhages, and blood-tinged exudates in the airways. The meninges show generalized congestion and oedema.

## Differential diagnosis

In pigs the differential diagnosis should include

## Specimens required for diagnosis

Procedures for the laboratory diagnosis of Nipah virus infections include serology, histopathology, immunohistochemistry, electron microscopy, polymerase chain reaction (PCR), and virus isolation.

For serology serum needs to be removed from the clotted blood samples within 24 hours to avoid haemolysis. For histopathology and immunohistochemistry, formalin-fixed tissues specially lung and airway samples.

For electron microscopy, polymerase chain reaction (PCR), and virus isolation, a wide range of fresh tissues (lungs, spleen, kidneys, tonsil, central nervous system) can be used.

All samples have to be collected and packed according to internationally recognised standards.

## Transmission

Transmission Pigs can be infected orally and through contact with infected pigs.

Humans get infected by contact with infected pigs.

## Risk of introduction

The main risk of Nipah virus being introduced in the Northern Pacific Islands is through the migration of bats, since fruit bats and flying foxes are known to travel long distances.

Illegal importation of contaminated pigs is another possible means of introduction.

## Control / vaccines

There is no vaccine for Nipah virus.

Control of the disease requires a very high level of organisation and, a plan for emergency response to Nipah outbreak should always consider the followings: diagnostic and laboratories preparedness and eradication and surveillance programme. Such a plan is described in the Manual on the diagnosis of Nipah virus infection in animals.

## References

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3. FAO/APHCA (2002) Manual on the diagnosis of Nipah virus infection in animals, RAP publication n° 2002/01, Thailand, 90p.
4. Johara MY, Field H, Rashdi AM, Morrissy C, Van Der Heide B, Rota P, Bin Adzhar A, White J, Daniels P, Jamaluddin A, Ksiazek T (2001), Nipah Virus Infection in Bats (Order Chiroptera) in Peninsular Malaysia, Emerging Infectious Diseases, Vol. 7, No. 3, May-June 2001, p 439-441
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