

## Japanese encephalitis

Japanese encephalitis (JE) is an arthropod-borne viral zoonosis. JE is the leading cause of human viral encephalitis in South East Asia and India. Among domestic animals, pigs are the main amplifying host in which it can cause reproductive failure in pregnant sows. Horses and human exhibit encephalitis and are dead-end hosts.

Japanese encephalitis virus belongs to the genus *Flavivirus* of the family *Flaviviridae*. There is only one serotype of Japanese encephalitis virus, but 5 antigenic groups are differentiated by various immunological assays. Protein prM and E-proteins have been used as biomarkers for JEV genotyping. Genotype I is distributed throughout Asia. Genotype I and III are most commonly associated with epidemic disease.

Many different species are susceptible to natural JEV infection such as swine, horse and birds (90 wild and domestic species), cattle, sheep, goat, dog, cats, bats, rodents, wild mammals, reptiles, amphibians, and humans. Pigs have been shown to amplify JEV transmission and increase the risk of transmission to humans and horses in a region. Water fowl such as the Black-crowned night heron and plumed egret are thought to be the main reservoir for JEV transmission. JE virus is transmitted through the bite of an infected mosquito, primarily *Culex* species. Other important amplifying hosts are herons, egrets and other ardeid birds that also act as maintenance hosts and may contribute to the long-distance dissemination of JEV into new geographic locations.

### Diagnosis in animals

Diagnosis is based on clinical signs. The sample of choice for laboratory diagnosis is fresh brain tissue; other suitable samples for testing include whole blood, tonsils, CSF, and spinal cord, spleen, liver or placental tissues from stillborns, neonates or fetuses. The collected samples should be refrigerated and shipped swiftly on wet ice.

### Virus Isolation and Identification

Infected tissues are preferred for virus isolation, as isolation from blood and CSF is rarely achieved. Cell lines such as C6/36 (*Aedes albopictus*) cells, AP61 cells, primary chicken embryo fibroblast, duck embryo cells, LLCMK2, Baby hamster kidney (BHK-21), African green monkey kidney cells (Vero) or porcine stable equine kidney (PS) cells are utilized for isolation.

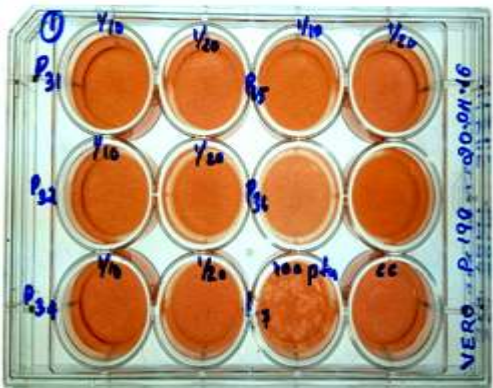
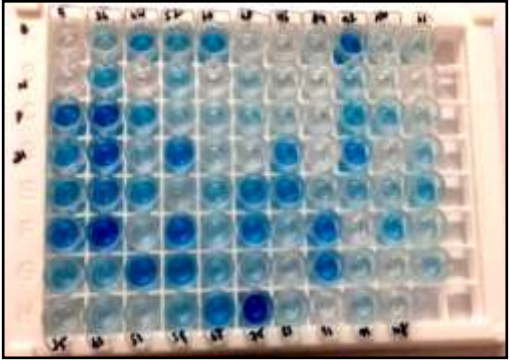
## Detection of viral antibody

A variety of diagnostic tests used for the serodiagnosis of viral infections. The more traditional assay includes complement fixation (CF), haemagglutination inhibition (HI), neutralisation (NT), immune adherence haemagglutination (IAHA), and indirect and anti-complement (ACIP), immunofluorescence (IFA). The selection of test will depend on the patient population and clinical situation, the number of specimen to be tested, turnaround time, ease of testing and the resources and capability of the individual laboratory.

Neutralization test (NT) assays detect functional virus specific antibodies capable of neutralizing or blocking the infectivity and replication of a given virus within a cell culture system. For greater accuracy, a Plaque Reduction Neutralisation Test (PRNT), followed by a Microneutralization test with a panel of viruses to incriminate the actual virus involved is considered optimal. Commercially available Japanese encephalitis antibody IgG ELISA kits are also used for screening of pig and horse serum samples.

## Detection of Viral Antigen

Nucleic acid amplification has become a valuable tool for the diagnosis of infectious diseases. The most prominent of methods are such as reverse transcription PCR (RT-PCR), nested PCR and multiplex PCR and real-time PCR. Sequencing of the PCR products allows for confirmation of infection and phylogenetic analysis allows for genotype determination.

	
Detection of antibodies in pig samples by Plaque Reduction Neutralization Test using chimeric JE virus: plaques detectable in well C3	Japanese encephalitis virus IgG ELISA- Pig samples

## Vaccination

Currently, about 12 licensed vaccines are available for use in horses and pigs. Both live and inactivated vaccines are available. Live vaccines are used in pigs only; vaccines are available as mono-component or multi component products. Countries making such vaccines include China, Japan and South Korea. Decision to use the vaccine in animals is dictated by the incidence and impact of the disease. In India animal JE vaccination is not practiced.

