

## Japanese Encephalitis Virus

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### Introduction

Japanese Encephalitis Virus (JEV) is an arbovirus belonging to the family Flaviviridae. It is maintained in a zoonotic cycle involving pigs, ardeid birds, and *Culex* species of mosquitoes. Humans are accidental/dead-end hosts of JEV infection because they cannot sustain high viral titers. Factors affecting the clinical manifestations and pathogenesis of JEV infection are not well understood.

Japanese Encephalitis is a viral infection transmitted by culex mosquitoes that bite from dusk to dawn in an enzootic cycle between mosquitoes and vertebrate hosts, primarily pigs and wading birds. Japanese encephalitis virus (JEV) is primarily a disease of childhood, with most cases occurring among children younger than 15 years. The disease develops in less than 1% of infected persons. JEV occurs year-round in tropical regions and primarily from May through October in temperate zones. The risk is greatest for travellers to rural Asia, where the mosquito breeds in rice fields and other agricultural areas.

**Keywords:** Pathogenesis, precursor, mummified fetus, genome.

### JEV genome

JEV is an enveloped virus about 50 nm in diameter with a single-stranded (ss), plus sense, RNA genome of ~11 kb in length. The genome is organized into a capsid formed by multiple copies of capsid (C) protein, which is covered by a host-derived lipid bilayer. The genome has one open reading frame (ORF) encoding for a single polyprotein, which is cleaved into 3 structural proteins – capsid (C), precursor to the membrane (prM), envelope (E), and 7 non-structural proteins – NS1, NS2A, NS2B, NS3, NS4A.

### JEV symptoms in humans

- Majority infections inapparent. Clinical signs in 1:300 to 1:1000.
- The incubation period is 5-15 days
- Mild headache, high fever, stiff neck, abnormal movements
- Impaired consciousness and coma

- Case fatality rate in JE is high (20-50%).

### **JEV disease in animals**

#### **Horses**

- Usually sub clinical, fever, impaired locomotion,
- Stupor, teeth grinding
- Blindness, coma and death are rare

#### **Pigs**

- Sows: Exposure early in pregnancy, birth of still born or mummified fetus
- Piglets: Neurological signs, death
- Boars: Infertility, swollen testis

### **Treatment and prevention**

The flaviviral infections are spreading to new areas, which is alarming and calls for measures to control. In general the flaviviral control programmes include mosquito control (spraying of pesticides, impregnated mosquito nets), pig control (segregation, slaughtering, and vaccination) and human vaccination.