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# Pathogenesis of Thai duck Tembusu virus in BALB/c mice: Descending infection and neuroinvasive virulence

Nichapat Yurayart[1] | Patchareeporn Ninvilai[2] | Theeraphap Chareonviriyaphap[3] | Theerayuth Kaewamatawong[4] | Aunyaratana Thontiravong[1,2] | Sonthaya Tiawsirisup[1]

[1]Animal Vector-Borne Disease Research Unit, Veterinary Parasitology Unit, Department of Veterinary Pathology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok, Thailand

[2]Department of Veterinary Microbiology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok, Thailand

[3]Department of Entomology, Faculty of Agriculture, Kasetsart University, Bangkok, Thailand

[4]Veterinary Pathology Unit, Department of Veterinary Pathology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok, Thailand

**Correspondence**
Sonthaya Tiawsirisup, Animal Vector-Borne Disease Research Unit, Veterinary Parasitology Unit, Department of Veterinary Pathology, Faculty of Veterinary Science, Chulalongkorn University, Bangkok 10330, Thailand.
Email: sonthaya.t@chula.ac.th, sonthayatiaw@hotmail.com

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## Abstract

Duck Tembusu virus (DTMUV) is an emerging flavivirus that causes systemic disease in an avian host. The predominant cluster of DTMUV circulating in Thailand was recently classified as cluster 2.1. The pathogenesis of this virus has been extensively studied in avian hosts but not in mammalian hosts. Six-week-old BALB/c mice were intracerebrally or subcutaneously inoculated with Thai DTMUV to examine clinical signs, pathological changes, viral load and virus distribution. Results demonstrated that the virus caused disease in BALB/c mice by the intracerebral inoculation route. Infected mice demonstrated both systemic and neurological symptoms. Pathological changes and virus distribution were observed in all tested organs. Viral load in the brain was significantly higher than in other organs ($p < .05$), and the virus caused acute death in BALB/c mice. The virus was disseminated in all parts of the body, but no virus shedding was recorded in saliva and faeces. Findings highlighted the potential of Thai DTMUV to transmit disease in mammalian hosts.

**KEYWORDS**

BALB/c mice, duck Tembusu virus, pathogenesis, virus distribution

## 1 | INTRODUCTION

Duck Tembusu virus (DTMUV) is a newly emerging virus that transmits disease in avian hosts, especially ducks and chickens. Infected animals manifest clinical symptoms including loss of appetite, retarded growth, depression and a decrease in egg production. DTMUV infected animals also demonstrate extraordinary clinical signs such as paralysis, walking in circles and blindness signifying nervous system infection. Morbidity and mortality rates were recorded at 90% and 5%–30%, respectively (Cao et al., 2011;

  