Isolation of Ingwavuma Virus from Domestic Pigs

Principal Investigators: Franklin H. Top, Jr., LTC, MC
Harry Rozmiarek, MAJ, VC
Dennis O. Johnsen, MAJ, VC
Nongard Sahakasmontri, B.S.
Ananda Nisalak, M.D.*

BACKGROUND: Detailed in the 1971 – 1972 SMRL Annual Report was the isolation of Ingwavuma from a *Culex vishnui* pool obtained in the Chiangmai Valley in 1970 and serologic evidence that domestic pigs indigenous to the valley were commonly infected with Ingwavuma (or a closely related virus). Studies undertaken during the past year have established Ingwavuma antibody prevalence in areas of Thailand other than the Chiangmai Valley, have demonstrated natural infection of Thai pigs with Ingwavuma virus, and have extended the range of this virus eastward to Taiwan.

RESULTS:

Prevalence of Ingwavuma Antibody in Thai Pigs from Areas Other Than Chiangmai: Sera of 20 pigs from each of 3 areas of Thailand – Kanchanaburi in the West, Udorn in the Northeast, and Saraburi in the Central plains – were tested for neutralizing (NT) antibody at a 1:20 serum dilution by the micro – plaque reduction neutralization test (PRNT) described in last year's annual report. Serum was considered to have antibody if it reduced the number of plaques to less than 80% of the control plaque counts. Ingwavuma antibody was found in pigs from all 3 areas, suggesting a broad distribution of this virus in Thailand; the prevalence was 50% in pigs at Kanchanaburi, 45% at Saraburi, and 10% at Udorn.

Natural Infection of Thai Pigs: In March 1972, the Department of Veterinary Medicine began a study at the Tubkwang Breeding Farm of Kasertsart University in Saraburi Province to determine the effects of Japanese encephalitis infections in pregnant sows. Beginning in April, serum for viral serology was obtained biweekly on study animals and weekly blood specimens were inoculated directly into weanling mice which were transported to SMRL and observed. Brain suspensions of dead or sick mice were further passaged in suckling mice.

Twenty–eight pregnant sows were thus studied from April through July 1972. No Ingwavuma isolates were obtained from the 6 animals who had NT antibody at the start of the study. Of the 22 animals initially lacking NT antibody, 16 had serologic evidence of infection and isolates were recovered from 11 (Table 1). Only one isolate was obtained per animal, suggesting that the duration of Ingwavuma viremia in pigs is less than one week. All but two of the isolates were from blood collected in the 2 week period from 21 April through 7 May. Significant rainfall occurred in Saraburi in March and April. Convalescent antibody titers of infected pigs ranged from 1:160 to $\geq$ 1:640, the geometric mean titer was 1:360.

Ingwavuma Isolates from Nam Phong, Thailand, and Taiwan: In addition to the Saraburi isolates, three strains of Ingwavuma virus were isolated from blood obtained from pigs near Nam Phong Air Force Base in the Korat Plateau. Three virus strains isolated from pig blood in Taiwan by Dr. Ananda Nisalak of NAMRU 2 have been shown to be identical to Ingwavuma virus by PRNT with hyperimmune BKM 705 antisera.

DISCUSSION: Isolation studies undertaken during the past year have confirmed the hypothesis developed from past antibody prevalence studies that pigs are an important host of Ingwavuma virus in Southeast Asia. Our studies have expanded the range of this virus previously isolated only in Africa and India through Thailand to Taiwan. Further studies of the virus which rarely if ever infects humans are not planned.

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*US Naval Medical Research Unit No. 2

Table 1. Natural Ingwavuma Infections in Pigs, Saraburi, 1972

Ingwavuma NT Antibody Status		Number of Pigs	
March 1972	July 1972	Studied	With Ingwavuma Isolates
Absent	Present	16	11
Absent	Absent	6	0
Present	Present	6	0