

ISOLATION OF BATAI VIRUS FROM SENTINEL DOMESTIC PIG FROM KOLAR DISTRICT IN KARNATAKA STATE, INDIA

G. GEEVARGHESE, N.Y. PRASANNA, P. GEORGE JACOB, HANUMAIAH, H.R. BHAT

National Institute of Virology, 20-A, Dr. Ambedkar Road, Pune 411 001, India

Received February 4, 1994

Summary. – Batai virus was isolated from the blood sample of one sentinel piglet out of 34 used to monitor the activity of the Japanese encephalitis (JE) virus at Madikere village in Kolar district, Karnataka State, India. This is the first report of the isolation of Batai virus from a mammal.

Key words: Batai virus; domestic sentinel pig

Batai virus was first isolated in Malaysia from *Culex gelidus*, subsequently in Czechoslovakia (known as Čalovo), India (known as Chittoor), former USSR, Thailand and Cambodia (Casals and Whitman, 1960; Bárdoš and Čupková, 1962; Singh and Pavri, 1966; International Catalogue of Arboviruses, 1985). All these isolates were from mosquitoes and determined to be identical. Antibodies against this virus were found in wild birds, man, rodents, bats, domestic animals such as goats, sheep, camels, cattle, buffaloes and reindeer, but no isolation of the virus has been obtained from mammals so far (Pavri and Sheikh, 1966; Karabatsos, 1985).

This communication presents the isolation of a strain of Batai virus from one of the piglets used as sentinels to monitor the activity of JE virus at Madikere village in Kolar district, Karnataka State, India (Geevarghese *et al.*, 1987).

Piglets in the age group of 2 weeks to 4 months were selected and used in the study. Serial blood samples were collected from these pigs at one interval of 10 days during September to December and at another interval of one month during January to August, 1986. Blood was collected from anterior vena cava of piglets and transported immediately on ice to the laboratory at Bangalore, where sera were separated and stored at -50 °C until screening for both antibodies and viruses. Antibodies were screened by haemagglutination inhibition (HI) test against JE and West Nile (WN) viruses and by neutralization test against JE and Batai viruses (Shope and Sather, 1979).

A single isolate of Batai virus was obtained from blood of a 11 months-old female piglet collected on November 13, 1986, out of 34 piglets used during the study. The serum sample was inoculated into a group of seven 2 day-old mice on May 4, 1987, by intracerebral (0.02 ml/mouse) and sub-

cutaneous (0.03 ml/mouse) routes. One of the 7 mice became sick on day 8 post inoculation and the brain of the sick mouse was harvested and passaged into another group of mice by the same routes. No signs of sickness were observed in the remaining 6 mice of the first passage. The isolate was filtered through a Seitz EK filter pad at 4th passage level and identified as Batai virus at the 6th passage level by complement fixation and neutralization tests (Casals, 1967; Shope and Sather, 1979). Reisolation of the virus from the original serum sample which was stored at -50 °C for 32 days was not successful. The virus strain was pathogenic by both ic and ip routes in infant mice and only by ic route in adult mice (3 to 4 week-old). Seroconversion to Batai virus (homologous virus isolate) was demonstrated by partially positive neutralizing antibodies to Batai virus in blood sample collected 14 days after the virus isolation. Subsequent samples could not be obtained as the pig was not more available.

It was interesting to note that 56 days prior to the isolation of Batai virus, the same pig had seroconverted to JE/WN viruses as confirmed by the HI test. Neutralizing antibodies to JE virus were also detected after the seroconversion mentioned above, indicating sequential infections of the same pig by both JE and Batai viruses.

Incidence of antibodies against Batai virus has been reported in vertebrates from many states in India, namely Tamil Nadu, Maharashtra, Gujarat, Orissa, West Bengal, Assam, Arunachal Pradesh, Uttar Pradesh, Punjab and Jammu and Kashmir (Pavri and Sheikh, 1966). The vertebrates include humans and a wide variety of domestic

animals such as cattles, buffaloes, sheep, goats, horses, mules, donkeys, camels etc. However, so far in India or else where there has been no report of isolation of Batai virus from domestic animals.

During our studies in Kolar district, Batai virus has also been isolated from three species of mosquitoes, namely *Culex tritaeniorhynchus*, *Cx. pseudovishnui* and *Anopheles subpictus* (data not shown). All these species are known to feed on domestic pigs. Porcine kidney cells have also been shown susceptible to this virus (Gogate, 1976). These findings indicate domestic pigs as a possible host of Batai virus in nature.

Acknowledgements. The authors wish to thank Dr. K. Banerjee, the Director and Dr. K.M. Pavri, the former Director of the National Institute of Virology, Pune, for providing facilities to carry out this work. The assistance rendered by the field staff of the National Institute of Virology, Units in Kolar and Mysore is also acknowledged.

References

- Bárdoš, V., and Čupková, E. (1962): The Čalovo virus: The second virus isolated from mosquitoes in Czechoslovakia. *J. Hyg. Epidemiol. Microbiol. Immunol.* **6**, 186–192.
- Casals, J., and Whitman, L. (1960): The antigenic group of arthropod-borne viruses: The Bunyamwera group. *Am. J. trop. Med. Hyg.* **9**, 73–77.
- Casals, J. (1967): Immunological techniques for animal viruses. In C. Maramosch and H. Koprowski (Eds): *Methods in Virology*, Vol. 3. Academic Press, New York, p. 113.
- Gogate, S.S. (1976): Susceptibility of Porcine Kidney (PK) cell line to infection with Arboviruses isolated in India. *Indian J. med. Res.* **64**, 83–86.
- Geevarghese, G., Sheikh, B.H., George Jacob, P., Bhat, H.R., and Pavri, K.M. (1987): Domestic pig as sentinels to monitor the activity of Japanese encephalitis and West Nile viruses in Kolar district, Karnataka. *Indian J. med. Res.* **86**, 413–418.
- Karabatsos, N. (1985): *International Catalogue of Arboviruses*. The American Society of Tropical Medicine and Hygiene, San Antonio.
- Pavri, K.M., and Sheikh, B.H. (1966): Distribution of antibodies reacting with Chittor virus in human and domestic ungulates of India. *Indian J. med. Res.* **54**, 225–228.
- Singh, K.R.P., and Pavri, K.M. (1966): Isolation of Chittor virus from mosquitoes and demonstration of serological conversions in sera of domestic animals at Manjri, Poona, India. *Indian J. med. Res.* **54**, 220–224.
- Shope, R.E., and Sather, G.E. (1979): Arboviruses. In E.H. Lennette and N.J. Schmidt (Eds): *Procedures for Viral, Rickettsial and Chlamydial Infections*. American Public Health Association, Washington, DC, p. 767.