

Prevalence of neutralising antibodies to Berne virus in animals and humans in Vellore, South India

Brief Report

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Summary. In Southern India the prevalence of neutralising antibody to Berne virus was high in sera obtained from cattle (49%), horses (38%), and sheep (36%). Neutralising antibody was not detected in sera from humans and monkeys.

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Berne virus was isolated from a horse with diarrhoea in 1972 in Berne (Switzerland), but not described until 1983 [10]. The demonstration of its unique morphology by electron microscopy [9], polypeptide profile and genome expression [5, 8], have led to the proposal that Berne virus should be the prototype strain of a new family of viruses, the Toroviridae [6, 7]. Although Berne virus has yet to be associated with any disease, Breda virus, a closely related virus, has been shown to cause diarrhoea in gnotobiotic calves and colostrum deprived calves [12]. A high prevalence of antibody to Berne virus has been demonstrated in domestic animals in Europe and the U.S.A. [11]. It has also been suggested that toroviruses may be circulating in man [2]. Torovirus-like particles were observed in human faecal specimens by electron microscopy, and these particles were clumped by antisera raised against Breda virus [2] and Berne virus [3]. We have looked for the presence of this new family of enteric viruses in South India by investigating the prevalence of neutralising antibody to Berne virus in sera collected from animals and humans.

158 sera were collected from the adult inhabitants of four villages near Vellore, 57 of whom were suffering from epidemic tropical sprue, a malabsorption syndrome of unknown aetiology [1]. 208 sera were collected from domestic animals in one of the villages, in Vellore town and from wild monkeys. All sera were stored at -20°C until tested. Sera were tested for neutralising activity against Berne virus (Strain P138, 1972) in embryonic mule skin cells

Table 1. Distribution of Berne virus neutralising antibodies in different animal species and humans

Species	Number tested	% Positive*
Humans	158	0
Monkey (<i>macaca radiata</i>)	38	0
Cattle	53	49
Calves	13	8
Goat	25	8
Horses	13	38
Donkey	30	23
Pig	11	9
Sheep	25	36

* Neutralising titre > 1:5

(EMS) grown in microtitre plate. Serial dilutions of serum were incubated with 100 TCID₅₀ of Berne virus for 1 h at 37°C before the addition of EMS cells to each well. The cells were observed for cytopathic effect for 1 to 5 days.

A summary of the results is shown in Table 1. A high prevalence of antibody was found in cattle sera (49%), horse sera (38%) and sheep sera (36%). A low prevalence of antibody was detected in pig sera (9%) and goat sera (8%), and no antibody was detected in the human and monkey sera tested. High titres of antibody were found in the sheep sera tested (mean 76 range 5–220), but lower titres were found in cattle sera (mean titre 14 range 5–20) and horse sera (mean titre 8.0 range 5–20).

A high prevalence of antibody to Berne virus has previously been reported in animal sera from Europe [11], and we have demonstrated that Berne related viruses are circulating in sheep, cattle and horses in South India. The prevalence of antibody reported here is significantly lower than that described in Europe, which may be related to the different methods of animal rearing. In South India individual villagers tend to own only a few animals which because of their value to the family are kept in the family compound with only limited communal grazing, in contrast to the large herds and flocks of commercial farming in Europe and the U.S.A. The degree of antigenic relatedness between different toroviruses is not known, but the finding here of low titres of Berne neutralising antibody in cattle and horses, suggests that more distantly related toroviruses may be circulating in Vellore.

As in previous studies from temperate climates of blood donors [11] and veterinarians [4] we were unable to find neutralising antibody to Berne virus in the human sera tested, despite the close human-animal contacts of the villagers. In addition the finding that none of the monkey sera tested contained Berne neutralising antibody suggests that primates in general may not be susceptible to the Berne related viruses. However, this does not exclude the possibility that a serologically unrelated torovirus may be circulating in primates.

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