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Innocuity and immunogenicity of an eHDV-2 vaccine in pregnant cows

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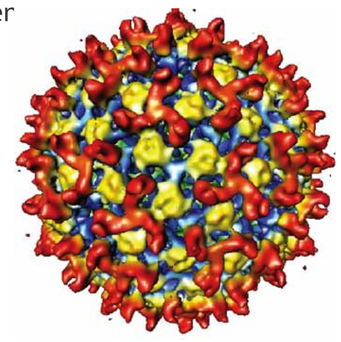
Introduction

Epizootic haemorrhagic disease (EHD) is an infectious non contagious viral disease of certain wild ruminants and rarely cattle. The disease when occurred is similar to that caused by bluetongue virus in sheep; in cattle abortions and stillbirths have also been observed.

Seven serotypes (1 to 7) of Epizootic Haemorrhagic Disease virus (EHDV) have beer described worldwide.



In Japan, as an effort to control the disease, live attenuated vaccines derived from the Ibaraky (EHDV serotype 2) strain have been developed and used.

The present study aimed to test the safety, innocuity and immunogenicity of an EHDV2 vaccine strain (Ibaraki virus, Kyoto Biken, Laboratories, Kyoto, Japan) (from now on, vEHDV2) in pregnant cows. Moreover, for the first time it was also assessed the capability of an EHDV attenuated virus to cross the placental barrier and infect foetuses.

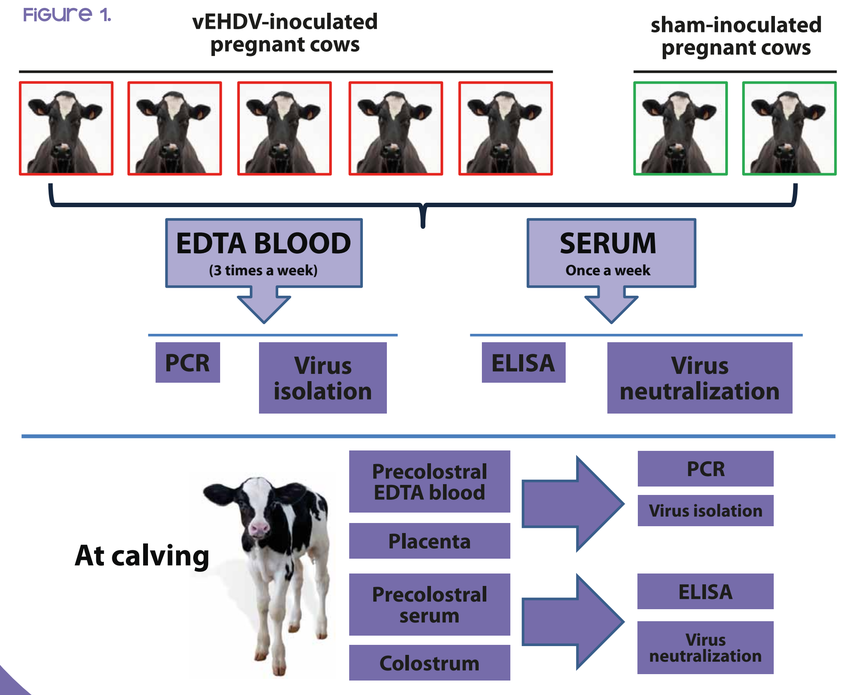
materials and methods

Five late-term pregnant cows were subcutaneously inoculated with 10^6 $TCID_{50}$ of vEHDV2. Two cows were sham-inoculated and served as control.

Following vaccination, rectal temperature and clinical signs referable to infection were monitored daily. EDTA-blood samples were collected three times a week and tested for the presence of EHDV RNA and infectious virus by PCR and virus isolation, respectively; serum samples were collected once a week and tested for EHDV2 antibodies by ELISA and virus-neutralisation.

At calving, EDTA-blood and serum samples from calves (before colostral intake) as well as colostrum from dams were collected, and tested serologically and virologically. The sampling schedule was then similar to that applied for the dams. Whenever possible, placenta was collected and tested for the presence of EHDV RNA and infectious virus (**Figure 1**).

Figure 1.



Results

Control cows and calves tested negative throughout the entire experimental period.

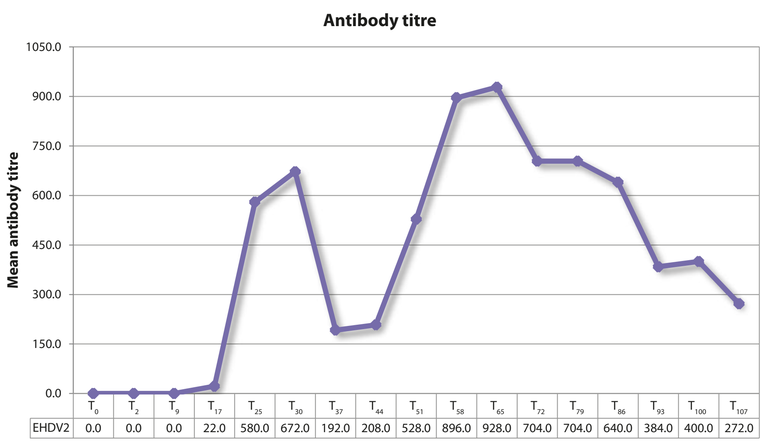
Neither fever nor signs of disease were observed in the vaccinated cows, and their blood samples tested always negative in PCR and virus isolation, except for one blood sample collected from a cow, 11 days post-vaccination (PV), from which infectious virus was isolated.

Four vaccinated cows seroconverted on day 17 PV, and one on day 25 PV. Antibodies were detected throughout the entire experimental period (107 days PV). Mean antibody titres peaked on day 65 PV (Mean 1:928) (**Figure 2**).

Collected placenta tested always negative.

The cows calved between 25 and 52 days PV. All pre-colostrum samples from calves were negative. Colostral antibody titres ranged from 1:40 to 1:1280; nevertheless, only in one calf neutralising titres (1:10) were found after the colostrum intake.

Figure 2. Mean neutralising antibody titers of pregnant cows after infection with vEHDV2.



	T_0	T_2	T_9	T_{17}	T_{25}	T_{30}	T_{37}	T_{44}	T_{51}	T_{58}	T_{65}	T_{72}	T_{79}	T_{86}	T_{93}	T_{100}	T_{107}
EHDV2	0.0	0.0	0.0	22.0	580.0	672.0	192.0	208.0	528.0	896.0	928.0	704.0	704.0	640.0	384.0	400.0	272.0

Discussion and conclusions

This trial shows that vEHDV2 is innocuous. It did not cause either clinical signs or abortions in the vaccinated cows. As one animal only evidenced detectable viraemia for one day following vaccination, the product could be considered safe in terms of spreading the vaccine virus in the environment. Furthermore, the vaccine was immunogenic, as it was able to elicit a strong and long-lasting immune response in vaccinated animals. Regarding the capability to cross the placental barrier, a feature commonly observed for Bluetongue vaccine viruses, the vEHDV did not cross the placenta and infect foetal tissues.

References

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