Determination of the fetal protection in pregnant heifers challenged with bovine viral diarrhea type 1 virus twelve months after one administration of a live-attenuated vaccine

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Objective

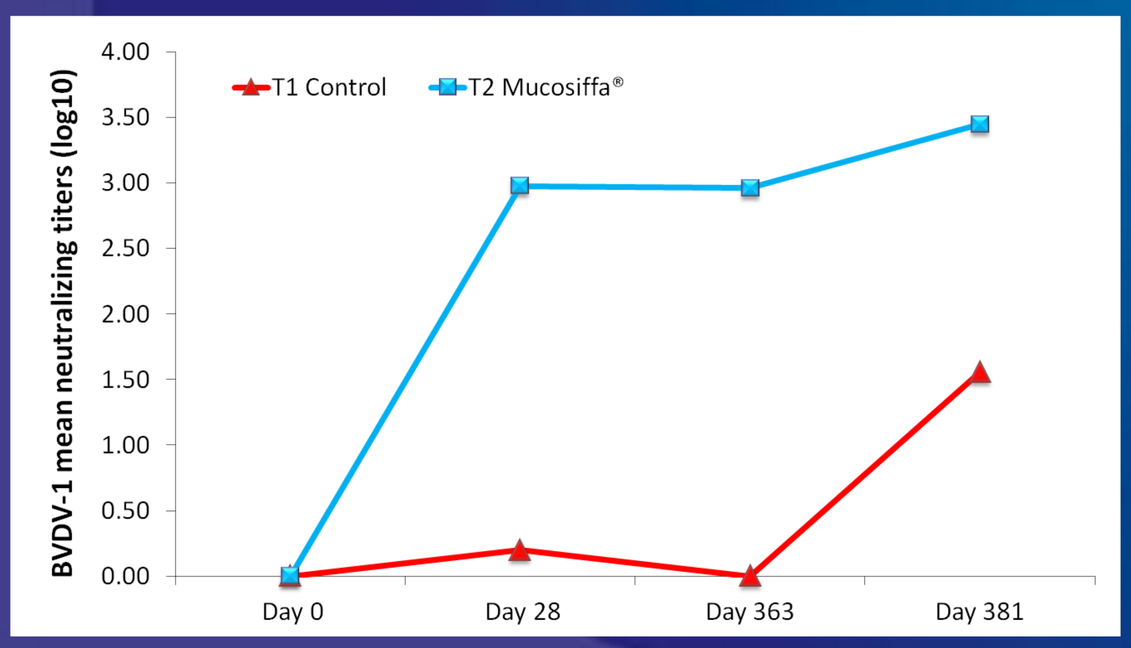
Mucosiffa® (Ceva Santé Animale) is a modified-live vaccine (MLV) used for the control of bovine viral diarrhea virus (BVDV) infection. In pregnant heifers experimentally challenged by BVDV-1, one administration of Mucosiffa® 126 days before challenge had been proven to prevent fetal infection[1]. Because current practices in cattle farms favors yearly vaccination schedules, a new experiment was carried out to evaluate the level of fetal protection obtained in pregnant heifers challenged twelve months after one administration of Mucosiffa®.

Materials and methods

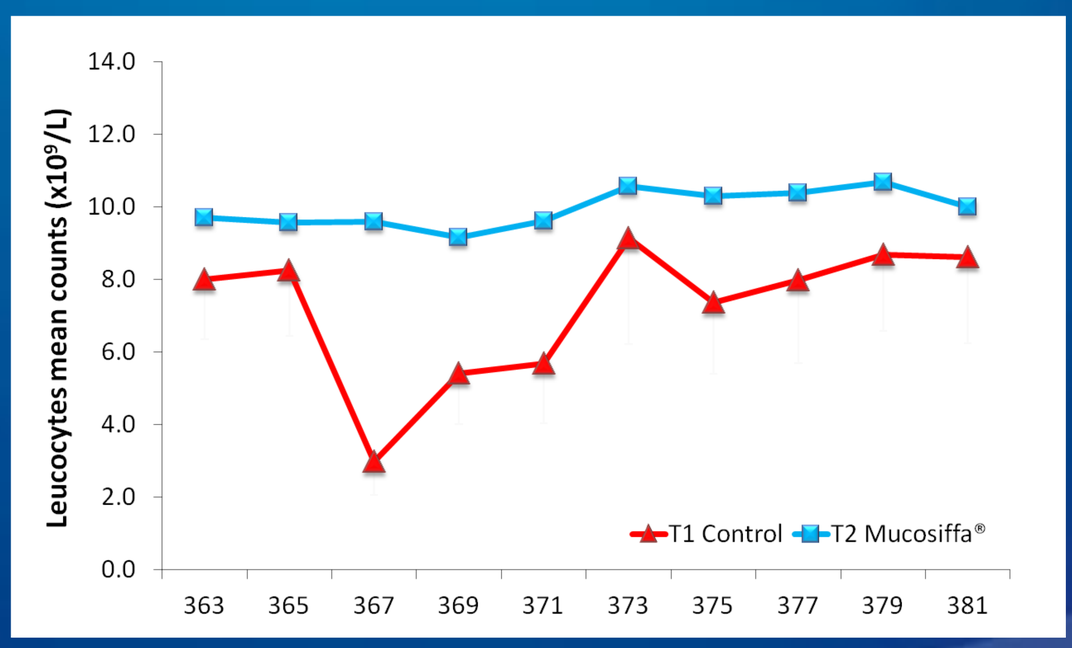
32 Holstein heifers free of BVDV were randomly allocated to one of the following group at day 0: T1 control (non vaccinated heifers, n=12) or T2 (heifers vaccinated with Mucosiffa®, n=20). All heifers were synchronized and received AI at day 276/277. On day 363, 15 pregnant heifers (5 from group T1, 10 from group T2) were challenged via the intranasal route with a BVDV-1 strain. Heifers were euthanized 28 or 29 days after challenge and their fetuses were harvested for the detection of the challenge virus in placenta and spleen (rt-PCR). Blood samples were collected from heifers at various times in the study to document their serological status (neutralizing antibody titers) and hematological parameters.

Results

All 32 heifers were seronegative for BVDV-1 antibodies at day 0. All vaccinated heifers successfully seroconverted 28 days after being vaccinated and maintained a high level of neutralizing antibodies while all control heifers remained seronegative until challenge (day 363).



In control heifers, post-challenge period was marked by a peak of rectal temperature (RT) at day 367 (mean=39.6°C) and a marked decrease in leucocytes and lymphocytes counts. On the opposite, RT and hematological parameters of vaccinated heifers remained unchanged during the post-challenge period.



The challenge virus was detected in all fetuses from the control heifers and not detected in any fetuses from the vaccinated animals.

	Heifers vaccinated with Mucosiffa® (n=10)	Control heifers not vaccinated (n=5)
Detection of virus strain in fetal spleen	0%	100%
Detection of virus strain in placenta	0%	100%
FETAL PROTECTION	**100%**	**0%**

Conclusions

Mucosiffa® is a safe MLV that provides 100% fetal protection to breeding females for at least one year after one intramuscular administration.

1. Meyer, G. et al. Fetal protection against bovine viral diarrhoea type 1 virus infection after one administration of a live-attenuated vaccine. Vet. J. Lond. Engl. 192, 242–245 (2012).