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ES 17: EPIZONE: TRANSMISSION DYNAMICS OF BVDV-1 AND THE NOVEL ATYPICAL BOVINE

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Bovine viral diarrhea (BVD) is an OIE notifiable disease that has significant economic impact on the cattle industry world-wide. BVD is also an animal welfare concern; depending on the virus strain and host factors, the clinical manifestation of infection may vary from asymptomatic or mild to severe or even fatal disease. Consequences of infection may include reproduction failure, poor reproductive performance, and susceptibility to secondary infections due to the immunosuppressive effects of BVD. Persistently infected (PI) calves serves as a virus reservoir. BVDV is a pestivirus in the Flaviviridae family; BVDV-1 and BVDV-2 are recognized as unique species. Novel group of pestivirus, informally named BVDV-3 was described recently in bovine sera of South American and Asian origin. The presence of those atypical BVDVs in other continent is unknown, however without proper control measures, the virus contaminating veterinary reagents and vaccines could have spread further. Our study is the first one describing clinical outcome and dynamics of the infection of cattle with novel BVDV.

The aim of this study was to characterize the competition between BVDV strains in vivo during an experimental study in young calves. To investigate virus replication dynamics, possible recombination events, clinical signs, and virus transmission in calves infected with BVDV. Additional objective was to validate detection system for atypical BVDVs. The experiment included groups of five 5-6 months old, BVD negative calves. The groups were:

1. BVDV-1 group: inoculated with BVDV type 1
2. BVDV-3 group: inoculated with the novel atypical strain Th/04_KhonKaen
3. BVDV 1&3 group: inoculated with a mixture of BVDV 1 and 3
4. Control group: inoculated with Eagles MEM

Each animal in group 1-3 received 5 ml of 105 TCID50 of inoculum i.m. and 5 ml intranasally.

Serum samples from all the calves were tested for presence of virus and antibodies. The virus population and replication dynamics were quantified by real-time RT-PCR, sequence analysis. The calves were euthanized post infection day (PID) 42, necropsy performed and tissues collected.

Preliminary results indicate that experimental inoculations in all three groups were successful based on antibody response, virus shedding, clinical picture and blood analysis. Pyrexia was observed in BVDV-1 and BVDV-3 groups on PID 7-9 while in BVDV 1&3 PID 7-10. Statistically significant decreases in white blood cell counts were observed PID 5 in BVDV-1 and BVDV-3 groups; PID 7 in BVDV 1&3 group and PID 14 in BVDV-1 and BVDV 1&3 groups. Significant decreases of lymphocyte counts were observed in all virus infected groups on PID 2-5-7. Viraemia based on antigen ELISA on serum samples was observed in all three inoculated groups between PID 5 and 9 with the maximum O.D. values on PID 7. Immune response based on ELISA test for antibodies (O.D. values above cut off) was detected PID14 in BVDV-1 group and PID 21 in BVDV-3 and BVDV 1&3 groups. While O.D. values for BVDV-1 and BVDV 1&3 groups were similar, the readings for BVDV-3 were almost 50% lower between PID 21 and 42. Ongoing analysis is directed towards strain specific real time RT-PCR to quantify viral RNA loads in the blood and nose swabs, virus neutralization test against homo- and heterologous virus strains and virus detection in cell culture. Specific cellular and humoral immune response would be also evaluated based on cytokine and T-cell responses. The result will be presented.