

Immunohistochemical Test on Skin Biopsies as a Method for Detection of Cattle Persistently Infected with Bovine Viral Diarrhea Virus

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A novel rapid method for identification of cattle persistently infected (PI) with bovine viral diarrhea virus (BVDV) was examined. Individual cattle PI with BVDV serve as a source of infectious virus within cattle herds. Identification of cattle which are PI with BVDV is a clinical challenge, since many PI cattle appear clinically normal. BVDV infects a wide variety of tissues and cell types, particularly cells of the monocyte macrophage lineage. Cells of this lineage are present in the skin. BVDV antigen can be readily detected by the immunohistochemical (IHC) method.

We hypothesized IHC testing skin biopsies might be a useful method to identify BVDV PI animals. We collected serum samples and skin biopsies (in the form of ear notches) from cattle suspected of being PI with BVDV and from cattle known to not be PI. IHC test for the presence of BVDV antigen was performed on the skin biopsies. These results were compared against the rapid virus isolation method which utilized serum as the inoculum for cell cultures in microtiter plates (MPVI). Specimens originated from cattle from six different herds located in various regions of Nebraska. The age of the cattle in this study ranged from two to ten months. A total of 24 cattle were tested. Samples of

serum and skin were collected simultaneously without prior knowledge of BVDV infection status from ten of the calves. Samples of skin with a supplemental serum sample were collected from 14 of the calves after an initial serum sample had been collected and tested by MPVI. Of the 24 cattle, 14 were positive by both methods and 9 were negative by both methods. Samples from one calf had discordant results. The discordant samples were positive by IHC and negative by MPVI. BVDV was isolated by conventional methods from the serum from that calf. That calf was from the group of calves where serum and skin were collected without prior knowledge of their infection status. The Kappa value for agreement of the two tests beyond the role of chance was 0.91 with a 95% confidence interval of 0.75 to 1.

IHC testing for the detection of persistent infection may be an alternative to MPVI. These preliminary results suggest the agreement between the IHC method and MPVI is high and IHC may be more sensitive than MPVI. Collection of specimens for IHC is as simple as collection of specimens for MPVI and the specimen is more stable since it is fixed in formaldehyde and does not need to be refrigerated for optimal results.