

Shifting the Focus on BVDV

Vaccination Alone Not Eradicating This Bovine Virus

Microbiologist Julia Ridpath of ARS's National Animal Disease Center says that, as they exist today, vaccine and voluntary control programs aimed at eradicating bovine viral diarrhea virus (BVDV) in the United States are not working.

"Decades of trying have shown that vaccination as a stand-alone solution is not the answer," says Ridpath, of the Ames, Iowa-based center's Virus and Prion Diseases of Livestock Research Unit. "Available vaccines don't protect animals for their entire lives, leaving windows of vulnerability in the face of constant exposure."

She adds that organized vaccination, prevention, and awareness "is a patchwork of efforts at best, with no regulation or certification programs in place."

Ridpath says an extensive management program encompassing vigilance, biosecurity education, and continued research is needed. "Preventing introduction into a herd is just as important as giving the animals vaccines."

There's no treatment for BVDV, which annually costs U.S. cattle producers millions of dollars in losses. It causes diseases that affect animal reproduction and nutrition, milk output, and respiratory function.

In pregnant cows, BVDV infection can cause spontaneous abortion or premature birth. Calves born with it remain persistent carriers that, if not removed, can infect herds throughout their entire lives.

"Infection can be hard to detect just by looking at an animal," says Ridpath. "The most beautiful of animals can be persistently infected."

She says it's possible to see abortion storms and herd-health crashes, "but

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Ear notch samples are becoming a popular and effective method of screening cattle. With minimum stress to the animal, microbiologist Julia Ridpath and animal caretaker Bruce Gray collect a sample to test for virus presence.

what's commonly seen is well-managed herds with poor performance. Profit margins are reduced through lower milk yield, increased secondary infections requiring veterinary treatment, and increased fetal and calf mortality."

A new focus would include recent research by unit microbiologist John Neill in which technology originally developed for cancer studies in humans is being applied against BVDV in animals.

Using SAGE

Neill is using serial analysis of gene expression (SAGE), a technology developed in the mid-1990s for detecting gene-expression alterations that tell how cancer cells differ from normal cells.

Neill is using SAGE on cattle to compare gene expression in normal cells and BVDV-infected cells. He's studying the virus's pathology and immunosuppressive properties and how it establishes persistent infections. This work may lead to a simple serum test for rapidly detecting persistently infected animals.

Ridpath recently launched a study with the Northeast Iowa Community-Based Dairy Foundation in Calmar, Iowa, focusing on newborn calves' response to BVDV vaccination. This study is the subject of a cooperative research and development agreement that runs through 2006. — By **Luis Pons**, ARS.

This research is part of Animal Health, an ARS National Program (#103) described on the World Wide Web at www.nps.ars.usda.gov.

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Microbiologist John Neill (left) and technician Bill Boatwright load samples into a fluorescent real-time thermocycler to measure levels of mRNAs present in BVDV-infected cells. This data is used to confirm results obtained from SAGE analysis of the same cell population.