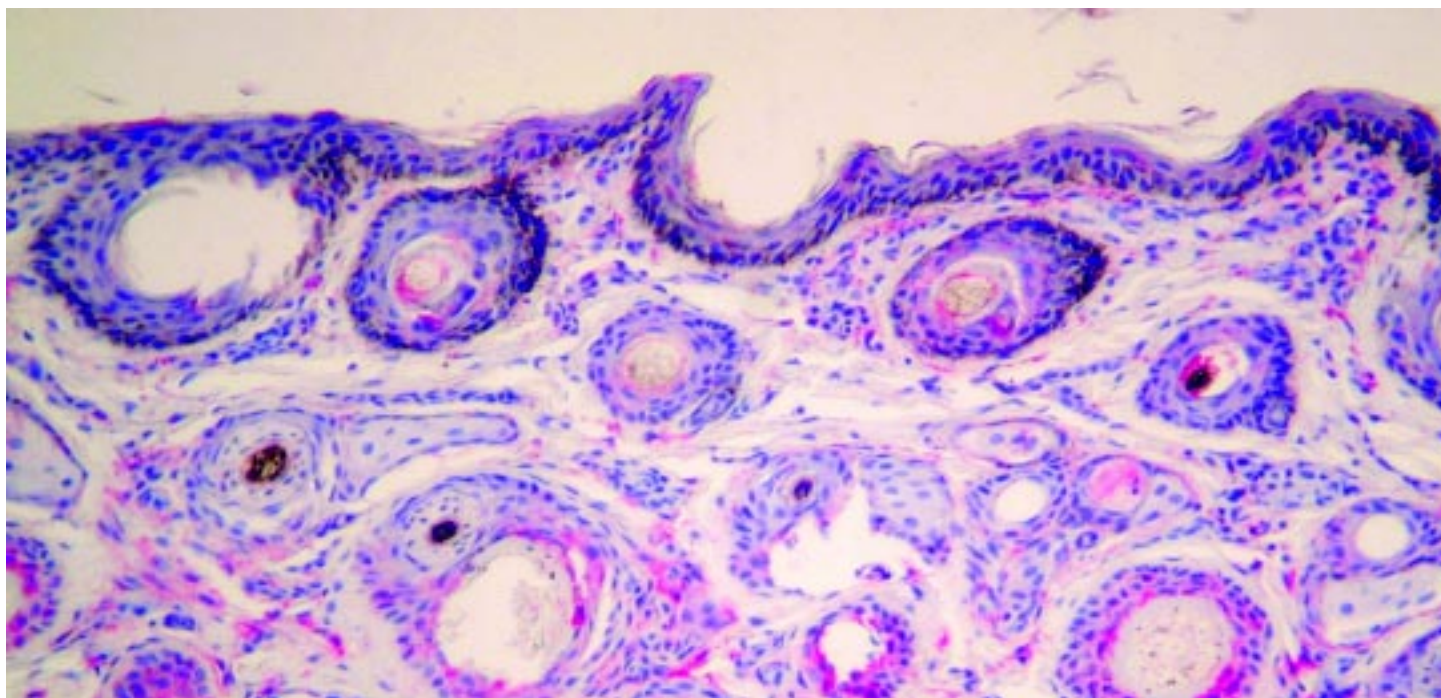


Detecting a Virus in Calves

To reduce economic losses from a livestock virus you need to know how the disease is spreading, and which animals are carrying it. Research underway at the University of Arizona Veterinary Diagnostic Laboratory (AzVDL), in cooperation with participating ranches in southern and south-central Arizona, will help veterinarians and ranchers understand more about the prevalence of bovine viral diarrhea virus (BVDV) in dairy and feedlot herds.

A single cow or calf infected with BVDV can compromise the health of the entire herd, causing thousands of dollars in losses. So many other illnesses can result in cattle that are weakened with BVDV that it's difficult to determine the true extent and cost of losses due to the virus. Although the acute form of the disease may be mild and the animal may appear to have recovered, it can remain persistently infected (PI) and spread the virus in the dairy or feedlot, reducing milk production, retarding growth, causing reproductive failure, reducing immunity against other diseases, and increasing early mortality in calves.

PI cattle can shed the virus in nasal mucus, saliva, urine and feces, even though they may not appear sick. By detecting these infectious animals early enough through testing, it may be possible to reduce the incidence of the disease.



Matthew McDaniel

Slice of ear tissue placed on a slide and stained reveals the presence of bovine viral diarrhea virus in the areas stained red.

A cooperative project with Arizona ranches and dairies

By Susan McGinley

Matthew McDaniel, a graduate student and AzVDL technician/research assistant, is working with Arizona Extension veterinarian Peder Cuneo; animal sciences associate professor Glenn Duff; AzVDL research scientist Robert Glock; and Veterinary Science and Microbiology department head Jim Collins to identify PI-BVDV dairy and feedlot calves.

The test group involves approximately 3000 dairy calves and 3000 beef calves.

"Not enough studies have been done on BVDV," McDaniel says. Although the prevalence of calves persistently infected with BVDV tends to be low in southern Arizona, it's not clear how many calves below breeding age actually have it. "We're looking for persistently infected animals among Holstein calves in dairies, and composite and purebred beef calves in feedlots."



Ear notch sample taken from calf for BVDV testing.

Beef ranchers are facing increasing challenges in dealing with BVDV; some feedlots will not accept cattle without a negative test for BVDV.

The researchers are employing an immunohistochemistry (IHC) protocol to test the calves.

"We use a tool similar to an ear-tagging device to take a small notch out the calf's ear," Cuneo says. "This tissue is immediately fixed in formalin and taken back to the laboratory where it is sliced and mounted on glass slides for treating and staining."

IHC methods test for the presence of certain proteins associated with the virus in cells or tissues.

"We use antibodies on the tissue, add a substrate to make it fluoresce, and examine the slide under a microscope," McDaniel says. "Cells stained red indicate the presence of the virus." This method can even be used on stored tissues.

"The advantage of using IHC is that you can go back to a tissue slide you collected 20 years ago, stain it, and find what you're looking for today," Cuneo says.

The testing is part of an overall strategy that includes measuring the performance of Holstein steers in crates, steers in neighboring crates, and performance in feedlots after removal from crates, if possible. The scientists will also attempt to identify the

virus source herd for Holstein steers.

For dairy calves that test positive for BVDV, follow-up virus isolation samples will be taken, and the calves will be watched for 60 days, with any deaths recorded. The location (hutch) where the calf was held will be observed for related herd deaths. The participating calf growers have agreed to retain any PI animals to determine their performance and the performance of pen mates.

If possible, the study will include following the calves to stocker or feeder operations in the case of beef calves, or until they leave the calf ranch, in the case of dairy calves.

The sampling began in fall 2004 after weaning. Although the full set of data won't be available until later in 2005, the producers involved in the study will be informed as the study progresses.

"As we get samples we'll run them within a week or so and then relay the results to the dairies," McDaniel says.

The researchers intend to define the impact BVDV has on the Arizona cattle industry, and develop a plan of action to eliminate or minimize the problem in the state.

"What we're doing involves getting the information out at the end," Cuneo says, "to get it back to the producers so they can do something with it." 📧

Pathobiology Graduate Program Applied MS Track

Graduate student/technician Matthew McDaniel is conducting his research on bovine viral diarrhoea virus as part of a new, more business or industry-oriented master's program offered through the Department of Veterinary Science and Microbiology. Faculty in the department offer graduate training programs in both a basic research track and in this business-oriented applied track.

The MS degree in Pathobiology, Applied Track addresses the interests of students in applied research. Veterinary science involves a variety of basic science disciplines within animal health and disease, many of which are related to businesses such as animal production, health-related products, and disease control. Microbiology is one of the basic foundation sciences of the rising biotechnology, pharmaceutical, and biologics industries. This program includes business courses that will provide students with basic business management skills.

The applied track is a rigorous educational graduate track with required course work in both science and business and includes an applied/field project and report. The project is directed by one or more faculty, and may involve aspects of field work, product development and/or evaluation, or clinical research.

The intent of the program is to train qualified students to respond to society's increasing needs in the rapidly changing applied biosciences including veterinary medicine, biotechnology, public health, and food safety.

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