

CORNELL CHRONICLE

Veterinary college develops vaccine for Johne's disease

By Stephanie Specchio | December 5, 2008

Scientists at Cornell's College of Veterinary Medicine have developed a vaccine that prevents Johne's disease, a condition that leads to \$220 million to \$250 million in losses annually to the U.S. dairy industry. The breakthrough will be published in the January 2009 issue of the journal *Vaccine*.

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Johne's disease (pronounced yo-knees) is a contagious, chronic and usually fatal bacterial infection that mainly infects the small intestine of such ruminants as cattle, sheep and goats as well as farm-raised deer, elk, llamas, alpaca, bison and zoological wildlife.

Until now, the only way to prevent the disease was to identify and cull infected animals and then prevent the spread of the disease with management changes. The Cornell team identified and prepared the antigen necessary for the vaccine development. Their antigen is licensed to the Biotechnology Research and Development Corp.

"Johne's disease is one of the most important infectious diseases that threatens farmers," said Yung-Fu Chang, Cornell professor of microbiology and the paper's lead author. "Equally important, though, this organism has been suspected to be one of several possible contributing agents to Crohn's disease that has similar pathologic lesions in people. The results of our research may offer useful information to those working with Crohn's disease."

Johne's disease is caused by the *Mycobacterium avium* subspecies *paratuberculosis*, a hardy bacterium known to survive for up to a year in the outside environment, and related to the agents of leprosy and tuberculosis. Found worldwide, the bacterium causes a thickening of the intestinal wall that blocks the normal absorption of food. Infected animals eat normally but cannot absorb any nutrients, which results in wasting and death.

Infected animals shed the bacteria in their manure and spread the disease. Other animals get infected through contaminated feed or water. Newborns and young animals can catch the disease through contaminated teats or directly from an infected mother's colostrum or milk. Unborn calves are also at risk of infection while in the uterus of an infected cow.

The disease is very hard to control; farmers may keep their barn areas spotless only to have their animals contract the disease in contaminated pastures, Chang said.

The research was funded by grants from the Biotechnology Research and Development Corp., and a contract through a cooperative agreement between the New York State Department of Agriculture and Markets and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service.

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