Age and Dose Dependent Susceptibility to *Mycobacterium avium* subsp. *paratuberculosis* Infection in Dairy Cattle

Rienske Mortier, Herman W. Barkema, Karin Orsel, Gwen Roy, Robert Wolf, Jeroen De Buck

Department of Production Animal Health, Faculty of Veterinary Medicine, University of Calgary, 3330 Hospital Dr NW Calgary AB T2N 4N1
Email: rarmorti@ucalgary.ca

Johne's Disease (JD) is caused by *Mycobacterium avium* subsp. *paratuberculosis* (MAP) and is a chronic wasting disease with chronic diarrhea, which results in severe production losses. Since no treatment is available, the focus is on prevention and control strategies. Control strategies have been directed towards prevention of infection of young calves. One of the weaknesses of this approach is that it is predominantly based on a paper, published in 1975, where the low number of animals included in this experiment makes a weak basis for assumption of age related susceptibility.

We have executed an infection trial in which we aimed to identify the age and dose at which calves are susceptible. Fifty-six Holstein-Friesian calves were experimentally infected at 5 different ages (14 days, 3, 6, 9 & 12 months), and in each age group animals were infected with a low and a high dose of MAP bacteria. All calves were euthanized at 17 months of age to determine the infection status. Results indicate that fecal shedding is present in all age groups, which suggests also older animals are susceptible to MAP infection.

A MAP-specific IFN-gamma response was detected in all age and dose groups as of 2 months post-infection, with the high dose groups responding higher than the low dose groups. The IFN gamma test may offer a powerful tool for detection of positive animals soon after infection.

Antibody titers were detected in some animals in all infection groups, but for the high dose animals as soon as 3 months after infection. This detection of antibodies in the earlier stages of JD may be important for diagnosis of JD.

At necropsy, macroscopic and microscopic lesions were present in all age groups, but the high dose animals were significantly more affected.

Implications: No decrease of susceptibility for MAP infection was observed within the first 1 year of age in dairy calves. A higher infection dose results in severe lesions at necropsy.