

Age and Dose Dependent Susceptibility to *Mycobacterium Avium* Subsp. *Paratuberculosis* in Dairy Cattle

Rienske Mortier, Karin Orsel, Herman W. Barkema, Michelle Drissler, Gordon Atkins, 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 can be described as a chronic wasting disease with chronic diarrhea, which ultimately results in death. In Canada, JD is estimated to cause a loss of CDN\$ 15 million annually in the dairy industry. In Alberta, herd-level prevalence of MAP-infection is at least 50%. Historically, MAP control was based on test and cull (removal of test-positive animals), but this technique was not very successful because of the low sensitivity of diagnostic tests in the early stages of the disease. Control strategies have been redirected towards prevention of infection of young calves. One of the weaknesses of this approach is that it is based on a study that was published in 1975 where the experiment only contained 9 animals (5 calves and 4 adults) in total. The low number of animals included in this experiment make a weak basis for prevention programs.

In this experiment, we aim to identify the age at which calves are susceptible to doses corresponding to environmental contamination by low and high shedding animals. Additionally, we will determine the shedding regimes and the onset of detectable immune responses against MAP depending on age at infection and infection dose. Sixty-six Holstein-Friesian calves will be infected at 5 different ages (14 days, 3, 6, 9 & 12 months); in each age group animals will be infected with a low and a high dose. Blood, serum, and fecal samples will be routinely collected to detect shedding and MAP-specific immune responses. All calves will be euthanized at 18 months of age and extensive sampling will be performed to analyze the disease status and dissemination of the bacteria in the animals.

The trial started in January 2010, the animals are 14 months old now and the first results are very promising. Necropsies are planned for the summer of 2011 and in June 2011 the second and last batch of calves will be started.

Implications: A clear understanding of which animals are susceptible will allow designing meaningful JD prevention and control programs.