

Age and dose dependent susceptibility to *Mycobacterium avium* subsp. *paratuberculosis* infection in dairy cattle

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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 are executing a clinical infection trial in which we aim to identify the age and dose at which calves are susceptible. Fifty-six Holstein-Friesian calves are 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 will be euthanized at 18 months of age to determine the infection status (planned for November 2012).

Preliminary results indicate that fecal shedding is present in most 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 lesions were present in all age groups, but the high dose animals were significantly more affected.

Implications: It seems animals over 6 months of age are still susceptible to MAP infection, but the infection dose has a high impact on progression of JD.