

# Inhalation as Route of Transmission for *Mycobacterium Avium* Subspecies *Paratuberculosis*

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Johne's disease (JD) is a chronic enteritis of cattle caused by *Mycobacterium avium* subsp. *paratuberculosis* (MAP). It is a non treatable disease important in cattle and results in intermittent diarrhea, loss of body condition, and lower productivity. Understanding the routes of transmission for MAP is very important to control the disease dynamics. The well-established transmission route of MAP is the oral uptake of the bacteria by susceptible calves, via colostrum, milk, water or food contaminated with feces from cattle shedding MAP. Modern MAP control programs focus on interruption of this route. Studies modeling MAP transmission on dairy farms and a long-term follow up of a dairy farm indicate that advised prevention measures reduce MAP prevalence but do not always lead to elimination. Recently, viable MAP was found in dust of cattle housing making inhalation of MAP another possible route of transmission.

The objective of this study is to test whether inhalation of MAP leads to MAP infection in calves, either through transtracheal inoculation or aerosolized MAP inoculation. Twelve calves will be collected and assigned to 3 groups; 3 calves will be infected with MAP by aspiration of aerosolized bacteria (group A), 3 calves will be infected by intra-tracheal tube (group B). Another 6 calves will serve as positive (3; oral inoculation) and negative (3) controls. The challenge will be performed with a trickle dose. Blood and fecal samples will be collected to detect immunological changes and MAP shedding. Animals will be euthanized 3 months after challenge and extensive tissue sampling will be performed. The study started in January 2011 and results will be available in the fall of 2011.

**Implications:** Identifying unknown and uncontrolled routes of MAP transmission will help to optimize MAP control programs.