Post-exposure vaccination with multi-stage vaccine significantly reduce map level in tissues without interference in diagnostics

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POST-EXPOSURE VACCINATION WITH MULTI-STAGE VACCINE SIGNIFICANTLY REDUCE MAP LEVEL IN TISSUES WITHOUT INTERFERENCE IN DIAGNOSTICS

A new (Fet11) vaccine against paratuberculosis based on recombinant antigens from acute and latent stages of Map infection was developed to be used without interference with diagnostic tests for bovine TB and Johne's disease.

Calves were orally inoculated with 2x10E10 live Map in their third week of life and randomly assigned to four groups of seven calves each. One group was left unvaccinated, while other calves were post-exposure vaccinated with either a whole-cell vaccine at 16 weeks, or Fet11 vaccine at 3 and 7, or 16 and 20 weeks of age, respectively. Antibody responses were measured by ID Screen® ELISA and individual vaccine protein ELISAs along with FACS and IFN-γ responses to PPDj and to individual vaccine proteins. At termination 8 or 12 months of age, Map burden in a number of gut tissues was determined by quantitative IS900 PCR and histopathology.

Fet11 vaccination of calves at 16/20 weeks returned a 1.1 $\log_{10}$ reduction of Map burden compared to non-vaccinated animals ($p<0.05$). Non-significant reduction was observed in early Fet11 and whole-cell vaccinated calves. Antibody and CMI responses corroborate observed vaccine efficacy: Six of the seven (85%) non-vaccinated calves seroconverted in ID Screen® ELISA indicating the progression of infection, while only three of 14 (20%) Fet11 vaccinated calves seroconverted. PPDj induced IFN-γ responses also increased over time, but Fet11 vaccinated calves had significantly reduced responses in PPDj IFN-γ assay from 40 to 52 weeks compared to non-vaccinated calves. All 14 Fet11 vaccinated calves were negative in both single and comparative tuberculin testing. All whole-cell vaccinated calves seroconverted after vaccination, and four and one animal tested positive in the single and comparative tuberculin skin test, respectively. These results indicate the Fet11 vaccine can be used to accelerate eradication of paratuberculosis while surveillance or test-and-manage control programs for TB and JD remain in place.