# Serological Response to Administration of Brucella Abortus RB 51 Vaccine, Using Needle-Free and Standard Needle-Based Injection System

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## Introduction

Over 4 millions calves per year are vaccinated against Brucella abortus in the United States annually. Given that accidental exposure to the vaccine (e.g. by needle-stick) may be associated with adverse side-effects in humans, consideration of alternative vaccine delivery methods is worthwhile. The objective of this study was to compare the immunologic responses of 4-6 month-old dairy and beef heifers to vaccination with 1010 CFU of Brucella abortus RB51 (SRB51) delivered either by standard needle-and-syringe system or needle-free injection system.

## Materials and Methods

A total of 135 calves (74 beef and 61 dairy) were randomly assigned to 4 different treatments: needle-free vaccination, standard needle vaccination, needle-free control, and standard needle control. Blood serum was collected and analyzed to assess humoral immune response to vaccination at day 0 and at day 30, using an ELISA. Whole blood was analyzed for interferon production by ELISA assay at day 90.

## Results

No adverse reactions were noted in any of the treatment groups. Antibody titers for needle-free and standard needle vaccination groups at day zero were significantly different from antibody titers at day 30. Administration method did not affect serologic response to SRB51 at day 30 ($P>0.05$). The breed type did not affect the serologic response to SRB51 using needle-free injection, at day 30.Gamma interferon production at day 90 did not differ between the control and vaccinated groups.

## Significance

The data suggests that the response of calves to vaccination with SRB51 using a needle-free injection system is similar to the response obtained with standard needle-and-syringe system. The vaccination of SRB 51 with a needle-free injection system may be an alternative to standard needle injection. This could result in fewer accidental human needle-stick injuries, elimination of the risk of residual needle and fragments in carcass, reduction of stress in vaccinated animals, reduction of medical waste and improvement of safety with increased accuracy of product administration. Given that the cellular immunologic response could not be established with certainty, additional challenge studies need to be done to fully evaluate the efficacy of the needle-free vaccination to prevent infection with B. abortus.