Evaluation of a Novel Vaccine Consisting of Siderophore Receptor Proteins and Porins for Controlling Salmonellosis in a Commercial Dairy Herd

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Introduction

The purpose of this study was to determine the safety of an autogenous subunit vaccine consisting of a highly purified preparation of siderophore receptor proteins and porins (SRP-P) derived from *Salmonella bredeney*. The organism was isolated from a commercial dairy herd showing severe clinical signs of salmonellosis: acute enteritis and septicemia resulting in high adult and calf mortality and morbidity. The vaccine was given to all cows (n=125) in the herd. The experimental trial examined the safety of the immunizing composition based on tissue reactivity of the injected material at the site of injection; loss of milk production after vaccination; serological response to vaccination; and effect on the incidence of salmonella within the herd.

Materials and Methods

Siderophore receptor proteins (iron-regulated proteins) and porins have been shown to be highly conserved between members of the family Enterobacteriaceae, making them likely vaccine candidates. The vaccine was prepared from SRPs having molecular weights of 89 kDa, 84 kDa, 72 kDa, 37 kDa, 32 kDa and 29 kDa proteins, and porins having molecular weights of 38-39 kDa. The vaccine was given to all cows (n=125) in the herd and boosted at 5 and 19 weeks after the first vaccination. Fecal samples were taken from all lactating cows (n=55) at the time of the first vaccination (Day 0) to establish a level of *Salmonella* within the herd and again at 3, 7, 11 and 21 weeks post-vaccination. In addition, 20 blood samples were taken from the lactating cows beginning at Day 0 and again at 3, 6, 7, 11, 16 and 21 weeks post-vaccination to evaluate serological response of the vaccine.

Results

Salmonella bredeney was initially isolated from this herd in January 1999. The severity of disease continued to escalate up to the point of first vaccination (July 27, 2000). At this point, fecal samples taken from all lactating cows (n=55) revealed an isolation rate of 85.4%. All *Salmonella* isolates were serotyped and found to be *Salmonella bredeney*. The prevalence of *Salmonella* was monitored throughout the experimental trial as well as individual somatic cell counts, mortality and morbidity, serological response to vaccination, adverse tissue reaction at the site of injection and milk production. These and other results will be discussed in greater detail.