



Knowledge

Temperature Response of Calves Vaccinated with Arsenal® 4.1

Introduction

After vaccination with a modified live respiratory vaccine, cattle sometimes exhibit fevers – commonly called “sweats” – as their immune systems process the replicating MLV antigens. A temperature spike and accompanying stress may cause animals to go off-feed, potentially reducing gains and making them susceptible to other diseases.

Calves affected by post-vaccination fevers, or pyrexia, generally recover within a few days. However, feedlots may incur additional expense if fever diagnosis causes these

animals to be pulled for unnecessary disease treatment. Therefore it can be beneficial to protect calves from respiratory disease without inducing fever.

This study was undertaken to determine whether or not Arsenal 4.1, a four-way modified live vaccine, causes body temperature to rise following vaccination.

Protocol

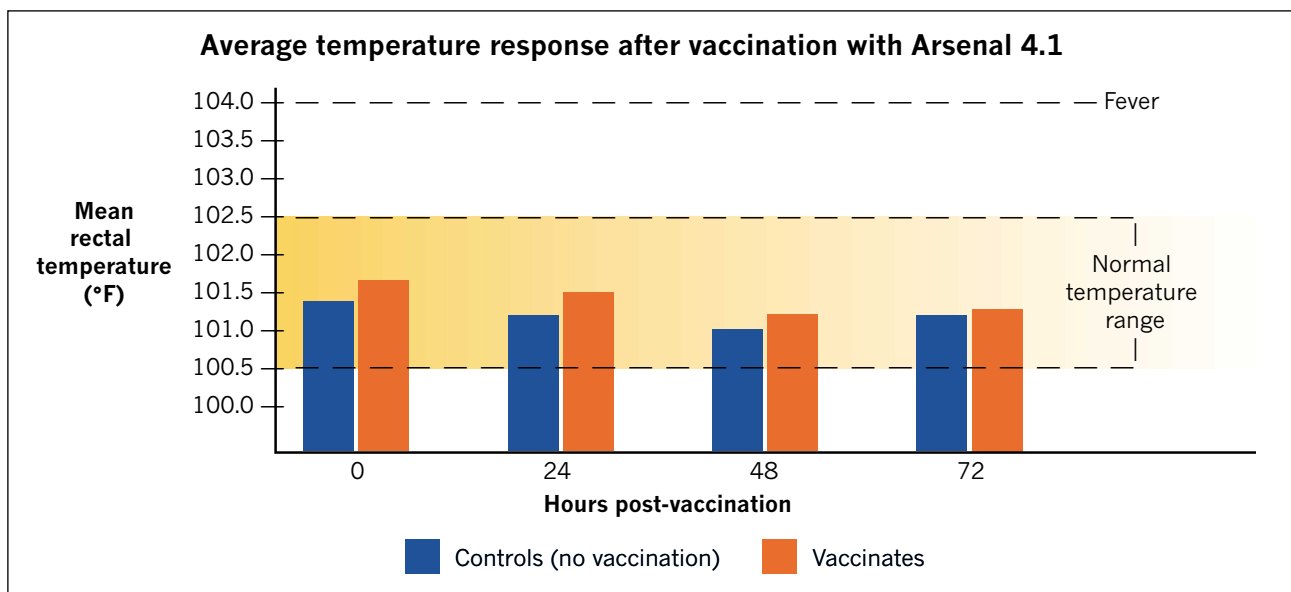
The randomized study group consisted of 40 Holstein steers and heifers, ranging in age from six to eight months of age and weighing about 500 pounds each. Thirty calves were vaccinated with Arsenal 4.1

from three different serials. The remaining 10 calves were unvaccinated controls. Arsenal 4.1 was administered subcutaneously as a single 2-mL dose, according to label directions.

Researchers recorded rectal temperatures on all calves prior to treatment and continued to monitor temperatures at 24, 48 and 72 hours after vaccination. A fever was defined as a temperature of 104.0 F or higher. Study personnel were blinded to treatments.

Results

There was no significant difference in body temperature between vaccinated and control



Average temperature response after vaccination with Arsenal 4.1

Mean rectal temperature (°F)

| | Pre-vaccination | 24 hours post-vaccination | 48 hours post-vaccination | 72 hours post-vaccination |
|---------------------------|-----------------|---------------------------|---------------------------|---------------------------|
| Controls (no vaccination) | 101.4 | 101.2 | 101.0 | 101.2 |
| Vaccinates | 101.7 | 101.5 | 101.2 | 101.3 |

animals. All temperatures were within the normal range (defined as 101.5 F, plus or minus 1 degree.)¹ Furthermore, no signs of stress were observed in the vaccinated calves.

Discussion

Previous research² proves that Arsenal 4.1 is effective against BVD and other respiratory diseases. This study demonstrates that the vaccine does not contribute to a body temperature increase after vaccination.

The non-pyrogenic nature of Arsenal 4.1 may be related in part to its noncytopathic (NCP) BVD. Arsenal 4.1 contains NCP Type 1 BVD, while most other modified live virus products contain cytopathic (CP) Type 1 BVD. The NCP biotype is the most predominant BVD virus found in cattle^{3,4} and is the leading cause of BVD-linked respiratory disease in calves.⁵

Research demonstrates that the bovine immune system responds differently to NCP and CP biotypes. CP strains induce an immune response that is more likely to be pyrogenic. Lambot, et al. reported that the NCP biotype produced a significantly higher and more rapid antibody response than the CP virus.⁶ A follow-up study by Lambot demonstrated the impact of BVD NCP biotype having a greater protective effect on viraemia.⁷ More research is needed to confirm the relationship between post-vaccination fevers and BVD biotypes.

Conclusion

Based on this study, calves do not develop fevers within 72 hours after vaccination with Arsenal 4.1.

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4. Dubovi E. *Comp Immun Microbiol Infect Dis.* 1992;15:155-162.
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