Disease Protection and Immunogenicity of Two Commercial Intranasal Vaccines Evaluated with a BHV-1 Challenge of Weaned Beef Calves.

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INTRODUCTION

- Intranasal vaccines are frequently used to prevent early bovine respiratory disease (BRD).
- Several commercial vaccines are available.
- Apparently similar vaccines may have different features.
- Vaccines can only be correctly compared when used in a similar situation.

OBJECTIVE

This study compared both immunogenicity and disease protection between 2 commercial intranasal vaccines

(Nasalgen® IP and Inforce 3®), when used in beef calves and challenged with BHV-1.

MATERIALS AND METHODS

See **Fig. 1**.

One hundred and six, 4 to 10 week-old calves at processing were randomly assigned to five intranasal treatment: Group A - vaccine diluent at processing and weaning / Group B – NasIP (Nasalgen IP®) at processing and booster at weaning / Group C – vaccine diluent at processing and primary NasIP at weaning / Group D- Inf3 (Inforce 3®), at processing and booster at weaning / Group E –vaccine diluent at processing and primary Inf3 at weaning.

All calves were removed from dams at 5- 6 months of age and 14 healthy, BVDV negative calves from each group were shipped the same day from the ranch to the research station. The day after arrival, calves received the designated weaning vaccination.

Three days later all calves were aerosol challenged with BHV-1 and monitored daily for clinical respiratory signs, body weight, and rectal temperature. Nasal secretions and serum samples were collected to quantify innate and acquired immune responses.

Primary vaccination with Bovilis® Nasalgen® IP resulted in a more rapid onset of reduction in virus shedding compared to primary vaccination with Inf3. Primary Nasalgen® IP vaccination resulted in a significant reduction in the number of days virus was shed but primary Inf3 vaccination did not. Boostered Nasalgen® IP group was the only group to have a measurable serum IgG response.

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RESULTS

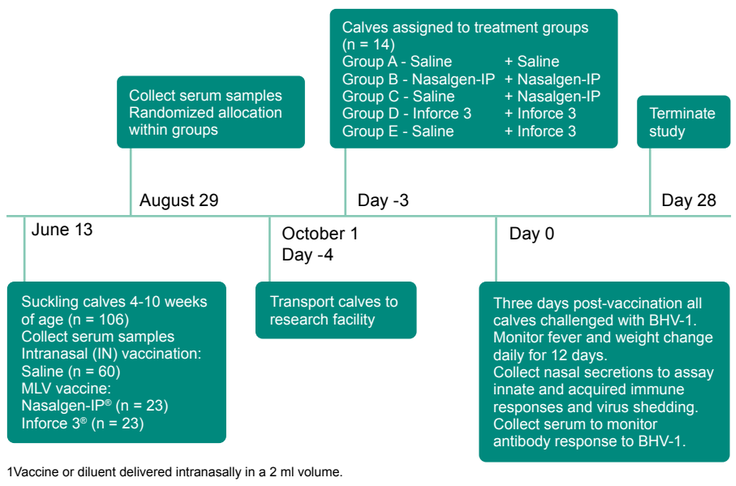
Analyses of clinical responses following BHV-1 challenge revealed mean rectal temperatures **(Fig. 2)** among all vaccinated animals were significantly lower than diluent controls and only the control group exhibited weight loss post BHV-1 challenge.

Also, all vaccination groups shed less virus than control calves **(Fig. 3)**.

Primary vaccination with NasIP resulted in a more rapid onset of reduction in virus shedding compared to primary vaccination with Inf3 (Day 3 vs. Day 6).

Only Group E (Inforce3 prime) showed no significant difference (p=0.197) in virus shedding days vs. controls. The Nasalgen IP booster group (Group B) displayed significantly higher serum IgG antibody titers three days after booster vaccination (time of challenge) compared to all other vaccine groups (p<0.0003) **(Fig. 4)**.

FIGURE 1. Study design for analyzing immune memory following intranasal (IN) vaccination of neonatal calves with a modified-live viral (MLV) vaccine.



1Vaccine or diluent delivered intranasally in a 2 ml volume.

FIGURE 2. Change in body temperature following BHV-1 aerosol challenge.

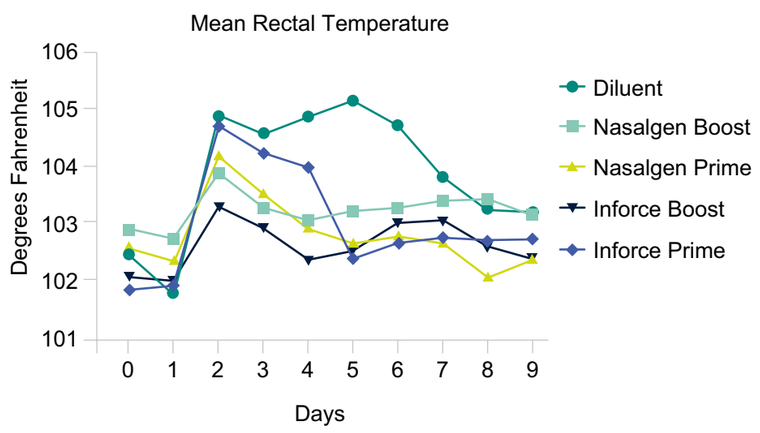


FIGURE 3. Viral shedding following BHV-1 aerosol challenge.

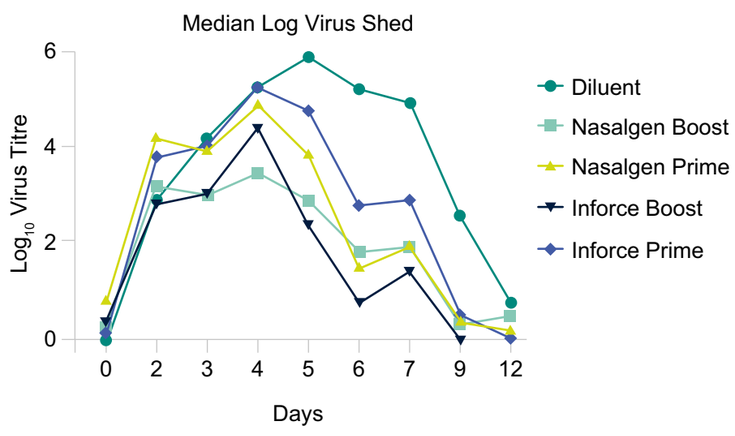
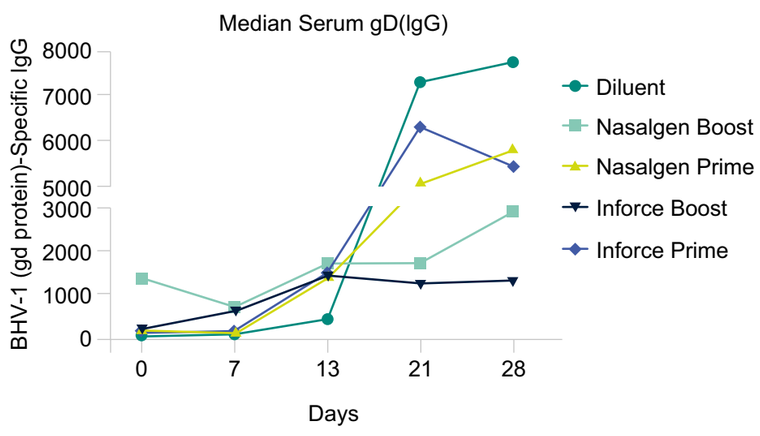


FIGURE 4. Concentration of IFNγ in nasal secretions following BHV-1 infection.



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