INFECTIOUS DISEASES

Mucosal and Systemic Immune Responses Following Intranasal Vaccination of Holstein Heifer Calves With Either a Bivalent Modified-Live Bacterial Vaccine or a Vaccine Containing the Same Bacteria and Three Modified-Live Viruses

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INTRODUCTION

Intranasal (IN) vaccination with modified-live viral (MLV) vaccines provides an effective strategy to capitalize on rapid development of the mucosal immune system in the upper respiratory tract (URT) of neonatal calves. Questions remain, however, about the immunogenicity of IN modified-live (ML) bacterial vaccines.

OBJECTIVE

This study was designed to evaluate immune responses to Mannheimia haemolytica (MH) and Pasteurella multocida (PM) when Holstein heifer calves received a single IN dose of a bivalent modified-live vaccine containing PM and MH versus a multivalent MLV vaccine co-formulated with both PM and MH.

MATERIALS AND METHODS

Holstein heifer calves (7 to 13 day old) fed colostrum

- **Group A:** not vaccinated
- **Group B:** bivalent (PMH)[1]
- **Group C:** multivalent (N3-PMH)[2]

Nasal secretions and blood were collected immediately prior to vaccination and weekly throughout a 35 days post-vaccination period. Deep nasopharyngeal swabs (DNPs) were collected immediately prior to vaccination and 35 days post-vaccination. Calves were scored weekly for signs of respiratory disease and diarrhea.

[1] Once ®PMH IN
[2] BOVILIS® Nasalgen® 3-PMH

The current study confirmed that both the Once PMH®-IN and Bovilis® Nasalgen® 3-PMH vaccines are immunogenic in young calves. There were no significant differences when comparing the local IgA antibody and systemic T lymphocyte responses induced by the bacterial components of these two vaccines.

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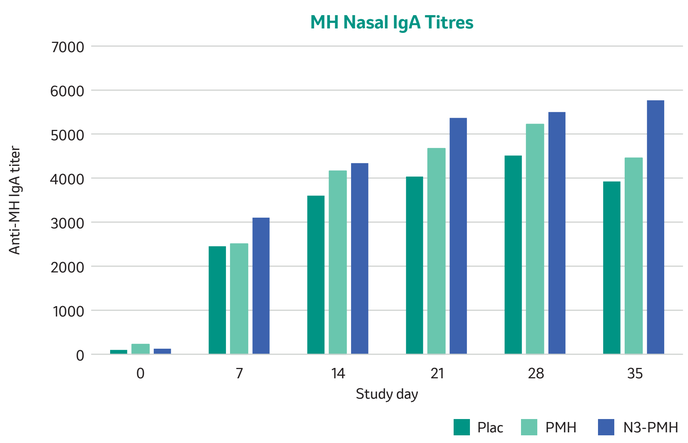
RESULTS

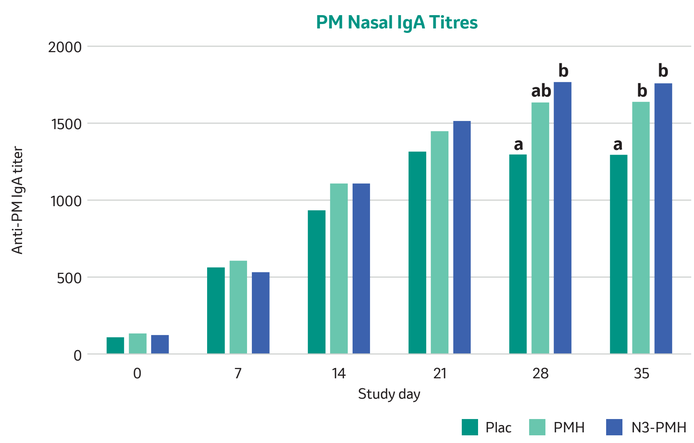
- MH-specific IgA antibody titres were determined. A significant ($p < 0.05$) time-dependent difference was identified within all groups when comparing post-vaccination titres with Day 0 **(fig. 1).** PM-specific IgA antibody titres were determined. A significant ($p < 0.01$) time-dependent difference was identified within all groups when comparing post-vaccination titres with Day 0. A significant ($P < 0.01$) treatment effect was observed when comparing among groups on days 28 and 35 post-vaccination **(fig. 2)**.
- T lymphocyte proliferation was measured comparing Day 35 to Day 0. Both vaccines induced significant increases in T lymphocyte proliferative responses induced by MH **(fig. 3)** and PM **(fig.4).**

FIGURE 1. *Mannheimia haemolytica* (MH)-specific IgA antibody titres in nasal secretions.



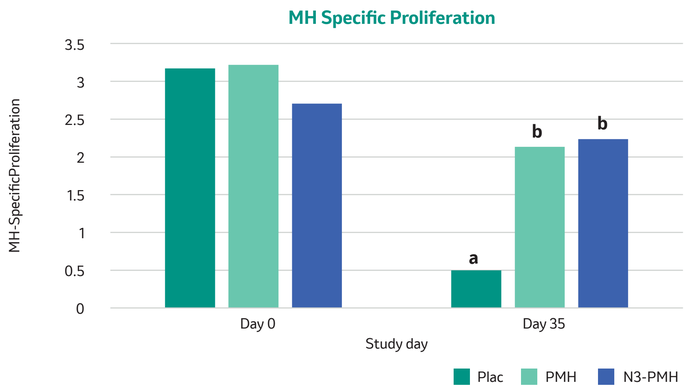
Data presented are mean

FIGURE 2. *Pasteurella multocida* (PM)-specific IgA antibody titres in nasal secretions.



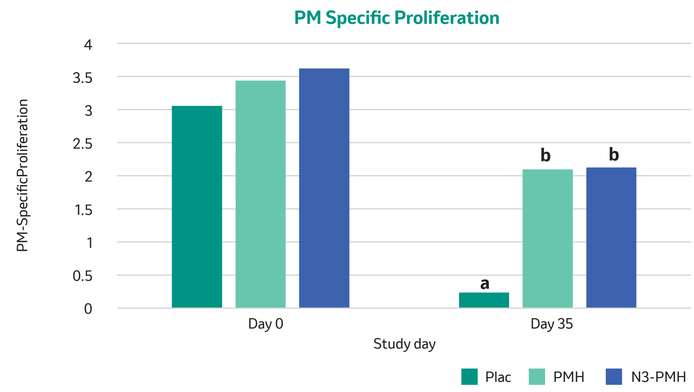
Data presented are mean
Significant differences among treatment groups are indicated by different letters (a,b)

FIGURE 3. Lymphocyte proliferative responses following *in vitro* re-stimulation of blood mononuclear cells.



T lymphocyte proliferation was measured with MH lysate.
An ANOVA was performed to compare time and treatment effects for each in vitro stimulus and significant ($p < 0.01$) differences among groups are indicated by different letters (a,b).

FIGURE 4. Lymphocyte proliferative responses following *in vitro* re-stimulation of blood mononuclear cells.



T lymphocyte proliferation was measured with PM lysate.
An ANOVA was performed to compare time and treatment effects for each in vitro stimulus and significant ($p < 0.01$) differences among groups are indicated by different letters (a,b).

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