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The effect of cross-fostering on the transfer of *Mycoplasma hyopneumoniae* maternal immunity from the sow to the offspring

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Introduction

Enzootic pneumonia, caused by *M. hyopneumoniae* is an important contributor to loss in the swine industry. Newborn pig management often includes cross-fostering. Previous studies have suggested that cross-fostering may hinder passive immune cell transfer (2, 3). Information on the impact of maternally derived (passive) immunity against *M. hyopneumoniae*, specifically the potential influence of cross-fostering on immunity to *M. hyopneumoniae in* the newborn pig, is critical. Therefore, the objective of this study was to evaluate the effect of cross-fostering piglets at different times on the transfer of cellular and/or humoral immunity to *M. hyopneumoniae*.

Materials and Methods

Gilts known to be naïve to *M. hyopneumoniae* were housed at a commercial farm. A group of gilts were vaccinated against *M. hyopneumoniae*. Piglets were cross fostered based on gilt vaccination status at 0, 6, 12 or 20h after birth. Two piglets were fostered per time point, thus 8 piglets per gilt were fostered and two piglets remained with their own mother. Blood was collected from piglets before and 24hr after colostrum ingestion. Blood was assessed for anti-*M. hyopneumoniae* antibodies using ELISA and blood lymphocytes were assessed for *M. hyopneumoniae*-specific lymphoproliferation. Delayed Type Hypersensitivity (DTH) testing was performed in 4-day old piglets and a representative sample of gilts as a measure of *M. hyopneumoniae*-specific cellular immunity.

Results and Discussion

Using ELISA and DTH testing as tools to assess humoral and cellular immunity only gilts that were vaccinated against *M. hyopneumoniae* developed humoral and cellular immunity to *M hyopneumoniae*. No piglets had humoral or cellular *M. hyopneumoniae*-specific immunity before colostrum ingestion. Non-cross fostered piglets from vaccinated gilts had *M. hyopneumoniae*-specific antibodies and some had *M. hyopneumoniae*-specific cellular immune responses at 24h. Non-cross fostered piglets from unvaccinated gilts did not have anti-*M. hyopneumoniae* antibodies at 24h and had negative *M. hyopneumoniae*-specific DTH responses. The proportion of piglets positive to *M. hyopneumoniae* ELISA is presented in the following table:

Tx/Time@fostering	0 hs	6 hs	12 hs	20 hs	Not fostered
Vax Control	-	-	-	-	10/10
Unvax Control	-	-	-	-	0/26
Vax to Vax	12/12	11/11	11/11	10/10	11/11
Vax to Unvax	0/10	10/10	10/10	9/9	9/9
Unvax to Vax	10/10	7/9	1/10	0/8	0/8

Piglets of vaccinated gilts that were cross fostered before 6 hr had negative *M. hyopneumoniae*-specific DTH responses. Two piglets from an unvaccinated gilt that were cross fostered onto a vaccinated gilt before 6 hr had positive *M. hyopneumoniae* DTH responses. Under the conditions of this study, anti-*M. hyopneumoniae* antibodies are transferred into piglets regardless of source as long as the piglet is fostered before 6 hr. The study indicates that *M. hyopneumoniae*-specific cellular immunity does not transfer into the piglet the same way as humoral immunity does. However, the role of immune cells and antibodies in protection for *M. hyopneumoniae* is yet to be understood.

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