

Persistence of maternally derived BVD virus antibodies in calves

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The information presented here was incidental to a trial undertaken to support a change in label claim for the registered product Bovilis® BVD (Intervet Ltd). It shows that maternally derived antibodies persist in some calves for longer than has previously been suggested.

The heifers were selected from a herd with a three-year history of low bulk milk BVD antibody levels and therefore with a low likelihood that BVD virus was circulating within the herd (Table 1).

On 18 April 2006 clotted blood samples were collected from the jugular vein of 76 heifers born in the spring of 2005 so that 30 BVD ELISA antibody (Ab) (Pourquier) negative heifers could be selected for the vaccination trial. In addition, all sera were pooled into groups of 10 and these were tested for BVD virus by polymerase chain reaction.

Sera were collected on 9 June from all calves that had positive or equivocal BVD ELISA Ab results in the April samples. These samples were retested for BVD Ab by ELISA.

Results

The farm's bulk milk BVD Ab history is summarised in Table 1.

Table 1: Farm BVD bulk milk test history

Date	Result
31 December 2003	10 – 30% BVD Ab
30 November 2004	10 – 30% BVD Ab
19 December 2005	<10% BVD Ab
14 March 2007	<10% BVD Ab

The BVD antibody ELISA results of the initial April screen of 76 heifers are summarised in Table 2.

Table 2: BVD Antibody ELISA results for 76 heifers

	BVD Ab Elisa		
	Positive	Equivocal	Negative
Result	9	12	55
Average age in days	260	260	255
(range)	(251-273)	(237-271)	(230-274)

The animals with the positive and equivocal Ab levels were all negative at the second sampling on 9 June at which time they were 289–320 days of age (average 312).

The PCR test was negative for all animals, confirming there were no PI animals in the group. The bulk tank milk Ab level remained low at <10% the following season, which further supports the belief that this herd is BVD virus free.

Discussion

The herd was selected because of its low level of exposure to BVD virus. The fact that less than 10% of the lactating cows had BVD antibodies and none of the replacement heifers were persistently infected confirms that BVD virus was not circulating within the herd. This implies that the antibodies demonstrated in the replacement heifers at the April sampling were derived from colostrum, not from postnatal exposure. This is also supported by the fact that the seropositive heifers became seronegative when resampled 52 days later. BVD virus antibodies from postnatal exposure essentially persist for the life of the animal¹.

This unexpected persistence of passive immunity, as measured by the BVD Ab ELISA, is longer than has generally been reported. The mean time to seronegativity in one study was 192 days or 6.4 months. However, the upper 95% confidence limit in this study was 9.4 months². Horner stated that 'maternal antibody can last up to eight months of age' but presented no data to support this³. Houe indicated that heifers could be bled from 8–18 months of age to determine if the group had been exposed postnatally⁴.

This study, using a herd with a low exposure rate, indicates that replacement stock 273 days or older (approximately nine months) still have maternally derived antibodies. Maternal antibodies may persist for even longer in herds that are actively infected with BVD because the colostrum is likely to contain higher concentrations. Calves will absorb more antibodies,

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which will take longer to decay. Therefore calves should be at least 12 months of age before it can be assumed that any antibodies present are derived from postnatal exposure.

This information is significant when groups of replacement stock are being tested to determine if BVD virus is spreading within a group of animals. Bleeding a subgroup of heifer replacements for antibodies has been advocated as a means of assessing whether BVD virus is actively spreading within a herd of cows³. Sampling heifers before maternal antibody levels have waned will give false positive results, which will have considerable consequences for any on-farm control programme. It is therefore strongly recommended to leave such sampling until the heifer replacements are at least one year of age.

References

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