

THE INDUCTION OF ANTIBODIES AGAINST VIAA IN CATTLE VACCINATED AND REVACCINATED WITH INACTIVATED FOOT-AND-MOUTH DISEASE VACCINE

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SHORT COMMUNICATION

The presence of antibodies to the virus infection associated (VIAA) antigen in sera of cattle has been interpreted to indicate these animals had been infected with foot-and-mouth disease (FMD) virus or have had the disease (5). Therefore countries and areas free from FMD limited the introduction of cattle to animals without antibodies to VIAA (5).

However the analysis of sera from cattle vaccinated or revaccinated with inactivated vaccines against FMD (1, 6, 7 and 9) showed that the vaccine induced antibodies against VIAA detectable by immunodiffusion in agar gel (IDAG) (8). The immunological response varies in intensity and is transitory.

In this experiment four trivalent vaccines (O₁ Campos, A₂₄ Cruzeiro and C₃ Indaial) were prepared with antigens produced in tanks with BHK21 cells. These antigens were treated with 2% chloroform, inactivated with binary ethyl-enimine (BEI) (4) and concentrated by adsorption to aluminum hydroxide gel, corresponding to 3.0, 9.0 and 27.0 ml of antigen (vaccines HA 3.0, HA 9.0 and HA 27.0 respectively). A vaccine was also prepared with regular antigen (not concentrated and oil adjuvant in a primary emulsion (3), with 2.5 ml of antigen per dose (OL 2.5) (Table 1). Several groups of 20 or 25 cattle 8-12 months old were immunized with these vaccines in a schedule as indicated in Tables 2 and 3. The sera of the different samples were studied by IDAG (2) and the results are given in tables mentioned before.

TABLE 1. Characteristics of vaccines used for cattle immunization

Vaccines	Ag/dose (ml)	Adjuvant	Vaccine/dose(ml)
OL 2.5	2.5	Oil	5.0
HA 3.0	3.0	AL(OH) ₃	5.0
HA 9.0	9.0	"	5.0
HA 27	27.0	"	5.0

TABLE 2. VIAA antibodies in cattle revaccinated once at 120 DPV

Vaccines	DPV				DPR		
	0	30	60	90	120	30	60
OL 2.5	0 ^a	0	0	0	0	0	0
HA 3.0	0	0	0	0	0	0	0
HA 9.0	0	0	0	0	0	2	0
HA 27	0	0	0	0	0	3	0

^aNo. of positive animals of the 21 used in each vaccine.
DPV = days after primovaccination.
DPR = days post-revaccination.

TABLE 3. VIAA antibodies in cattle revaccinated twice at 60 day intervals

Vaccines	DPV			DPR ^a		DPR ^b		
	0	30	60	15	30	60	30	60
HA 9.0	0 ^c	0	0	10	10	3	0	0
HA 27	0	0	0	14	14	3	1	0

^aFirst revaccination at 60 DPV.
^bSecond revaccination at 60 days after the first revaccination.
^cNo. of positive animals of the 20 utilized in each vaccine.
DPV = days after primovaccination.
DPR = days post-revaccination.

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The results in Table 2 show that a primovaccination with vaccines prepared by the usual process for production of aluminum hydroxide vaccines, even with high concentrations of antigen without purification, did not induce VIAA antibodies in the animals. In the sera of 30 days after revaccination (DPR), which had been done 120 days after primovaccination (DPV), only weak reactions were detected in 2 and 3 of the 21 animals vaccinated with aluminum hydroxide vaccines formulated with 9 and 27 ml of antigen respectively.

When the vaccines, which had given positive results for VIAA antibodies in the above mentioned experiment were used in a vaccination schedule with a 60 days revaccination interval, the results for VIAA antibodies were again negative at primovaccination. However sera collected at 15, 30 and 60 days after the first revaccination showed a high number of cattle with VIAA antibodies, mainly at 15 and 30 days of sampling. The second revaccination practically did not induce the formation of VIAA antibodies detectable by IDAG as only one animal vaccinated with the vaccine containing 27 ml of antigen was positive.

The results obtained confirm the data published by other authors (1, 6, 7 and 9) that inactivated vaccines prepared with high concentrations of antigen, which are usually applied in FMD control programs, can induce the formation of VIAA antibodies in cattle after revaccination. But the reactions are of short duration as 60 days after revaccination the number of positive animals is quite low. It was also observed that a revaccination interval of 60 days increased the number of VIAA positive animals. In contrast the disease induces strong VIAA antibodies which last for many months (1).

Finally it should be mentioned that after the second revaccination at 60 days only in one animal VIAA antibodies could be detected. It is possible that the VIA antigen was degraded somewhat since the vaccines were held in the refrigerator for 120 days for revaccination of cattle. New experiments will be conducted to elucidate these findings.

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